

# Victimization, Posttraumatic Stress Disorder, and Substance Use and Abuse Among Women

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## INTRODUCTION

Data from the Epidemiologic Catchment Area (ECA) Survey (Helzer et al. 1987) indicate a lifetime prevalence rate of 13.8 percent for alcohol abuse or dependence. Rates for women are substantially lower than those observed for men: 4.57 percent v. 23.83 percent lifetime and 2.16 percent v. 11.90 percent past year. Large differences in rates for men and women are likely to reflect both biological and social factors (Helzer et al. 1987). These data indicate the importance of examining the relative roles of biological and environmental factors in the etiology of alcohol abuse or dependence among women.

As reviewed by Rose (1995), data from population-based twin studies indicate large effects for genetic factors in women in the development of alcohol dependence. Percentages of variance accounted for by genetic factors ranged from approximately 0.50 to 0.67. Other findings indicated that smaller heritability quotients for women than for men may have been related to alcohol use among nonrepresentative clinical samples (Rose 1995). These data suggest the possibility of a substantial role for genetic factors in women's alcohol dependence and emphasize the importance of using epidemiological samples in the study of etiological factors.

In terms of environmental factors associated with alcohol dependence among women, researchers have begun to study associations between severe traumatic events and alcohol and other substance use or abuse. Several studies indicate that substance use disorders are more prevalent in individuals with a history of criminal victimization (Burnam et al. 1988; Cottler et al. 1992; Elliot et al. 1989; George and Winfield-Laird 1986; Helzer et al. 1987; Kilpatrick 1990; Kulka et al. 1990). For example, in a study of 3,125 Los Angeles residents that was

part of the National Institute of Mental Health ECA project (Burnam et al. 1988), lifetime rates of alcohol abuse or dependence were significantly higher among sexual assault victims than among nonvictims (18.38 percent v. 13.80 percent), as were rates of drug abuse or dependence (20.41 percent v. 5.49 percent).

Other studies of women seeking treatment for substance use disorders report high rates of violent assault among women with substance abuse problems (Brady et al. 1994; Cohen and Densen-Gerber 1982; Ladwig and Andersen 1989; Miller et al. 1987).

An important issue that has not been adequately addressed in such studies is the temporal sequence of substance abuse and violent assault. Because substantial evidence exists that violent assault can produce posttraumatic stress disorder (PTSD) (Breslau et al. 1991; Kessler et al. 1995; Kilpatrick et al. 1989; Resnick et al. 1993), another important issue in understanding the relationship between violence and substance abuse is whether PTSD and substance use and abuse are related. Kessler and coworkers (1995) reported that women with PTSD were 2.48 times as likely as women without PTSD to have alcohol abuse and/or dependence (27.9 percent v. 13.5 percent) and were 4.46 times as likely to have drug abuse and dependence (26.9 percent v. 7.6 percent). Thus, it is important to determine whether PTSD may mediate development of substance abuse after the crime and whether PTSD and substance abuse are independently associated with crime and to identify issues of chronology.

Extant findings of studies examining relationships among these variables have been contradictory. Burnam and associates (1988) observed a pattern representing a vicious cycle in which sexual abuse victimization was a significant risk factor for initial development of alcohol or other drug abuse or dependence. Substance abuse or dependence also significantly increased risk of subsequent sexual victimization. A measure of PTSD was not included in the study. In contrast to these findings, Cottler and colleagues (1992) reported that within a St. Louis sample of the ECA survey, substance use onset preceded and significantly predicted initial development of PTSD. Thus, they suggested that substance use probably increases risk of exposure to traumatic events that could lead to PTSD. They also found that cocaine or opiate abuse was particularly likely to be related to a history of traumatic events (Cottler et al. 1992).

An important factor that may relate to these contradictory findings is substantial differences in the methods used to assess history of sexual assault incidents. Burnam and colleagues (1988) included a screening question presented to all respondents that behaviorally defined the experience of forced sexual contact, ranging from molestation incidents to completed rape incidents. Their procedure did not use culturally loaded terms such as “rape” but instead specifically asked about touching of sexual parts of the body and sexual intercourse. In contrast, Cottler and coworkers’ (1992) procedure used solely the word “rape” in a more general assessment of any traumatic incidents a respondent may have experienced. This approach has been criticized as leading to great underestimates of true rates of sexual assault and rape because many women do not classify their actual experiences by using legal terms that are often associated with cultural stereotypes about these crimes (Resnick et al. 1993).

Resnick and associates (1993) suggested that studies using such terminology may lead to misinterpretations about chronology of traumatic events and the development of mental health disorders. Thus, one possible reason for the contradictory findings regarding the relationships among substance use or abuse, traumatic event history, and PTSD is the lack of sensitive assessment of sexual assault events, which often occur early in an individual’s life (Kilpatrick et al. 1992). Kilpatrick and coworkers (1992) found that of all rapes reported among a national sample of women, 29 percent occurred earlier than age 11. An additional 32 percent of all cases occurred when the women were 11 to 17 years of age. If such early events are missed, the absence of important historical information may in some cases mistakenly lead to the assumption that substance use or abuse precedes victimization by sexual assault or other trauma. Differing interpretations of findings could have important implications for understanding the etiology or maintenance of each type of problem. Similarly, such interpretations of relationships influence the development of intervention approaches and populations targeted for treatment.

