Long-Term Morbidity and Mortality among a Sample of Cocaine-Dependent Black and White Veterans

Joy C. Yang, David Huang, and Yih-Ing Hser

ABSTRACT *Racial minorities generally exhibit worse health status than do whites. To assess the presence of similar phenomena among long-term cocaine-using veterans, this study examined racial variations in mortality and health status among cocaine-dependent men who were originally recruited at their admissions to cocaine treatment in 1988–1989 and were interviewed approximately 12 years later in 2002–2003. Mortality was higher among whites (15%) than blacks (6%), particularly due to drug overdose. Controlling for socioeconomic factors, cocaine severity, and depression, the racial difference was still significant in the survival analysis. Racial differences were examined in the health status of those interviewed in the 12-year follow-up study (178 blacks and 65 whites), after confirmation of their comparable socioeconomic backgrounds and levels of healthcare access and utilization. Contrary to expectations, few racial differences were found on most health indicators, although the level of cocaine use was higher among blacks. Furthermore, fewer blacks reported having hepatitis or sexually transmitted diseases than did whites. The study results suggest that black cocaine-dependent veterans do not have worse health status when compared with white veterans on most health indicators.*

KEYWORDS *Black veterans, Cocaine dependence, Health disparities, Racial differences.*

INTRODUCTION

Ethnic and racial health disparities are a pressing national concern as minority populations, particularly blacks, exhibit worse health status compared to whites. For example, the Commonwealth Fund 2001 Health Care Quality Survey found that 77% of blacks age 50 and older were diagnosed with a chronic disease or condition, such as cancer, heart disease, or diabetes, compared to 64% of whites.¹ Blacks generally have higher rates of mortality from these diseases than whites and are more likely to die from homicide, drug overdose, and infectious diseases such as HIV/AIDS.^{2–4} Several explanations have been offered to account for these disparities, including differential access to health care resulting from socioeconomic differences.⁵ Blacks reportedly tend to see physicians who are less

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trained and have less access to important clinical resources than doctors who treat white patients.⁶ Higher morbidity among racial minorities has also been connected to their experiencing racial discrimination.⁷⁻⁹ The study reported here examined racial health disparities among a cocaine-dependent sample of veterans. The following review of literature provides context and background on this population.

Racial disparities in mortality are evident among drug-using populations. In a study of fatal drug overdoses in New York City from 1990–1998, Galea et al.¹⁰ found that blacks and Latinos were more likely to die of drug overdoses than were whites. Although racial disparities continue to exist among substance abusers, a trend toward their leveling has appeared in recent mortality data. National Vital Statistics data have shown an increase in age-adjusted drug-induced death rates for white males from 9.2 per 100,000 population in 1999 to 12.1 in 2002. The corresponding rates were higher for black males but have fluctuated little over time (14.3 in 1999 and 14.2 in 2002).² The narrowing gap between blacks and whites is also seen in the rates of alcohol-induced deaths, which decreased significantly for black males from 1999 to 2002 (from 16.2 to 12.8) but remained constant for whites (10.9 to 10.8).²

Cocaine is one of the most widely abused substances, but little is known about racial health disparities among those who abuse it.^{10,11} The adverse effects of cocaine on health are well documented,¹²⁻¹⁴ and higher levels of addiction are associated with poor perceived health.¹⁵ During the last 6 months of 2003, cocaine was involved in approximately 126,000 emergency department (ED) visits, or 20% of all drug-related ED visits.¹⁶ Blacks accounted for 31.9%, and whites made up approximately 49.7% of these visits.

As with racial health disparities among cocaine users, not much is known about the disparities among drug-using veterans. However, in one study of participants at a Veterans Affairs (VA) substance abuse work therapy program, racial differences were found with respect to drug and alcohol severity, psychiatric health, and social support. Black participants had broader social support networks and higher drug use severity but less alcohol use severity than did whites. They were also found to have better psychiatric health than whites.¹⁷

Veterans have been estimated to have a significantly higher prevalence of previous-month heavy drinking and marijuana use compared to non-veterans (7.5 and 3.5% compared to 6.5 and 3.0%, respectively), but no differences are apparent with respect to their illicit drug use apart from marijuana (1.7% for veterans and 1.9% for non-veterans).¹⁸ Veterans were also significantly more likely to receive treatment for their substance abuse compared to non-veterans.¹⁸

