Prevalence of Depression and Alcohol and Other Drug Dependence in Addictions Treatment Populations.

Norman S. Miller, M.D.*; Debra Klamen, M.D.**;
Norman G. Hoffmann, Ph.D.*** & Joseph A. Flaherty, M.D.**

Abstract—The diagnosis of depression has been viewed as an important factor in the treatment response for those who have alcohol and other drug dependence. The objective of the study was to examine the prevalence of a lifetime history of major depression in inpatients with a substance use disorder in addictions treatment. An evaluation study of 6,355 patients was conducted in inpatient and outpatient addictions treatment programs from 41 sites. Subjects were required to have a substance use disorder and to be evaluated for a lifetime diagnosis of major depression according to DSM-III-R criteria. The rate of a lifetime diagnosis of major depression was 43.7%. The most common diagnosis was alcohol dependence, followed by cocaine dependence, and cannabis dependence). Depression was associated in significantly greater numbers with diagnoses involving drugs other than alcohol, in females greater than in males, with number and frequency of use, and in inpatient programs more than outpatient programs. The rates for continuous abstinence at one year did not differ between those with and without a lifetime history of depression.

Keywords—addiction, alcohol, depression, drugs, prevalence, treatment

*Departments of Psychiatry and Neurology, The University of Illinois at Chicago, College of Medicine.
**Department of Psychiatry, The University of Illinois at Chicago, College of Medicine.
***Department of Psychiatry, The University of Minnesota–Minneapolis.
Please address correspondence and reprint requests to Norman S. Miller, M.D., Department of Psychiatry (M/C 913), The University of Illinois at Chicago, College of Medicine, 912 S. Wood Street, Chicago, Illinois 60612-7327.

Depression either as a symptom, syndrome, or diagnosis in association with alcohol and other drugs has been studied extensively (Mueller et al. 1994; Helzer & Przybeck 1988; Blankfield 1986; Dackis et al. 1986; Hesselbrock, Meyer & Keener 1985; Schuckit 1983a, 1983b; Alterman, Erler & Murphey 1981; Dorus & Senay 1980). The overall findings have indicated a high association of depressive and substance-related disorders. Various schemes for etiology and relative onset have been devised to differentiate independent or consequent roles for the respective disorders (Miller & Fine 1993; Schuckit 1983a, 1983b). The predominant conclusion in studies has been that alcohol and other drugs can induce depression (Mueller et al. 1994; Blankfield 1986; Dackis et al. 1986; Schuckit 1983a, 1983b; Dorus & Senay 1980). However, a popular theory has postulated that alcohol and other drug use is secondary to an "underlying depressive disorder" (Khantzian 1986). Although studies have shown that depression associated with alcoholism can complicate the clinical course (Mueller et al. 1994; Helzer & Przybeck 1988; Behar, Winokur & Berg 1984), studies relating to whether or not depression has a negative impact on the response to addictions treatment in addicts/alcoholics are conflicting (Mueller et al. 1994; McClellan et al. 1993; DeMoja 1992; Harrison & Streed 1991; Helzer & Przybeck 1988; Rounsaville et al. 1987; Dackis et al. 1986; Hesselbrock, Meyer & Keener 1985).

ALCOHOL AND MULTIPLE DRUG USE IN ASSOCIATION WITH DEPRESSION IN COMPOSITE TREATMENT POPULATIONS

Studies generally have not examined intact treatment populations in large numbers for the differential effects of drug categories of disorders in relation to the presence of a history of depression. Typically, individual drug disorders or limited numbers of drug types have been examined for presence of specific psychiatric diagnoses in small numbers in addiction populations, such as opioids, alcohol, or cocaine (Rounsaville et al. 1987; Hesselbrock, Meyer & Keener 1985). In such studies, a direct comparison of multiple drug types in association with depression was not possible because of the lack of study in a single composite population of subjects. Comparisons across populations and studies were necessary in order to determine the relative association of depression and types of drug disorders.

Dose Response and Depression

The number and frequency of multiple drug disorders, including alcohol disorder, has not been linked to the presence of depression in studies of alcoholics or other drug dependents (McClellan et al. 1993; Rounsaville et al. 1987). The influence of multiple drugs with or without alcohol on the prevalence of depressive symptoms (relative effect of specific drugs in relation to depression) has not been well studied, especially in different classes of drugs in the same treatment population. The relative association of drug types to depression is possible to assess in a composite study of comparable patients.

Program Characteristics and Treatment Matching

The prevalence of depression in association with categories of substance-related disorders according to program settings (i.e., inpatient and outpatient programs) has not been documented. Initial studies suggest that matching patients to treatment according to severity of depression in alcoholics and other drug dependents can be effective (McClellan et al. 1993). These studies suggest that matching comorbid psychiatric severity in substance-related disorders to treatment program characteristics may be more advantageous because of the emphasis on individualized and specific levels of intensity of treatment (Hoffmann, DeHart & Fulkerson 1993; McClellan et al. 1993). In addition, assessment and referral according to comorbid psychiatric severity to either inpatient or outpatient treatment are growing mandates by managed care in the delivery of addictions treatment.

Response to Treatment

Of importance is that the abstinence-based form of addictions treatment has not been studied extensively for its effect on comorbid depression with addictive disorders in treatment outcome. The abstinence-based form of addictions treatment was used by 95% of the treatment centers surveyed in the United States (Roman 1989). Consequently, the effect of this form of treatment on outcome for psychiatric comorbidity requires documentation for clinicians and other researchers.

Purpose of the Study

The purpose of the present study was to evaluate the prevalence of a lifetime diagnosis of major depression in alcoholics and other drug dependents in abstinence-based treatment programs. The abstinence-based treatment program is based on the 12-Step approach to addiction treatment, which emphasizes abstinence from alcohol and other drugs and referral to continuing care as a part of the treatment program and 12-Step recovery groups for long-term management (Hoffmann & Miller 1992).