In addition to discrepancies in approaches to assessment of traumatic event histories, extant studies of the relationship among substance abuse, trauma exposure, and PTSD in women have been retrospective, which limits interpretations about the chronology of critical variables. Finally, no studies that adequately address these issues have included a measure to

estimate the role of such stressors in conjunction with family history variables that may affect genetic and/or environmental factors.

An evaluation of family history, along with information about exposure to intrafamilial and/or extrafamilial crime at various ages, might yield important information about the chronology of critical variables and relative contributions of environmental and biological factors.

Addressing the temporal sequence of substance abuse, PTSD, and crime victimization in women requires a research design that includes the following elements: (1) use of a probability sample, not a treatment-seeking sample; (2) careful assessment of baseline history of violent assault and onset of substance use; (3) longitudinal followup assessment of study participants to detect new cases of violent assault and substance use or abuse; and (4) inclusion of an estimate of potential biological contributing factors to attempt to separate biological from environmental influences.

#### **NATIONAL WOMEN'S STUDY METHODOLOGY**

This chapter, which is based on the authors' National Women's Study, a longitudinal study of a nationally representative sample of women that was designed to address many of the aforementioned problems, includes the following:

- Presentation of descriptive information about the prevalence of violent assault, substance use or abuse, and PTSD among this nationally representative sample of adult women.
- Examination of data on age of onset of critical variables to evaluate chronology factors.
- Description of the violent assault and PTSD history of women from this sample who have received substance abuse treatment.
- Discussion of these hypotheses about the vicious cycle theory:
  - A history of violent assault increases the risk of alcohol dependence.
  - A history of substance use or abuse increases the risk of violent assault.
  - Risk of alcohol dependence at followup is predicted by a history of violent assault, substance abuse, past-year violent assault, and PTSD.

The random-digit-dialing telephone survey method was used to locate and interview a national probability sample of adult women, 2,008 of whom were age 18 and older (n=4,008) and 2,000 of whom were an oversample of younger women between the ages of 18 to 34. To correct for the effects of oversampling, the data were weighted by age and race to 1989 estimates of the distribution of these characteristics in the U.S. population of adult women. The mean age for the entire sample was 44.9 years (standard deviation=18.4). Most of the women were high school graduates (63.4 percent) and were married or cohabiting (63.7 percent). More than half the sample reported household income between \$15,001 and \$50,000, with a substantial minority (27.3 percent) reporting incomes at or less than \$15,000. For more detail on descriptive data from wave 1 of the study, see Resnick and colleagues (1993).

Of the designated respondents, 4,008 (85 percent) completed wave 1 interviews, 3,359 (83.8 percent) completed at least one of two followup interviews, and 2,892 (72.2 percent) completed both followup interviews. Sample selection and interviewing were done by female interviewers from a New York City-based survey research firm. Lifetime prevalences of rape, aggravated assault, and PTSD were assessed at wave 1. Descriptive information about lifetime rape and aggravated assault cases was collected at wave 1 and information about new victimization cases at waves 2 and 3. The 3,359 women with at least 1 year's followup data were separated into two groups: those victimized in the followup period and those not subsequently victimized. Current PTSD status was assessed at both followup interviews.

The following are operational definitions of key variables.

- Demographic variables assessed at wave 1
  - Current age: Measured in years at wave 1
  - Race: African-American, Asian, Hispanic, Native American, white; simplified to white v. nonwhite for multivariate analyses based on population distribution and ease of interpretation of results
  - Education: Non-high school graduate, high school graduate, college graduate; measured at wave 1
  - Household income: Subdivided for conceptual reasons into poverty level (less than \$10,000 in 1988) or above poverty level (more than \$10,000 in 1988)

- Marital status: Single, cohabiting, married, separated, divorced, widowed; simplified to married v. nonmarried for multivariate analyses
- Family history of substance abuse problems measured at wave 1; assessed based on the report that at least one of the respondent's biological parents had one or more of the following substance abuse-related problems when the respondent was growing up:
  - Problems with family or friends
  - Problems with work
  - Problems with health
  - Problems with the law
  - Injuries or accidents
- Assault incidents
  - Rape: Defined as nonconsensual assault using force or threat of force involving some type of sexual penetration of victim's vagina, rectum, or mouth. Up to three incidents were assessed during wave 1 (first, most recent, and worst, if distinct from first or most recent). Only one incident was assessed at each followup interview. The specific questions to assess rape used sensitive, behaviorally specific phrasing following the orienting preface below:

Another type of stressful event that many women have experienced is unwanted sexual advances. Women do not always report such experiences to the police or discuss them with family or friends. The person making the advances isn't always a stranger, but can be a friend, boyfriend, or even a family member. Such experiences can occur anytime in a woman's life—even as a child. Regardless of how long ago it happened or who made the advances . . .

Has a man or boy ever made you have sex by *using force* or threatening to harm you or someone close to you? Just so there is no mistake, by sex we mean putting a penis in your vagina.