As the study reported here focused on cocaine-dependent black and white men in their mid-30s and older, it is helpful to examine national prevalence and treatment data for this group. Data on cocaine use prevalence from the 2003 National Survey on Drug Use and Health (NSDUH) show that black and white non-Hispanic men ages 35 and older report similar lifetime cocaine use. Among those in this gender and age group, 24.5% of blacks and 25.7% of whites reported having ever used cocaine. Two percent of blacks and 1.3% of whites reported cocaine use within the previous year. Using Census 2000 population data for this gender and age group, this translates into approximately 121,000 blacks and 713,700 whites. Although there are more cocaine-using white men than black men in this age group nationwide, treatment admission data from the 2002 Treatment Episode Data Set (TEDS) for men ages 35 and over showed that blacks were admitted to treatment for cocaine as their

primary substance of abuse in greater numbers than whites.¹⁹ White men in this age group made up 10.9% of all treatment admissions for primary cocaine abuse, or 26,192 treatment episodes. The corresponding figure for black men was 23.3%, accounting for 55,921 treatment episodes, suggesting that cocaine-dependent black men may be more willing to seek treatment for their addiction, or there may be other influences that steer them into the treatment system in greater numbers than whites.

Based on a sample of black and white cocaine-dependent male veterans that have been followed for more than 12 years, our study examined racially related disparities in their mortality and morbidity. The resulting longitudinal data permit an assessment of racial differences in important long-term indicators of health status, taking into consideration socioeconomic status as well as access to and utilization of health services. Because factors related to access to health care (including measures of socioeconomic status and utilization of health services and drug and alcohol treatment) may be contributors to disparities in health, we first examined these factors among our sample. Controlling for any differences in these factors, we then examined whether race still played a role in disparities in the health status of our sample. In accordance with the literature, we hypothesized that blacks in the sample would have higher mortality and worse health status than whites, controlling for socioeconomic status and healthcare utilization. As cocaine dependence is an important characteristic of this sample and a determinant of health status, we further examined racial differences in long-term cocaine use and utilization of treatment for cocaine dependence.

MATERIALS AND METHODS

Sample

This study is based on 215 black men and 79 white men who were part of the original sample of 321 male veterans (including 27 Hispanic men who were excluded from the analysis due to limited sample size) who were admitted to the West Los Angeles Veterans Affairs Medical Center (WLA-VAMC) from 1988 through 1989 for their cocaine dependence. All subjects met the then-current criteria of the Diagnostic and Statistical Manual of Mental Disorders-Third Edition (DSM III-R) for cocaine dependence. Subsequent to intake, the sample was interviewed in 1990–1991 (96.2% interview completion rate) and again in 1991–1992 (87.5% interview completion rate). The 12-year follow-up study described here was conducted in 2002–2003, with a 96.9% location rate (266 interviewed, 28 were confirmed to be dead, nine refused, and eight were either out of the country, too ill, or too mentally dysfunctional to be interviewed); ten subjects were lost to follow-up.²⁰ At the 12-year follow-up, 13 blacks and 12 whites were found deceased; 178 blacks and 65 whites were interviewed.

Interview Procedures

Face-to-face interviews were conducted by UCLA research staff experienced in tracking, locating, and interviewing subjects using established protocols. Most interviews took place in a private office at UCLA. If incarcerated, subjects were interviewed in a private room of the jail or prison. Interviews were also conducted at the subject's home or in a public place if requested by the participant. The

average interview required between 2 and 3 h to administer. At the end of the interview, subjects were requested to provide a urine specimen if they were not incarcerated. At the 12-year follow-up, 204 of the 254 non-incarcerated subjects agreed to provide a urine specimen, with 194 urinalysis results usable (ten urine specimens were insufficient for testing). The 50 urine sample refusals were mostly interviewed outside of the Los Angeles area (78%). All participation, including the furnishing of urine samples, was voluntary. Urinalyses showed that the congruence between self-reported current cocaine/crack use (in previous 7 days) and urinalysis results among those who provided a urine specimen was 88.0%.

The UCLA Office for the Protection of Research Subjects approved the study's interview procedures and a Certificate of Confidentiality was obtained from the U.S. Department of Health and Human Services (DHHS), protecting researchers from court orders to disclose information from interviews that would identify subjects.

Measures

The Natural History Instrument (NHI) was used at the baseline as well as at follow-up interviews. The NHI was adapted from instruments designed by Nurco et al.²¹ and has been previously applied to drug-abusing populations of a similar nature.^{22,23} The information provided by the participants was retrospectively recalled in a chronological sequence for their entire cocaine use career, which covered, across the three interviews, from 1 year prior to first cocaine use to the time of the 12-year follow-up interview.