The study examined the presence of a DSM-III-R diagnosis of substance use disorders and a lifetime diagnosis of major depression according to drug type (including alcohol), number and frequency of drugs, treatment program characteristics, and response to treatment. Questions regarding the prevalence of comorbid depression with substance use disorders were the following: (1) What was the prevalence? (2) How did the prevalence vary with number and frequency of drugs? (3) How did the prevalence differ according to inpatient and/or outpatient treatment programs? and (4) How did the comorbid depression respond to standard addiction treatment? The study was conducted in intact treatment populations from multiple sites that consisted of similar treatment methods, namely abstinence-based. Because of the composite population from multiple sites for diagnoses (patients with diagnoses for alcohol and

other drug disorders, and major depression), a relative comparison of rates for comorbidity of depression with substance use disorders could be made according to types of drug disorders. Also, a relative comparison of the response to treatment cou1d be eva1uated according to drug disorders and the presence or absence of a lifetime diagnosis of major depression.

METHODS

Subjects

The data on the subjects were derived from voluntary admissions in 38 inpatient and 19 outpatient programs in a version of the general registry system of the Comprehensive Assessment and Treatment Outcome Research (CATOR). The subjects selected consisted of a sample of 6,355 from inpatient, outpatient evening, outpatient day, day hospital, and inpatient/evening programs from 41 sites. The treatment outcome was defined by abstinence, psychosocial adjustment, psychiatric and medical utilization, employment status, and legal complications. The evaluation of subjects was conducted prospectively. Baseline demographic, clinical, and history data were collected by treatment staff via standard data forms (383 questions) on initial admission and by a structured telephone interview (110 questions) by independent evaluators in the subsequent acquisition of data at six- and 12-month follow-up.

Data Collection

The outcome data were gathered by experienced technicians independent of the treatment programs whose responsibility was to collect and enter data. The data analyses were conducted by two of the authors (Miller and Hoffmann). The personal and telephone interviews for data collection have been tested for validity and reliability in other studies (Miller & Hoffmann 1995; Hoffmann & Ninonuero 1994; Harrison, Hoffmann & Streed 1991).

Validity and Reliability

The general descriptions and results of treatment outcome for the population in this study have been reported elsewhere. Comparison of inpatient and outpatient programs for demographic and outcome characteristics also have been reported elsewhere (Miller & Hoffmann 1995; Harrison, Hoffmann & Streed 1991).

Inclusion and Exclusion Criteria

For inclusion in the study, a subject required a current DSM-III-R diagnosis of substance use disorder and an evaluation specifically for a lifetime DSM-III-R diagnosis of major depression. Excluded from the study were those who were not able to comprehend or cooperate with the structured evaluation (3% of the total population). The completion rate for treatment stay was 5,548 (87.3%), 263 (4.1%) were transferred, 348 (5.5%) left against medical advice (AMA), and 196 (3.1%) were discharged for noncompliance.

Program Characteristics

The majority of the monitored treatment programs were variations of the abstinence-based treatment programs derived from the principles of the 12-Step programs combined with professional counseling. The abstinence-based model adheres to the exclusionary criteria in DSM-III-R that stipulate that substance use disorders are independent. Most programs regularly refer the patients to Alcoholics Anonymous/Narcotics Anonymous or other 12-Step programs and encourage attendance at continuing care provided by the treatment program.

RESULTS

Sociodemographic Characteristics

The majority of the patients attended an inpatient treatment site (78.4%) .Only about one in five received structured outpatient services (21.6%) (see Table 1). Ethnic and socioeconomic statuses are presented in Table 1. The population most represented was Caucasion (88.9%), middle-aged (mean=35.7 years), male (70.6%), high school educated (84.7%), employed (73.3%) (income $10,000 to $50,000),

living alone (55.7%) or married (43.3%). However, there was considerable variability on many of the demographic characteristics. Females (29.4%), African-Americans (7.9%), single (56.7%), unemployed (16.4%), low level of education (15.4%), and incomes (less than $10,000, 29.9%; more than $50,000, 5.9%), and living with others were also represented. A substantial minority had received previous psychiatric treatments (31%), including treatment specifically for depression (24.2%) (see Table 1). Most of the patients completed the treatment programs (87.3%).

Diagnostic Characteristics

Combinations of Alcohol and Other Drug Diagnoses. The rates of alcohol dependence among other drug dependence was significant, as expected from other studies that find high rates of alcohol dependence in association with other drug dependence (see Table 2). The highest association in males and females was between alcohol and cannabis, followed by cocaine, stimulants, opioids, and prescription drugs. The association between prescription drugs and other drug dependence in males and females was greatest for opioids, followed by stimulants, cannabis, and cocaine. Cannabis dependence was associated in males and females with stimulants, greater than with opioids and cocaine. Stimulant dependence in males and females was associated with opioid dependence, greater than cocaine dependence. Cocaine and opioid dependence together was greater in males than in females (see Table 2).

Alcohol and Other Drug Diagnoses and Depression Diagnosis. The rate of lifetime diagnosis of major depression was 43.7% in the total sample (N=6,248); for subclinical depression (less than five criteria in DSM-III-R for major depression) the lifetime rate was 9.6%. Over half of the patients had two or more symptoms of depression and 35.9% had five or more symptoms of major depression. The most common diagnosis of a single substance use disorder was alcohol (51.3%) (see Table 3).