Has anyone ever made you have oral sex by force or threat of harm? Just so there is no mistake, by oral

sex we mean that a man or boy put his penis in your mouth or someone penetrated your vagina or anus with their mouth or tongue.

Has anyone ever made you have anal sex by force or threat of harm?

Has anyone ever put fingers or objects in your vagina or anus against your will by using force or threats?

An affirmative response to any of these questions indicated that a woman had been a victim of rape, defined as vaginal, anal, or oral penetration that occurred through the use of force or threat of force, whether or not the woman subjectively defined the incident as rape or reported it to police or other authorities.

- Aggravated assault: Defined as an attack with a weapon or without a weapon with intent to kill or seriously injure the victim. Descriptive data were gathered about a respondent's only or worst incident during wave 1. Data were gathered on only one incident per followup assessment. A positive history of aggravated assault was defined as a positive response to either of the following questions.

Another type of stressful event women sometimes experience is being *physically* attacked by another person. Not counting any incidents already described to me, has anyone, including family members or friends, ever attacked you with a gun, knife, or some other weapon, regardless of when it happened or whether you ever reported it or not?

Has anyone, including family members and friends, ever attacked you without a weapon, but with the intent to kill or seriously injure you?

- History of prior victimization: The number of rapes or aggravated assaults occurring prior to wave 1 interview was determined. The range of this variable was zero to 4.

- New victimization: The question of whether a rape or aggravated assault occurred in the interval between wave 1 and waves 2 and 3 was assessed. This variable was scored dichotomously as negative (zero) if no incidents had occurred or positive (1) if any incident was reported. In a small subset of cases in which a victimization occurred during both waves, analyses were based on data from the earliest followup assessment, wave 2, for purposes of defining assault status and current PTSD status.
- Current PTSD: Measured by the National Women’s Study PTSD Module (Resnick et al. 1993) at wave 2 and wave 3 interviews. PTSD status was scored dichotomously on the basis of absence (zero) or presence (1) of sufficient symptoms to meet *Diagnostic and Statistical Manual of Mental Disorders (Third Edition-Revised) (DSM-III-R)* (American Psychiatric Association 1987) criteria within the past 6 months. This measurement instrument has high sensitivity compared with the Structured Clinical Interview for *DSM-III-R* (Spitzer et al. 1987) with an overall kappa of 0.77 for lifetime PTSD and 0.71 for current PTSD based on the *Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition)* (American Psychiatric Association 1994) PTSD Field Trial data (Kilpatrick et al., in press). Further validity data relate to the consistent population- and event-specific rates of PTSD obtained with this instrument using the telephone assessment method employed in this study and those obtained using in-person structured clinical interviews (Resnick et al. 1993).
- Sensation-seeking: A six-item short form of the Disinhibition-Intentions for the Future Subscale of Zuckerman’s Sensation Seeking Scale Form VI was used to measure this variable (Zuckerman 1984). Scores range from 6 to 18. The scale asks respondents:

Regardless of whether you have actually done any of the following things in the past, for each, I’d like to know whether you probably would do it if the opportunity arose, have thought about it but probably won’t do it, or have no desire to do it.



Doing something illegal but enjoyable . . .

Doing what feels good regardless of the consequences . . .

Going out with someone just because they are physically exciting . . .

Doing unconventional things, even if they are a little frightening . . .

Refusing to follow orders from someone in authority . . .

- Alcohol dependence
  - Lifetime: Respondent met *DSM-III-R* criteria for alcohol dependence sometime during her lifetime; assessed at wave 1. Scored dichotomously according to the presence or absence of a history of alcohol dependence.
  - Past year at wave 1: Respondent met *DSM-III-R* criteria for alcohol dependence within 1 year prior to wave 1 or had consumed two or more alcoholic drinks per day each day of that period. Scored dichotomously according to the presence or absence of criteria.
  - Current: Respondent was measured at waves 2 and 3 followup interviews. Scored dichotomously according to presence or absence of meeting criteria for alcohol dependence within the most recent followup period, or consumption of two or more alcoholic drinks per day during the most recent followup period.
- Substance use categories: A slight modification of a Guttman scale of increasing drug use categories developed by Elliott and colleagues (1989) was used. Numerical scores were based on the following categories for use reported at wave 1:
  - Category 0 No alcohol dependence, no heavy alcohol use, no other drug use
  - Category 1 Alcohol dependence or heavy alcohol use, without other drug use
  - Category 2 Marijuana use, without amphetamine, barbiturate, cocaine, opiate, or other drug use
  - Category 3 Polydrug use (four or more instances of use of cocaine, heroin, barbiturates, amphetamine, hallucinogens, or inhalants)

Categorization was based on data obtained about lifetime and past-year usage at the wave 1 assessment.

- Substance abuse treatment: Scored dichotomously according to whether or not respondent reported that she had ever received substance abuse treatment at wave 1 assessment.