Relevant background and socioeconomic variables included age, educational attainment (less than high school, high school, trade/technical school, at least some college), mean monthly salary, employment status (employed, unemployed, unemployed due to disability), marital status (married/living with partner, single, divorced/separated/widowed) and receipt of public assistance (SSI/disability, Social Security, welfare/food stamps). These variables were assessed at baseline (1988–1989).

Mortality among this sample was documented using death certificate data. Causes of death were classified by the underlying cause of death as coded in accordance with the ICD-9.²⁴

Among those alive and interviewed in the 12-year follow-up, we examined levels of substances used (e.g., tobacco, alcohol, marijuana, methamphetamine, cocaine, and heroin), which included ages of onset and current and past levels of use. Alcohol dependence was determined by the DSM-IV criteria. Longitudinal patterns of cocaine use and drug treatment over the cocaine use careers were derived from the NHI, including the number of months of cocaine use in a given year and the number of months in treatment in a given year over the entire cocaine use career. Treatment services included hospital inpatient, residential, outpatient drug free (non-methadone), and support groups (e.g., Alcoholics Anonymous, Cocaine Anonymous, and Narcotics Anonymous).

At the 12-year follow-up study, information was collected on utilization of medical, mental health, drug, and alcohol services. Participants were asked whether they had used specific medical, mental health, drug and alcohol treatment services and the number of treatments received during their lifetimes. Presence of social support was assessed by determining the number of people that could provide participants with social support in the previous 12 months.

In addition to mortality, long-term health status was measured by statuses in substance use, medical/health, and mental health at the 12-year follow-up. Substance use was based on report of any use of alcohol or other drugs during the previous year. Participants' ongoing health conditions at the 12-year follow-up interview were collected using items adapted from the *National Health and Nutrition Examination Survey (NHANES)* instrument.²⁵ Participants were asked to identify medical diseases and conditions that they had ever had, their age when the diseases first occurred, whether they were ever formally treated for them, and whether the conditions were still ongoing. Perceived health and functioning were assessed using the *Short Form 36 (SF-36) Medical Outcome Survey*. The SF-36 includes subscales of general health, physical and social functioning, emotional well being, pain, and role limitation due to physical health problems. Scores for each domain are calculated on 100-point scales. Higher scores indicate better functioning and health. The reliability of this standardized instrument with cocaine-dependent samples has been affirmed by Falck et al.¹⁵

Hopkins Symptom Checklist-58 (SCL; Derogatis, 1974) was used to measure psychological distress on five subscales: depression (e.g., feeling blue, thoughts of ending your life); anxiety (e.g., nervousness or shakiness inside, heart pounding or racing); obsessive-compulsiveness (e.g., having to check and double check what you do, feeling blocked in getting things done); interpersonal sensitivity (e.g., feeling critical of others, your feelings being easily hurt); and somatization (e.g., headaches, pains in heart or chest). Current psychiatric symptoms are rated on a scale of one to four, with four indicating greater problem severity.

Analytic Approaches

Univariate analyses were conducted to examine group differences using *t*-tests (for continuous variables) or χ^2 tests (for categorical variables). Survival analysis was conducted to assess the racial difference on mortality, controlling for age, employment status, length of time in drug treatment in lifetime, depression (from the SCL), years of cocaine use and early initial use of cocaine (initiation of cocaine use before age 18). Additionally, multivariate analysis (logistic regression for dependent variables that were dichotomized and general linear model for continuous variables) was applied in comparison of group differences on health indicators. Covariates included socioeconomic status (age, education, employment and marital status), healthcare utilization (emergency room visits, hospitalization, inpatient/outpatient mental health services), and addiction severity (years of cocaine use, alcohol dependence).

Mixed-model analysis, including a random effect for individual, was conducted to test for racial differences with respect to longitudinal patterns of cocaine use and treatment participation over the 12-year follow-up period. Two models were conducted to test for group differences separately on (1) levels of cocaine use and (2) treatment participation. Because treatment levels showed a curvilinear pattern during the initial years after baseline, a quadratic "year" term was included in the model to assess racial differences in treatment over time. These analyses covered the cocaine use career beginning at baseline and extending to 12 years after baseline. Mixed-model analysis was conducted using the SAS Proc Mixed procedure.