There was a clear finding that alcohol dependence was associated with major depression significantly less than other drug dependence. In general, the association of a lifetime diagnosis of major depression in males was greatest for opioid, prescription drug, and stimulant dependence,

TABLE 1
Sociodemographic and Diagnostic Characteristics of Major Depression

	Frequency	Rate (%)
Program Characteristics		
Site		
Inpatient	4,982	78.4
Outpatient	1,373	21.6
Total	6,355	100.0
Patient Characteristics		
Ethnicity		
Asian	8	0.1
African-American	495	7.9
Hispanic	85	1.4
Native American	120	1.9
Caucasian	5,519	88.9
Other	38	0.6
Gender		
Male	4,486	70.6
Female	1,869	29.4
Age (years)*		
14–17	77	1.0
18–30	2,318	37.0
31–45	2,598	42.0
46–65	1,084	17.0
66+	168	3.0
Marital Status		

Never married	1,922	31.1
Divorced	1,036	16.8
Separated	380	6.2
Widowed	163	2.6
Married	2,671	43.3
Level of Education		
No degree	951	15.4
High School/GED	3,440	55.8
Vocational/Technical	664	10.8
Bachelor's Degree	824	13.4
Master's Degree	138	2.2
M.D./J.D.	153	2.5
Employment		
Full-time	4,017	63.8
Part-time	596	9.5
No response	646	10.3
Unemployed	1,034	16.4

(continued on next page)

TABLE 1 — *Continued*

	Frequency	Rate (%)
Annual Personal Income		
<$10,000	1,901	29.9
$10,000–$20,000	1,645	25.9
$20,000–$30,000	1,217	19.2
$30,000–$50,000	736	11.6
>$50,000	372	5.9
No answer	482	7.6
Annual Family Income		
<$10,000	875	13.8
$10,000–$20,000	1,119	17.6
$20,000–$30,000	1,215	19.1
$30,000–$50,000	1,312	20.6
>$50,000	914	14.4
Did not say	920	14.5
Living Arrangements		
Alone	3,494	55.7
Living with parents	1,523	24.3
Living with spouse	1,253	20.0
Depression Treatment		
Never had treatment	4,763	75.8
Had treatment	1,524	24.2
Other Psychiatric Treatment		
Never had treatment	5,241	84.3
Had treatment	977	15.7
Total Psychiatric Services (Depression and other psychiatric)		
Never had treatment	4,387	69.0
Had either treatment	1,435	22.6
Had both treatments	533	8.4

*Mean=35.753 years; median=33.000 years; SD=12.448

followed by cocaine and cannabis dependence. In females, the association of major depression was greater in stimulant, prescription drug, and opioid dependence, followed by cannabis and cocaine dependence (see Table 4).

Onset of Alcohol and Other Drug Dependence by Depression Diagnosis. The mean age of onset for alcohol use was 16.2 years and 17.4 years for cannabis. The earlier the onset of alcohol or cannabis use, the significantly greater the proportion of diagnoses of major depression. The association of a lifetime diagnosis of major depression and an earlier onset of alcohol and other drug use was greater in females than males (see Table 4).

Number and Frequency of Drug Use by Depression Diagnosis. The association of number but not frequency of drug use with a lifetime diagnosis of major depression was significant. The greater the number of drugs used either daily or weekly, the greater the proportion of diagnoses with major depression. Weekly drug use was similar to daily use for rates of major depression. Females showed greater rates of depression for both daily and weekly drug use (see Table 5).

Program Characteristics. The rates for a lifetime diagnosis of major depression in males and females with alcohol and/or other drug dependence were significantly greater for inpatient than outpatient only programs in either the evening or day hospital. In general, the prevalence rates for depression were significantly greater for females than for males, but the prevalence differentials between program subgroups were more striking for males (see Table 6).

Treatment Outcome Based on Completion of Treatment. The rate for continuous abstinence in the first six months at follow-up for those who completed the initial treatment program was 74.2%, and was 67.7% for the second six months for the overall sample. The overall abstinence rate for one continuous year was 55.4% (see Table 7). There were no significant differences in abstinence rates between those without a lifetime diagnosis of major depression and those with such a diagnosis for either males (54.9% versus 54.4%) or females (58.0% versus 56.0%). In other words, the proportion of those patients who relapsed during the first year following addiction treatment was the same whether or not a lifetime diagnosis of major depression was present in their histories (see Table 8).

The abstinence rates for nondepressed and depressed patients with drug disorders (alcohol, prescription drug, cannabis, stimulant, cocaine, and opioid disorders) were consistently the same in both males and females. A diagnosis of major depression did not distinguish treatment outcome among the substance-use disorders except for cocaine dependence in males where the abstinence rate was significantly greater in depressed than nondepressed patients (45.2% versus 38.2%) (see Table 8).

DISCUSSION

This study provides a naturalistic examination of the association of a lifetime diagnosis of major depression in a composite sample of patients with alcohol and other drug diagnoses. The association of major depression according to alcohol and other drug diagnoses, onset of use, program setting, frequency and number of drugs used, and response to treatment was examined.

Alcohol and Other Drug Dependence and Major Depression

The high association of alcohol and other drug dependence with depression was similar to that of other studies in treatment and general populations (Mueller et al. 1994; Miller, Gold & Belkin 1992; Miller 1991; Helzer & Przybeck 1988; Blankfield 1986; Dackis et al. 1986; Hesselbrock, Meyer & Keener 1985; Schuckit 1983a, 1983b; Alterman, Erler & Murphey 1981; Dorus & Senay 1980). The association of a lifetime diagnosis of major depression with various types of drug dependence in this study was highest for opioids, stimulants, cannabis, and cocaine, and least for alcohol dependence.

As expected, the relative comparison of gender revealed females to have consistently higher rates of depression across all drug diagnoses. Depression was least associated with alcohol, and greatest with

prescription medications in women, and least with alcohol dependence, and greatest for opioid and prescription dependence in men.

The higher prevalence of a diagnosis of major depression with other drug diagnoses was consistent with previous reports. Rounsaville and colleagues (1982) found rates of major depression in opioid addicts to be 48.9% in males and 69.2% in females. Others have found high rates of major depression in cocaine addicts at 50% (Kosten et al. 1986). Reports for prescription medications in association with major depression have also been in the range of 50% according to the Environmental Catchment Area data and other clinical studies (Miller 1991; Regier et al. 1990). Depression in association with cannabis use has also been found to be elevated (Helzer & Przybeck 1988).