## **PROCEDURE**

On the basis of wave 1 data, respondents were divided into groups that were positive or negative for lifetime and past-year alcohol dependence. Univariate analyses were conducted to evaluate relationships between these variables and the variables reflecting demographics, family history of substance abuse problems, sensation-seeking scores, violent assault history, and PTSD. Multivariate analyses then were conducted, including significant associated variables to predict lifetime and past-year alcohol dependence or heavy-use groups.

Next, data from waves 2 and 3 were used to classify respondents into groups based on histories of alcohol dependence during the most recent followup assessment period and reports of new assaults during followup assessment periods. Several measures from wave 1 (i.e., family history of substance abuse problems, lifetime and past-year alcohol dependence, substance use category, lifetime PTSD status, and current PTSD status) were used to predict alcohol dependence at waves 2 and 3, as well as having experienced new assaults at waves 2 and 3.

## **RESULTS**

### **Relationship Between Wave 1 Violent Assault, PTSD, and Lifetime Alcohol Dependence**

Descriptive data (wave 1) indicated that 10.3 percent of women had been victims of aggravated assault and 12.7 percent had been victims of rape at some time in their lives. Lifetime prevalence of PTSD was 12.3 percent and past-6-month prevalence of PTSD was 4.6 percent within the entire sample. Lifetime prevalence of alcohol dependence or heavy drinking was 6.4 percent, and past-year prevalence was 3.0 percent.

### Univariate Risk Factors for Lifetime Alcohol Dependence

Women with a family history of substance abuse problems, sensation-seeking, and lifetime PTSD were significantly more likely to have lifetime alcohol dependence than their counterparts (figure 1). Risk of lifetime alcohol dependence increased substantially as a function of the number of lifetime assaults a woman had experienced (figure 2).

### Multivariate Analysis

Multivariate logistic regression analysis was used to evaluate relationships between variables identified as significant in univariate analyses with the lifetime alcohol dependence/heavy use variable. Variables significant in the final model of this procedure significantly increase the odds of alcohol dependence after controlling for the effects of all other variables in the model. Eight predictor variables were entered simultaneously into the final model: the four variables just described in the univariate analyses and the demographic control variables age, race, income, and education. In the final model, four

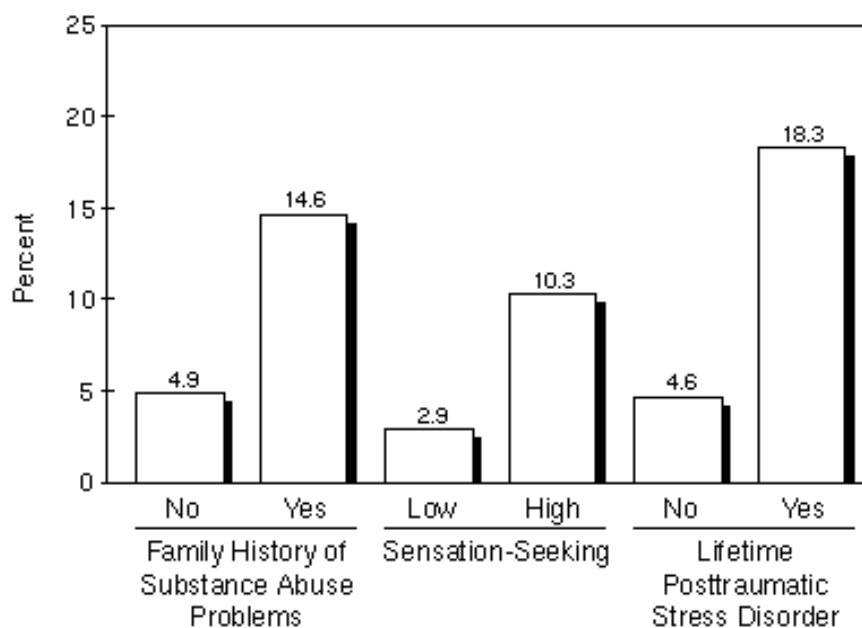
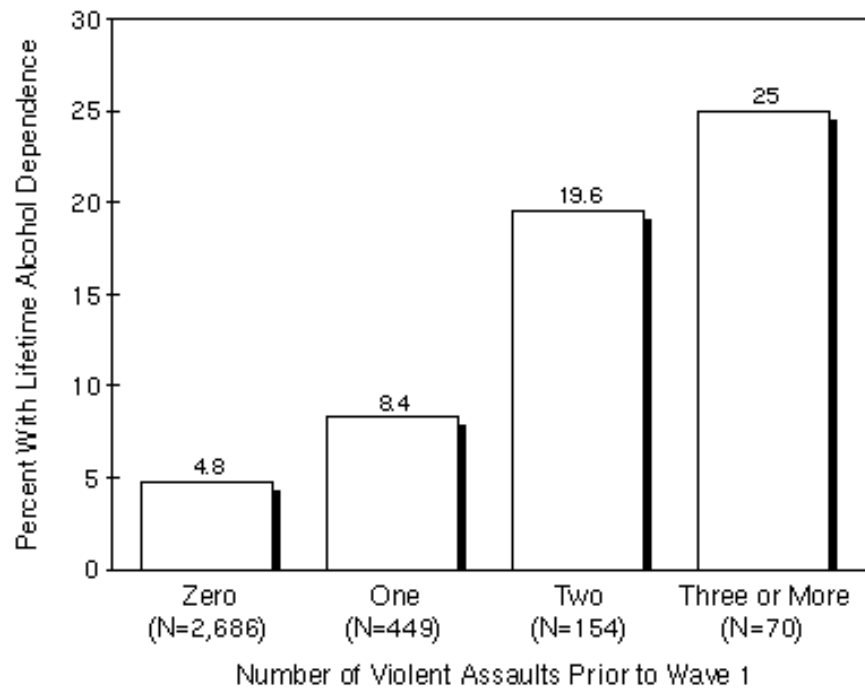


FIGURE 1. Univariate risk factors for lifetime alcohol dependence at wave 1



**FIGURE 2.** *Relationship between number of violent assaults and lifetime alcohol dependence at wave 1*

variables were significant predictors of lifetime alcohol dependence, controlling for each of the other variables within the model (table 1).

Women reporting a family history of alcohol abuse or dependence were 1.99 times more likely to experience lifetime alcohol dependence or heavy use than women without such a history. Higher sensation-seeking scores were also associated with significantly increased odds of

**TABLE 1.** *Final multivariate logistic regression model predicting lifetime alcohol dependence at wave 1*

Variable	Range	Odds Ratio	Confidence Interval
Family substance abuse problem	0-1	1.99	1.43-2.77
Sensation-seeking	6-18	1.26	1.18-1.34
History of violent assault	0-3	1.43	1.20-1.70
Lifetime posttraumatic stress disorder	0-1	2.39	1.68-3.39

NOTE: Current age, race, household income, and education were not significant factors in the final model.

lifetime alcohol dependence, with an odds ratio of 1.26 for each unit increase in the sensation-seeking scale score. Violent assault history, which ranged from zero to three possible assaults in wave 1, was associated with increased odds of lifetime alcohol dependence of 1.43 with each unit increase in the number of violent assaults. Thus, women with one assault had increased odds of 1.43 over those with no assaults. Women with two assaults had increased odds of 2.05 over those with no assaults. Women with three assaults had increased odds of 2.92 over those with no assaults. Finally, women with lifetime PTSD were 2.39 times more likely to be dependent on alcohol than women without PTSD.

#### **Timing of Violent Assault, First Alcohol Consumption, and Alcohol Intoxication**

Of the 638 assault victims from whom data about age of first assault and age of first drink were available, 10.1 percent reported never having consumed alcohol. For 50.1 percent, their first alcohol consumption occurred after the year of their first reported assault. For 5.6 percent, the age of first drink and age of first assault were the same. For 34.2 percent, the first drink occurred before the first assault.

First instance of being drunk was also examined in relation to age of first assault. Of those reporting assault histories, 22.5 percent reported never having been drunk, 44.1 percent had only been drunk after their first assault, 6 percent became drunk and had their first assault the same year, and 27.5 percent became drunk before the year they were first assaulted.

Timing of onset of first drink, first being drunk, and assault onset was examined separately among women who met criteria for alcohol dependence or heavy use. Among women with alcohol dependence or heavy use who also had assault histories, 27 percent reported having their first drink before their first assault, whereas 29.6 percent of assault victims with alcohol dependence reported first being drunk before their first assault.

#### **Relationship Between Lifetime Alcohol Dependence and Past-Year Alcohol Dependence at Wave 1**

Of the 101 women who met past-year diagnostic criteria for alcohol dependence or heavy drinking at wave 1, 38 did so on the basis of heavy drinking and 63 on the basis of alcohol dependence.

Multivariate logistic regression analysis was performed using age, household income, family substance abuse problems, sensation-seeking, history of violent assault, lifetime PTSD, and lifetime alcohol dependence (all of which were significantly associated with past-year alcohol dependence or heavy use in univariate analyses) to predict past-year alcohol dependence or heavy drinking (table 2). After controlling for other variables in the model, only lifetime alcohol dependence or heavy use and sensation-seeking scores were significant predictors of past-year alcohol dependence or heavy use. Odds for past-year alcohol dependence or heavy drinking were 25.99 times greater among those with lifetime alcohol dependence than among those without such dependence. Of the lifetime positive group, 63 percent also had met criteria during the past year. Controlling for lifetime alcohol dependence, sensation-seeking was also associated with increased odds of past-year alcohol dependence or heavy drinking: Odds of past-year alcohol dependence or heavy drinking at wave 1 increased as a function of increases in sensation-seeking.

**Relationship Between Past-Year Substance Use at Wave 1 and New Assaults During Waves 2 and 3 Followup**

Among women completing at least one followup assessment period (n=3,359), 4.3 percent reported experiencing at least one rape or aggravated assault during the followup interval. Substance use during the year prior to followup (assessed at wave 1) was examined in association with risk of new assaults. Among the wave 1 sample respondents who participated in at least one followup assessment, 93.7 percent were classified as non-alcohol dependent and nonusers of other drugs. Alcohol dependence or heavy use with no other drug use was reported

**TABLE 2.** *Final multivariate logistic regression model predicting past-year alcohol dependence or heavy drinking at wave 1*

Variable	Range	Odds Ratio	Confidence Interval
Sensation-seeking	6-18	1.12	1.03-1.21
Lifetime alcohol dependence	0-1	25.99	15.64-43.38

NOTE: Current age, race, household income, and education were not significant factors in the final model.

by 2.3 percent, marijuana use with no other drug use by 3.2 percent, and polydrug use by 0.7 percent.