TABLE 2
Combinations of Alcohol and Other Drug Diagnoses*

	Male (%)	Female (%)
Alcohol Dependence among Drug Dependence		
Prescription Drugs	52.1	34.0
Cannabis	81.9	77.7
Stimulants	71.4	62.7
Cocaine	77.8	69.5
Opioids	66.7	38.9
Prescription Dependence among Drug Dependence		
Cannabis	4.7	14.6
Stimulants	25.5	35.3
Cocaine	9.7	14.2
Opioids	64.4	72.2
Cannabis Dependence among Drug Dependence		
Stimulants	57.1	50.0
Cocaine	50.1	38.0
Opioids	41.1	38.9
Stimulant Dependence among Drug Dependence		
Cocaine	11.6	13.4
Opioids	24.4	25.9
Cocaine Dependence among Opioid Dependence		
Opioids	37.8	33.3

*p>0.00001

TABLE 3
Diagnostic Characteristics of Major Depression

	Frequency	Percent	Cumulative Percent
Diagnosis of Major Depression by DSM-III-R Criteria			
No Depression	2,918	46.7	
Subclinical[a]	600	9.6	
Major Depression[b]	2,730	43.7	
Number of Symptoms of Major Depression			
None	3,024	47.6	47.6
One	137	2.2	49.7
Two	157	2.5	52.2
Three	307	4.8	57.2

Four	447	7.0	64.1
Five	605	9.5	73.6
Six	808	12.7	86.3
Seven	870	13.7	100.0
Substance Use Disorder Diagnosis by Hierarchy			
Ungrouped[c]	398	6.3	6.3
Alcohol	3,263	51.3	57.6
Prescription Drugs	277	4.4	62.0
Marijuana	779	12.3	74.2
Stimulants	242	3.8	78.0
Cocaine	1,252	19.7	97.7
Opioids	144	2.3	100.0

[a]Depression did not meet DSM-III-R criteria.

[b]Lifetime diagnosis.

[c]Drug use that did not meet DSM-III-R criteria for dependence.

Studies of Alcohol and Other Drugs in Depression

Studies on alcohol consumption have generally shown that alcohol use has at least a bimodal effect on depression (Greeley, Swift & Heather 1992; Hartka et al. 1991; Jaffe 1990). In the short term, alcohol use leads to decreased levels of depression; however, with chronic use, it leads to exacerbated levels of depression (Greeley, Swift & Heather 1992; Hartka et al. 1991; Jaffe 1990). A year-long follow-up of 742 respondents from a survey of the general population examined the relationship of depression and alcohol consumption. The immediate effect of alcohol use was to decrease levels of depression, whereas the long-term (one year) effect was to increase levels of depression (Aneshensel & Huba 1983).

TABLE 4
Depression Diagnosis Given Alcohol and Other Drug Diagnoses

Depression Diagnosis by Alcohol and Other Drug Dependence

Type of Dependence	Male (%)	Female (%)
Alcohol only	31.3	50.0
Prescription	62.2	76.0
Cannabis	42.1	62.4
Stimulant	60.6	79.0
Cocaine	47.4	56.9
Opioid	62.9	68.5
Ungrouped	30.7	47.5

(Pearson chi-square p>0.00001)

Depression Diagnosis by Age First Drank

Age (years)	Male (%)	Female (%)
14	46.1	65.6
16	35.4	57.9
17	32.6	50.1
18+	41.4	50.0

(p>0.00001)

TABLE 5
Number of Drugs and Frequency of Drug Use for Diagnosis of Major Depression

Number of Drugs by Rate (%) for Diagnosis of Major Depression*

	Daily		Weekly	
Number of Drugs	Male	Female	Male	Female
0	21.7	31.6	20.7	30.8
1	27.8	38.7	29.3	39.8
2	39.0	58.3	38.2	57.7
3	55.9	52.6	56.2	58.0

Frequency of Drug Use by Rate (%) for Diagnosis of Major Depression*

Gender	Daily	Weekly
Male	58.4	57.6
Female	79.0	72.9

*(p>0.00001)

TABLE 6
Rates (%) for Diagnoses of Depression Per Type of Program

Type of Program	Male (%)*	Female (%)**
Inpatient	40.4	58.1
Outpatient (3-4 hrs.)	29.5	51.4
Day Hospital (5-8 hrs.)	26.2	43.8
Inpatient to Evening Outpatient	42.0	54.5
Inpatient to Day Hospital	37.5	35.0

*Pearson chi-square p>0.00001 for males.
**Pearson chi-square p>0.05 for females.

In a multivariate analysis, users of the central nervous system depressant methaqualone had a nearly fourfold elevated risk for depressed mood as compared to nonusers (Buckner & Mandell 1990). Heroin was also significantly associated with depressed mood, and use of anxiolytics and cocaine approached significance. In this study, methaqualone use appeared to substantially increase the risk for depressed symptoms independently of self-esteem or negative life events (Buckner & Mandell 1990).

Dose Response and Depression

The number and frequency of drugs used correlated significantly with the probability of having a lifetime diagnosis of major depression. The number of drugs increased linearly with the rates for major depression in those with drug dependence. There was a twofold increase in the rate of depression from using no drugs to using three drugs. The difference between weekly and daily use was not as significant as the number of drugs used.

These results are not surprising given that all the drugs possess pharmacological properties of inducing depression either during intoxication (sedatives, opioids, alcohol) or drug withdrawal (cocaine and other stimulants) (Buckner & Mandell 1990; Jaffe 1990). Moreover, these depressant effects appear to be additive with using increasing numbers of drugs. Apparently, no other study has examined the association of major depressive syndromes and frequency/number of drugs in both men and women in treatment populations.

A study of the response of alcohol on mood in alcoholics was conducted in an experimental setting (Tamerin & Mendelson 1969). Euphoria was reported only during the initial phase of alcohol intoxication, and prolonged drinking was associated with a progressive increase in depression. Termination of a drinking episode was associated with resolution of the depression and the restitution of a normal mind. The results are similar to other studies where anxiety and depression were noted to increase rather than decrease with continued intoxication (Anthenelli & Schuckit 1993; Schuckit & Montero 1988). Paradoxically, in no case was drinking stopped voluntarily as a result of the depressed and anxious mood (Mello & Mendelson 1970).

Onset of Alcohol and Other Drug Use and Major Depression in Longitudinal Studies

The present study indicates that the earlier the onset of drinking, the greater the likelihood of depression. Also, depression is closely linked to the onset of alcohol and other drug use in adolescents when they often begin addictive use of alcohol and other drugs. The current data showed a graded association between a lifetime diagnosis of major depression, and the onset of drinking to be greater in women than men.

These findings were consistent with longitudinal studies that found that longer duration of alcohol consumption was associated with greater prevalence of depression (Hartka et al. 1991; Aneshensel & Huba 1983). A meta-analysis of eight longitudinal studies containing measures of depression and alcohol consumption was performed to examine the relationship of depression and drinking over time. The results for male alcoholics contradicted the hypothesis that men who were depressed drank to alleviate their feelings of sadness, by finding no relationship between earlier depression and later alcohol consumption (Hartka et al. 1991). The results suggested that alcohol use led to increased rates of depression. For females, strong positive relationships were found between earlier depression and later alcohol consumption. These results indicated that women who felt depressed turned to the health care system for treatment. The study also found that the rates of heavy alcohol use were greater among men than women, but that women reported depression more often than men (Hartka et al. 1991).

Another longitudinal study of 2,382 students in Mexico and 1,775 high-school students in the United States found that illicit drug use accounted for the depression found in the students (Swanson et al. 1992). Using a multivariate model, the survey found a strong link between depressive symptomatology, drug use and suicide, similar to that previously observed in general and clinical populations of adolescents (Swanson et al. 1992; Miller, Mahler & Gold 1991; Berman & Schwartz 1990).

TABLE 7
Treatment Outcome Based on Overall Abstinence Rates

	Frequency	Rate (%)
Abstinence and Relapse in First Six Months		
Abstinent six months	4,077	74.2
Relapsed	1,421	25.8
Abstinence and Relapse in Second Six Months		
Abstinent six months	4,249	67.7
Relapsed	2,025	32.3
Abstinence and Relapse for One Year		
Abstinent all year	3,522	55.4
Abstinent six months	238	3.7
Relapsed	2,595	40.8

Program Characteristics

The study also provided a comparison of program types and severity by depression diagnosis. As shown in previous studies, psychiatric severity was greater in inpatients and in women (Miller & Hoffmann 1995; Harrison, Hoffmann & Streed 1991). However, the direct comparison of program types and gender for major depression has never been reported. There appeared to be a naturalistic selection of referrals for

depressed patients to inpatient settings over outpatient settings in the present study. Previous studies also showed that abstinence rates and treatment outcome were similar for inpatients and outpatients despite differences in global psychiatric and addiction severity (Miller & Hoffmann 1995; Harrison, Hoffmann & Streed 1991). The lack of difference suggested that a more intensive level of treatment compensated for the greater severity in inpatients.

Response to Treatment

Contrary to other studies on psychiatric severity, treatment outcome did not differ between those alcoholics and other drug dependents with and without a lifetime diagnosis of major depression (McLellan et al. 1993; Shaw et al. 1975). There were no significant differences between abstinence rates for nondepressed and depressed alcoholics and other drug dependents except for a higher abstinence rate in depressed cocaine dependents.

These results are contrary to studies of treatment of alcoholics and opioid addicts that found the presence of major depression to be associated with poorer treatment outcome (Rounsaville et al. 1987, 1982). The prognostic significance in these studies suggested that the specific disorder of major depression predicted the poorer response to treatment. When controlling for the Addiction Severity Index for psychiatric severity, major depression remained significantly related to poorer treatment outcome in these studies. The other psychiatric diagnoses were accounted for by a global severity dimension. The treatment methods employed were not clearly described in these studies.

Importance of the Study

Clinicians are frequently faced with the difficult task of evaluating the relative importance of a diagnosis of depressive symptoms during the life of the patient, particularly in association with a substance-related disorder. The clinician often does not have an accurate history to confirm abstinence to "tease out" depressive symptoms induced by alcohol and other drug use from an independent depressive disorder. Also, a retrospective history from an active user of alcohol and other drugs typically emphasizes psychiatric symptoms and minimizes the influence or contributions from alcohol and other drug use. Frequently, a longitudinal perspective is not possible in a clinical setting to be able to distinguish the nature and etiologies of the episodes of major depressive symptoms over a lifetime. The results of this study provide the clinician with a perspective from obtaining a history of major depressive disorder in the course of a substance-related disorder. The perspective provides a basis for assessing and predicting the association of depressive symptoms and substance-related disorders in clinical populations in a wide variety of substance diagnoses. Lastly, because the use of combinations of alcohol and other drugs was so common, the subjects were examined in overlapping categories of alcohol and other drugs to reflect the naturalistic setting of the study.

TABLE 8
Treatment Outcomes Based on History of Major Depression and Abstinence Rates According to Gender and Drug Types

Comparison of Treatment Outcomes (one year) by History of Major Depression

	No History of Depression		History of Depression	
Treatment Outcome	**Male***	**Female****	**Male***	**Female****
Abstinent one year	1,492 (54.9%)	464 (58.0%)	919 (54.4%)	584 (56.0%)
Abstinent past six months	96 (3.5%)	27 (3.4%)	74 (4.4%)	40 (3.8%)
Relapsed	1,130 (41.6%)	309 (38.6%)	695 (41.2%)	418 (40.1%)

*Pearson chi-square p=0.36102.
**Pearson chi-square p=0.66169.