A significant relationship existed between past-year substance use and the likelihood of assault during the followup period. Rates of new assault were lowest among women with no heavy alcohol use or drug use and increased among women with alcohol dependence. Women with marijuana use had still higher rates of new assault, and women with hard drug use had the highest rates of new assault (figure 3).

Logistic regression analysis using the four-point past-year substance use score to predict likelihood of new assault was also significant. Odds of new assault were 1.77 times greater for women with alcohol dependence than for nonusers, 3.10 times higher for marijuana users than for nonusers, and 5.45 times higher for polydrug users than for nonusers. The logistic regression model predicting new assault at waves 2 and 3 by past-year substance use category at wave 1 was as follows:

Variable	Range	Odds Ratio	Confidence Interval
Past-year alcohol dependence at wave 1	0-3	1.77	1.49-2.11

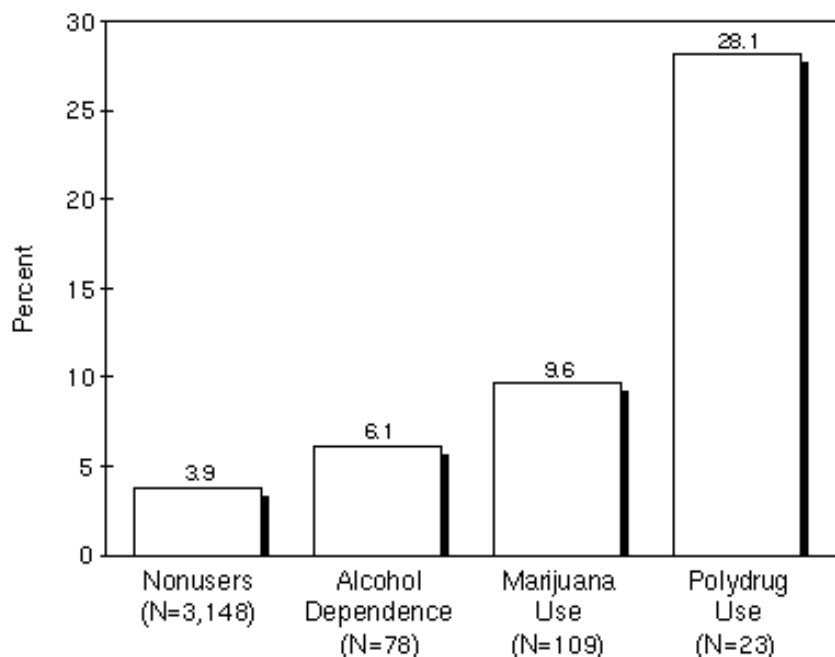


FIGURE 3. Relationship between past-year substance use at wave 1 and new assault during waves 2 and 3 followup

**Relationship Between Past-Year Alcohol Dependence (Wave 1), Assault and PTSD (Waves 2 and 3), and Alcohol Dependence at Followup**

Results of multivariate logistic regression analysis are shown in table 3. Significant predictors of alcohol dependence or heavy use at followup waves included past-year alcohol dependence assessed at wave 1, exposure to new assault at followup waves, and current PTSD at followup. Women with past-year alcohol dependence at wave 1 were 9.33 times more likely to be alcohol dependent at waves 2 and 3 than women without past-year alcohol dependence at wave 1. For women with a new violent assault during the followup period, the odds were 3.25 times greater than for women without such assaults of alcohol dependence at waves 2 and 3. Finally, women with PTSD were 5.52 times more likely to be alcohol dependent than women without PTSD. All three variables were significantly related to the chances of alcohol dependence in the followup period, accounting for the effects of the other two variables and indicating that new assault and PTSD were important predictors even when controlling for past-year alcohol dependence at wave 1.

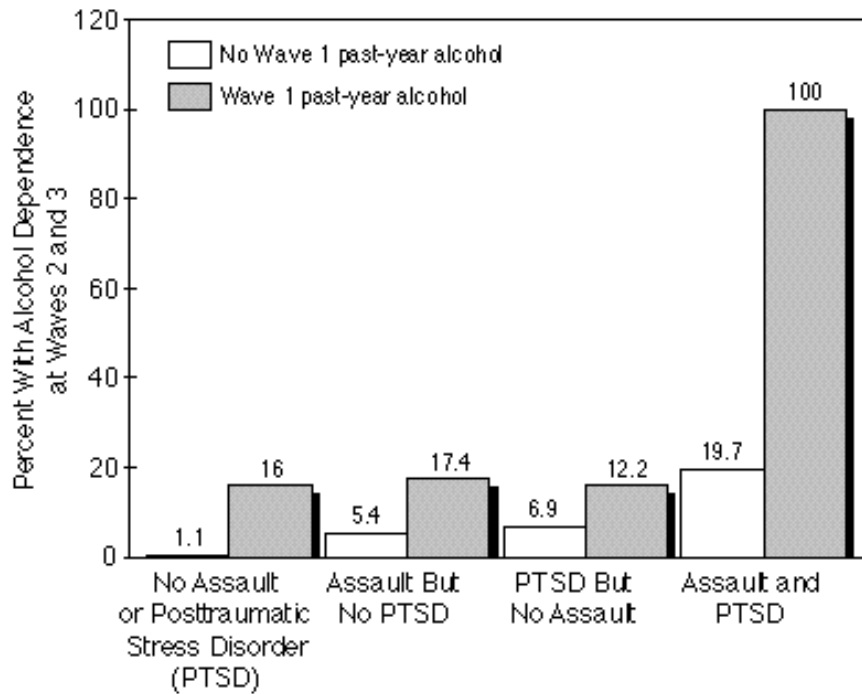
Relationships between past-year alcohol dependence at wave 1, new assault, PTSD, and alcohol dependence at followup are shown in figure 4. Women with alcohol dependence immediately prior to the followup period were substantially more likely to have alcohol dependence at followup across all conditions than women without alcohol dependence at followup. Among women without past-year alcohol dependence, the impact of new assaults and PTSD on alcohol dependence at followup was clear: Rates of alcohol dependence increased substantially after assault and after PTSD, particularly among assault victims with PTSD.

**TABLE 3.** *Final multivariate logistic regression model predicting alcohol dependence at waves 2 and 3*

Variable	Range	Odds Ratio	Confidence Interval
Past-year alcohol dependence at wave 1	0-1	9.33	4.57-18.92
New assault at waves 2 and 3	0-1	3.25	1.52-6.96
Current posttraumatic stress disorder at waves 2 and 3	0-1	5.52	2.89-10.59

NOTE: Current age, household income, family history of substance abuse problems, sensation-seeking, and history of violent assaults at wave 1 were not significant in the final model.





**FIGURE 4.** *Relationship between past-year alcohol dependence at wave 1, assault and posttraumatic stress disorder at waves 2 and 3, and alcohol dependence at waves 2 and 3*

### **Women Receiving Substance Abuse Treatment**

Patterns of drug and alcohol use and patterns of violent assault history and PTSD were evaluated separately among a subset of 70 women who had received treatment for substance abuse, reported at wave 1. The receipt of treatment provides an objective indicator separate from self-report that indicates a subsample that is likely to have serious substance use problems. Among women who had received substance abuse treatment, 60 percent were polydrug users, 17 percent were alcohol dependent, 16 percent used marijuana, and 7 percent were nonusers of drugs and did not meet alcohol dependency criteria (figure 5). In contrast, among all women who completed wave 1, 72 percent had a lifetime nonuser classification (figure 6).

As shown in figure 7, only 16 percent of women seeking treatment for substance abuse did not have a history of violent assault or PTSD. Seventy-three percent had a history of rape or aggravated assault, and

44 percent had a history of PTSD. One-third had a history of violent assault and PTSD.

## DISCUSSION

Data were consistent with the three major hypotheses stated. As predicted by hypothesis 1, a history of violent assault increases the risk of alcohol dependence at wave 1 even after controlling for family history of substance abuse problems and sensation-seeking. PTSD also increased risk of alcohol dependence after controlling for family history, sensation-seeking, and violent assault.

Hypothesis 2, that a history of substance use or abuse increases the risk of violent assault, was partially supported. Specifically, women with increasing categories of substance use were increasingly more likely to suffer violent assault at followup. Although women with alcohol dependence were slightly more likely than nonusers to be assaulted, risk of assault was considerably higher among polydrug users, more than one-quarter of whom were assaulted in the 2-year followup period.

Hypothesis 3, that risk of alcohol dependence at followup is predicted by history of violent assault, substance abuse, past-year violent assault, and PTSD, was also partially supported. Past-year alcohol dependence at wave 1 was the biggest predictor of alcohol dependence at followup, but new assaults and PTSD still predicted alcohol dependence at followup after controlling for prior alcohol dependence. Prior assault did not emerge in the multivariate analyses, probably

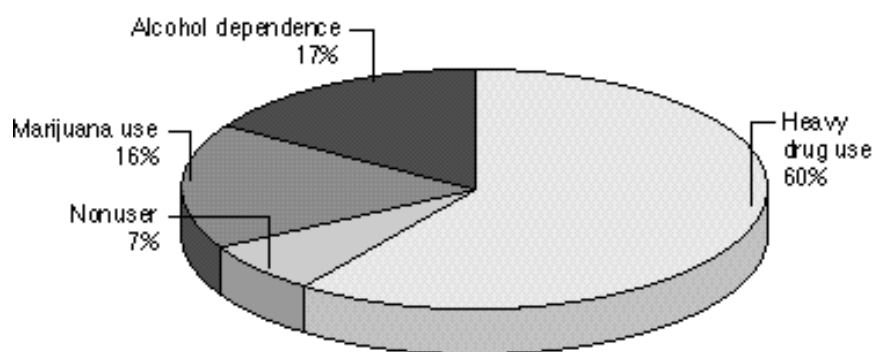


FIGURE 5. Percent of women receiving treatment for substance abuse by substance use category (n=70)