Treatment Outcome for Major Depression by Drug Type

	Abstinent One Year							
	Relapsed							
			No Depression		Depression		No	
Depression Drug Type	Depression Male	Female	Male	Female	Male	Female	Male	Female
Ungrouped[a]	115	35	54	40	68	27	27	16
P[b]=0.550	62.8	56.5	66.7	71.4	37.2	43.5	33.3	28.6
Alcohol	954	288	426	266	643	157	303	179
P=0.553	59.7	64.7	58.4	59.8	40.3	35.3	41.6	40.2
Prescription	28	26	44	77	17	11	30	40
P=0.764	62.2	70.3	59.5	65.8	37.8	29.6	40.5	34.2
Cannabis	181	24	125	49	175	35	134	49
P=0.527	50.8	40.7	48.3	50.0	49.2	59.3	51.7	50.0
Stimulant	28	11	55	39	26	10	28	40
P=0.092	51.9	52.4	66.3	49.4	48.1	47.6	33.7	50.6
Cocaine	172	68	184	91	278	91	222	119
P=0.035	38.2	42.8	45.2	43.3	61.8	57.2	54.7	56.7
Opioid	14	12	31	22	19	5	25	15
P=0.234	42.4	70.3	55.4	59.5	57.6	29.4	44.6	40.5

[a]Less than three criteria for Substance Use Disorder.

[b]Pearson chi-square, in percentages.

Limitations of the Study

The limitations of this study were that only a history of a lifetime diagnosis of major depression was reported and not its direct relationship to alcohol and other drug use. Therefore, a more accurate term to describe the findings may be "depressive syndrome" because the possibility of a substance-induced depression was not excluded. Only major depression was examined in response to treatment and not overall psychiatric severity. Also, follow-up of these patients longitudinally was not reported to determine presence, absence, or recurrence of depression in relation to relapse to alcohol and other drug use. Moreover, the specific etiological roles in alcohol consumption (namely, drinking) causing depression or depression causing drinking were not examined.

The diagnosis of lifetime major depression was based on DSM-III-R derived symptom endorsements (criterion "A" for a major depressive episode); as such it does not necessarily rule out situations in which the depression was initiated and maintained by an organic factor, was due to uncomplicated bereavement, or was superimposed on a psychotic disorder. Thus, the lifetime depression in the current study is most precisely considered a major depressive *syndrome*, rather than a major depressive *episode*. Note, however, that the severity of the depression was sufficient for 28% of the total sample to have sought prior treatment for depression (compared with the overall rate of 39% for lifetime depression).

The clinical and etiological importance of the relationship between depression and alcohol and other drug disorders has been often assumed in studies and clinical practice. Despite popular belief, there is little evidence that depression plays a causal role in alcohol consumption, particularly addictive use. Research has found depression to be negatively correlated with drinking in nonalcoholic manic-depressives (Mayfield & Allen 1967). Thus, the importance of treating the addictive disorder becomes clearer, particularly because continued drinking in the presence of depression is more likely to be caused by the substance use disorder than to be a consequence of the depressive disorder (Kosten & Kleber 1988; Dackis et al. 1986; Tamerin & Mendelson 1969). Some longitudinal studies of substance users have found lower rates of persistent depression following the detoxification period (5% to 15%), in the absence of specific treatment for depression, thus implicating substance use as more often predisposing to depression than vice versa (Blankfield 1986; Schuckit 1983a, 1983b; Liskow, Mayfield & Thick 1982).

Studies have suggested that the premorbid psychiatric and psychological states did not differ for alcoholics and other drug addicts prior to the onset of alcohol and other drug use and addiction (Anthenelli

& Schuckit 1993; Turnbull & Gomberg 1990; Schuckit & Montero 1988; Bowen et al. 1984). However, studies did show that a certain number of patients may have persistent symptoms of major depression after one year or greater from their last drink (Behar, Winokur & Berg 1984; Dorus & Senay 1980). In other studies, depressed nonalcoholics were less likely to consume alcohol during depressive episodes than alcoholics who were depressed (Jaffe 1990; Schuckit & Montero 1988). Many reports showed that alcohol and other drugs induced depression, and that depressive episodes were common in alcoholics and other drug addicts (Anthenelli & Schuckit 1993; DeMoja 1992; Landry, Smith & Steinberg 1991; Miller et al. 1991; Cummings, Prokop & Cosgrove 1985; Woodruff et al. 1973). Moreover, the depressive symptoms generally resolve with abstinence, and particularly with specific treatment of the addictive disorder. No study has shown that depression induces drinking or other drug use beyond self-report, which on further examination was found to be a rationalization for alcohol and other drug use (Gastfriend 1993; Miller 1993; Raskin & Miller 1993; Strain, Stitzer & Bigelow 1991; Blankfield 1986; Drake & Vaillant 1981; Mayfield 1979; Tamerin & Mendelson 1969).

Future Research

Freed (1978) conducted a comprehensive review of pertinent research that remains relevant to the future understanding of the relationship between alcohol and mood. The review revealed mixed findings and claims that the motivation for drinking alcohol is for reasons of psychological benefit, tension reduction, or affective improvement. While there were measurement and methodological barriers to delineating the relationship between drinking and depression, including self-reports by alcoholics, the preponderance of the evidence suggested that alcoholics experience increasing dysphoria as a consequence of alcohol consumption. On the other hand, nonalcoholics anticipate (and generally attain) elevated moods as a result of drinking but did not consume alcohol to the point of inducing depression. The importance of a longitudinal study of mood beginning with adolescents and young adults was stressed. Also, dose response studies—alcohol (dose) and mood (response)—are needed for both alcoholics and controls, particularly over time, in addictive and nonaddictive use, and in those with and without a history of depression. Also, self-report data should not focus solely on depression, but also on drinking and other drug addiction, as explanations for alcohol and drug use.

SUMMARY

The present study provides the only known study of comorbid lifetime depressive disorders in addiction treatment populations. The prevalence rates for comorbidity are compared across drug types and treatment settings. The rate for comorbid major depressive and substance-use disorder was 43.7%. The rate for comorbid depressive disorder was least for alcohol only, and greatest for drugs other than alcohol. The rate for comorbid depressive disorder was greater in women and inpatient treatment programs. Overall, the presence of a lifetime diagnosis of depressive disorder did not predict the response in treatment outcome to treatment for substance-use disorders in comparison to those who did not have a depressive disorder. The study did not distinguish substance-induced depression from an independent major depressive disorder. However, the clinician is provided with a perspective based on a large sample of what to expect when faced with the clinical problem of diagnosing depression in those with substance-related disorders.

REFERENCES

Alterman, A.I.; Erler, F.R. & Murphey, E. 1981. Alcohol abuse in the psychiatric populations. *Addictive Behavior* 6:69–73.

American Psychiatric Association. 1987. *Diagnostic and Statistical Manual of Mental Disorders.* 3rd ed. revised. Washington, D.C.: American Psychiatric Association.

Aneshensel, C.S. & Huba, G.J. 1983. Depression, alcohol use, and smoking over one year: A four-wave longitudinal causal model. *Journal of Abnormal Psychology* 92 (2): 134–50.

Anthenelli, R.M. & Schuckit, M.A. 1993. Affective and anxiety disorders and alcohol and drug dependence: Diagnosis and treatment. *Journal of Addictive Diseases* 12 (3): 73–88.

Behar, D.; Winokur, G. & Berg, C.J. 1984. Depression in the abstinent alcoholic. *American Journal of Psychiatry* 141 (9): 1107–109.

Berman, A.L. & Schwartz, R.H. 1990. Suicide attempts among adolescent drug users. *American Journal of Diseases of Children* 144:310–14.

Blankfield, A. 1986. Psychiatric symptoms in alcohol dependence: Diagnostic and treatment implications. *Journal of Substance Abuse Treatment* 3:275–78.

Bowen, R.C.; Cipywnyk, D.; D'Arcy, C. & Keegan, D.L. 1984. Types of depression in alcoholic patients. *Canadian Medical Association Journal* 130:869–74.

Buckner, J.C. & Mandell, W. 1990. Risk factors for depressive symptomatology in a drug using population. *American Journal of Public Health* 80 (5): 580–85.

Cummings, C.P.; Prokop, C.K. & Cosgrove, R. 1985. Dysphoria: The cause or the result of addiction? *Psychiatric Medicine* 16 (13): 131–34.

Dackis, C.A.; Gold, M.S.; Pottash, A.L.C. & Sweeney, D.R. 1986. Evaluating depression in alcoholics. *Psychiatry Resident* 17:105–9.

DeMoja, C.A. 1992. Longitudinal survey of anxiety and depression in drug users and addicts. *Psychological Report* 70:738.

Dorus, W. & Senay, E.C. 1980. Depression: Demographic dimensions and drug abuse. *American Journal of Psychiatry* 137:699–704.

Drake, R.E. & Vaillant, G.E. 1981. Predicting alcoholism and personality disorder in a 33-year longitudinal study of children of alcoholics. *British Journal of Addiction* 83:799–803.

Freed, E.X. 1978. Alcohol and mood: An updated review. *International Journal of the Addictions* 13 (2): 173–200.

Gastfriend, D.R. 1993. Pharmacotherapy of psychiatric syndromes with comorbid chemical dependence. *Journal of Addictive Diseases* 12 (3): 155–70.

Greeley, J.; Swift, W. & Heather, N. 1992. Depressed affect as a predictor of increased desire for alcohol in current drinkers of alcohol. *British Journal of Addiction* 87:1005–12.

Harrison, P.A.; Hoffmann, N.G. & Streed, S.G. 1991. Drug and alcohol addiction treatment outcome. In: N.S. Miller (Ed.) *Comprehensive Handbook of Drug and Alcohol Addiction*. New York: Marcel Dekker.

Hartka, E.; Johnstone, B.; Leino, E.V.; Motoyoshi, M.; Temple, M.T. & Fillmore, K.M. 1991. A meta-analysis of depressive symptomatology and alcohol consumption over time. *British Journal of Addiction* 86:1283–298.

Helzer, J.E. & Przybeck, T.R. 1988. The co-occurrence of alcoholism with other psychiatric disorders in the general population and its impact on treatment. *Journal of Studies on Alcohol* 49:219–24.

Hesselbrock, M.N.; Meyer, R.E. & Keener, J.J. 1985. Psychopathology in hospitalized alcoholics. *Archives of General Psychiatry* 42:1050–55.

Hoffmann, N.G.; DeHart, S.S. & Fulkerson, J.A. 1993. Medical care utilization. *Journal of Addictive Diseases* 12 (1): 97–108.

Hoffmann, N.G. & Miller, N.S. 1992. Treatment outcomes for abstinence-based programs. *Psychiatric Annals* 22 (8): 402–8.

Hoffmann, N.G. & Ninonuero, F.G. 1994. Concurrent validation of substance abusers self-reports against collateral information: Percent agreement vs. Kappa vs. Yule's Y. *Alcoholism: Clinical and Experimental Research* 18:231–32.

Jaffe, J.H. 1990. Drug addiction and drug abuse. In: A.G. Gilman, T.W. Rall, A.S. Nies & P. Taylor (Eds.) *The Pharmacological Basis of Therapeutics*. 8th ed. New York: Pergamon.

Khantzian, E.S. 1986. The self medication hypothesis of addictive disorders: Focus on heroin and cocaine dependence. *American Journal of Psychiatry* 142:1259–264.

Kosten, T.R.; Gawen, F.H.; Rounsaville, B.J. & Kleber, H.D. 1986. Cocaine abuse among opioid addicts: Demographical diagnostic factors in treatment. *American Journal of Drug and Alcohol Abuse* 12 (1/2): 1–16.

Kosten, T.R. & Kleber, H.D. 1988. Differential diagnosis of psychiatric comorbidity in substance abusers. *Journal of Substance Abuse Treatment* 5:201–6.