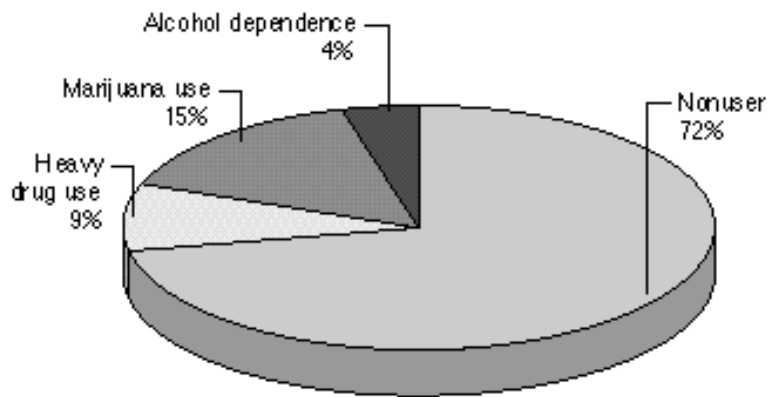


FIGURE 6. Breakdown of women in wave 1 by lifetime substance use category (percent)

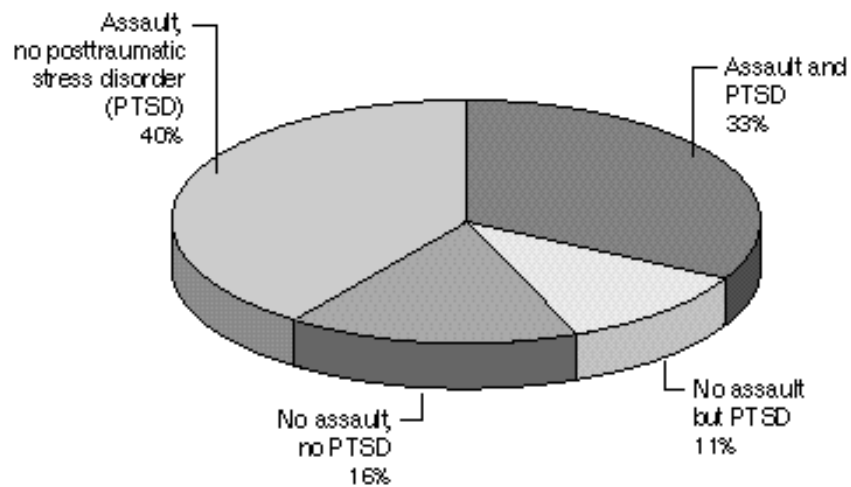


FIGURE 7. Assault and posttraumatic stress disorder history of women receiving substance abuse treatment (n=70)

because it is highly predictive of both new assault and PTSD at followup (Kilpatrick et al. 1994).

Evaluation of the timing of alcohol use or dependence and assault is crucial in this type of study. Although a portion of our evaluation (that done exclusively with wave 1 data) was retrospective in nature, there was some evidence that assault tended to precede alcohol use or dependence rather than vice versa. At wave 1, most victims with alcohol dependence said their first assault occurred *before* their first alcohol

consumption or intoxication. This is partially a byproduct of the early age at which many rapes occur (62 percent of rapes occur before age 18 and 28 percent before age 11) (Kilpatrick et al. 1992; Kilpatrick et al., in press).

The longitudinal data provide clearer evidence that assault could be significantly associated with new onset of alcohol dependence or heavy use. Among women without alcohol dependence at wave 1, those assaulted at followup were more likely than their nonassaulted counterparts to develop alcohol dependence at followup. This provides the strongest evidence regarding the direction of the relationship between assault and alcohol dependence.

The role of PTSD in alcohol dependence is important. Clearly, assault victims with PTSD are much more likely to have alcohol dependence than victims without PTSD. This finding has two implications: (1) It is important to screen women for PTSD as well as for assault history, and (2) treating assault victims' PTSD might address some of their alcohol dependence problems.

### **Implications for Prevention**

Two major implications of these findings for prevention of substance abuse, particularly alcohol dependence among women, have been identified. First, assault victims, particularly those with a family history of substance abuse problems, those high in sensation-seeking, and those with PTSD, are at high risk of developing alcohol dependence and should be targeted for substance abuse prevention efforts. Second, women with alcohol dependence, heavy alcohol use, and other drug use, particularly hard drug use, are at high risk of being assaulted. This, in turn, increases the risk of subsequent alcohol dependence or heavy use. This group, identified by significant substance use, should be targeted to receive self-protection or crime prevention training. Such strategies may intervene in the vicious cycle that appears to be maintained between victimization, PTSD, and substance abuse in women.

### **Implications for Future Research**

Because assaults occur at relatively early ages, longitudinal studies should begin early in life. Because the current study included only women, the extent to which findings can be generalized to men is

unclear. Currently, we are conducting a national study of male and female adolescents that will address these issues in a much younger age group.

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