Landry, M.J.; Smith, D.E. & Steinberg, J.R. 1991. Anxiety, depression, and substance use disorders: Diagnosis, treatment, and prescribing practices. *Journal of Psychoactive Drugs* 23 (4): 397–416.

Liskow, B.; Mayfield, D. & Thick, J. 1982. Alcohol and affective disorder: Assessment and treatment. *Journal of Clinical Psychiatry* 34:144–47.

Mayfield, D.G. 1979. Alcohol and affect: Experimental studies. In: D.W. Goodwin & C.K. Erickson (Eds.) *Alcoholism and Affective Disorders.* New York: S.P. Medical and Scientific Books.

Mayfield, D.G. & Allen, D. 1967. Alcohol and affect: A psychopharmacological study. *American Journal of Psychiatry* 123:1346–351.

McLellan, A.T.; Luborsky, L.; Woody, G.E.; O'Brien, C.P. & Druley, M.C.A. 1993. Predicting response to alcohol and drug abuse treatment: Role of psychiatric severity. *Archives of General Psychiatry* 40:620–25.

Mello, N.K. & Mendelson, J.H. 1970. Experimentally induced intoxication in alcoholics: A comparison between programmed and spontaneous drinking. *Journal of Pharmacological and Experimental Therapeutics* 170 (1): 101–16.

Miller, N.S. 1993. Comorbidity of psychiatric and drug disorders: Interactions and independent status. *Journal of Addictive Diseases* 12 (3): 5–17.

Miller, N.S. 1991. Special problems of the alcohol and multiple-drug dependent. Clinical interactions and detoxification. In: R.J. Frances & S.I. Miller (Eds.) *Clinical Textbook of Addictive Disorders.* New York: Guilford.

Miller, N.S. & Fine, J. 1993. Evaluation and acute management of psychotic symptomatology in alcohol and drug addictions. *Journal of Addictive Diseases* 12 (3): 59–72.

Miller, N.S.; Gold, M.S. & Belkin, B.M. 1992. The diagnosis of alcohol and cannabis dependence in cocaine dependence. *Advances in Alcohol and Substance Abuse* 8 (3/4): 33–42.

Miller, N.S. & Hoffmann, N.G. 1995. Treatment outcome effectiveness. *Alcoholism Treatment Quarterly* 12 (2): 41–56.

Miller, N.S.; Mahler, J.C.; Belkin, B.M. & Gold, M.S. 1991. Psychiatric diagnosis in alcohol and drug dependence. *Annals of Clinical Psychiatry* 3 (1): 79–89.

Miller, N.S.; Mahler, J.M. & Gold, M.S. 1991. Suicide risk associated with drug and alcohol dependence. *Journal of Addictive Diseases* 10 (3): 49–61.

Mueller, T.I.; Lavori, P.W.; Keller, M.B.; Swartz, A.; Warshaw, M.; Hasin, D.; Coryell, W.; Endicott, J.; Rice, J. & Akiskal, H. 1994. Prognostic effect of the variable course of alcoholism on the 10-year course of depression. *American Journal of Psychiatry* 151 (5): 701–6.

Raskin, V.D. & Miller, N.S. 1993. The epidemiology of the comorbidity of psychiatric and addictive disorders: A critical review. *Journal of Addictive Diseases* 12 (3): 45–57.

Regier, D.A.; Farmer, M.E.; Rae, D.S.; Locke, B.Z.; Keith, S.J.; Judd, L.L. & Goodwin, F.K. 1990. Comorbidity of mental disorders with alcohol and other drug abuse. *Journal of the American Medical Association* 264 (19): 2511–518.

Roman, P.M. 1989. *Inpatient Alcohol and Drug Treatment: A National Study of Treatment Centers.* Executive Report to National Institute on Alcoholism and Alcohol Abuse. Institute for Behavioral Research, University of Georgia.

Rounsaville, B.J.; Dolinsky, Z.S.; Babor, T.E. & Meyer, R.E. 1987. Psychopathology as a predictor of treatment outcome in alcoholics. *Archives of General Psychiatry* 44:505–13.

Rounsaville, B.J.; Weissman, M.M.; Kleber, H. & Wilber, C. 1982. Heterogeneity of psychiatric diagnoses in treated opioid patients. *Archives of General Psychiatry* 39:161–66.

Schuckit, M.A. 1983a. Alcoholism and other psychiatric disorders. *Hospital and Community Psychiatry* 34:1022–27.

Schuckit, M.A. 1983b. Alcoholic patients with secondary depression. *American Journal of Psychiatry* 140:711–14.

Schuckit, M.A. & Montero, M.G. 1988. Alcoholism, anxiety, and depression. *British Journal of Addiction* 83:1373–380.

Shaw, A.; Dolly, P.; Morgan, D.W. & Robinson, A.J. 1975. Tricyclic antidepressants. *American Journal of Psychiatry* 132:641–44.

Strain, E.C.; Stitzer, M.L. & Bigelow, G.E. 1991. Early treatment of depressive symptoms in opioid addicts. *Journal of Nervous and Mental Diseases* 179:215–21.

Swanson, J.W.; Linskey, A.O.; Quintro–Salinas, R.; Pumariega, A.J. & Holzer, C.E. 1992. A binational school survey of depressive symptoms, drug use, and suicidal ideation. *Journal of the American Academy of Child and Adolescent Psychiatry* 31 (4): 669–78.

Tamerin, J.S. & Mendelson, J.H. 1969. The psychodynamics of chronic inebriation. Observations of alcoholics during the process of drinking in an experimental group setting. *American Journal of Psychiatry* 125 (7): 886–99.

Turnbull, J.E. & Gomberg, E.S.L. 1990. The structure of depression in alcoholic women. *Journal of Studies on Alcohol* 51:148–55.

Woodruff, R.A.; Guze, S.B.; Clayton, P.J. & Carr, D. 1973. Alcoholism and depression. *Archives of General Psychiatry* 28:97–100.