Unless otherwise indicated, the significance level was set at $p < 0.05$. In considering the possibility of false significance due to a multiplicity of statistical tests, a conservative significance criterion of $p < 0.01$ was also indicated.

RESULTS

Background and Socioeconomic Characteristics at Baseline

The mean age of the 294 participants at baseline was 35.1 years and ranged from 21 to 65 years. While college attendance was less than 20% at intake for both blacks and whites, over 62% of these participants had attended at least some college by the time of the 12-year follow-up interview. Blacks and whites in our sample did not differ in age, education, employment and income, marital status, or disability at intake (see Table 1). Both groups showed high levels of education and employment. About two-thirds of both blacks and whites reported completion of high school, and many had additional education. Approximately three out of five blacks and whites were employed. The two groups also showed similarities in receiving SSI/disability and Social Security, although significantly fewer whites (2.5%) were on welfare or received food stamps compared to blacks (12.1%).

Mortality

Overall, whites had a significantly higher mortality than did blacks (15 vs. 6%; $p < 0.05$). The racial difference was significant (HR = 3.78, 95% CI = 1.57–9.101, $p <$

TABLE 1. Demographics and socioeconomic characteristics among all black and white participants (N = 294)

	Black (N = 215)	Whites (N = 79)	Total (N = 294)
Age at intake (%)			
21–30	20.9	25.3	22.1
31–40	59.5	57.0	58.8
41–50	17.7	17.7	17.7
51+	1.9	0	1.4
Mean age (SD)	35.3 (6.4)	34.6 (6.5)	35.1 (6.4)
Education at intake (%)			
Less than high school	6.1	11.5	7.6
High school	66.2	62.8	65.3
Trade/technical/state license	9.4	10.3	9.6
College	18.3	15.4	17.5
Employment status at intake (%)			
Employed	59.7	55.8	58.7
Unemployed due to disability	9.0	6.5	8.3
Unemployed	31.3	37.7	33.0
Monthly take home salary, mean (SD)	721.87 (846.24)	737.82 (954.54)	726.0 (874.0)
Marital status at intake (%)			
Married/living with partner	31.3	22.8	29.0
Single	26.2	29.1	27.0
Widow/separated/divorced	42.5	48.1	44.0
Public assistance at intake (%)			
SSI/disability	11.2	11.4	11.2
Social security	3.3	0	2.4
Welfare/food stamps*	12.1	2.5	9.5
Disability at intake (%)	15.0	16.7	15.5
Deceased after intake	13 (6.0%)	12 (15.2%)	25 (8.5%)

* $p < 0.05$ on χ^2 test between blacks and whites.

0.01) in the survival model that controlled for socioeconomic variables, cocaine use, cocaine dependence treatment, and depression. Of these covariates, older age (HR = 1.11, $p < 0.01$), shorter length of time in treatment (HR = 0.94, $p < 0.05$), and early initiation of cocaine use (HR = 5.96, $p < 0.01$) were also significantly related to mortality.

As for causes of death, no significant group differences were found, with the exception that whites were significantly more likely to die of a drug-related cause than were blacks ($p < 0.01$; data not shown).

Cocaine Use History and Treatment among Interviewed Participants

Table 2 provides histories of cocaine use and treatment participation among participants who were alive and interviewed at the 12-year follow-up. Blacks, on average, were approximately 2 years older than whites when they first started using cocaine ($p < 0.05$). A significantly higher percentage of whites (66.2%) compared to blacks (46.6%) reported having abstained from cocaine five or more years at the 12-year follow-up ($p < 0.01$). Whites also had significantly longer periods of abstinence than did blacks, averaging nearly 8 years of continuous abstinence compared to 6 years for blacks. No racial differences were found in the number of years between participants' first and last cocaine use. Lifetime alcohol dependence was higher among whites (55.4%) compared to blacks (34.3%; $p < 0.01$). There

TABLE 2. Histories of substance abuse and treatment among participants interviewed at the 12-year follow-up (N = 243)

	Black (N = 178)		White (N = 65)		Total (N = 243)	
Cocaine use history						
Age at first cocaine use*	26.0	(6.3)	23.9	(6.3)	25.4	(6.4)
Years between initial and last cocaine use	17.2	(7.7)	16.6	(7.6)	17.0	(7.7)
Abstinent from cocaine five or more years at the 12-year follow-up (%)**	46.6		66.2		51.9	
Years of continuous cocaine abstinence before the 12-year follow-up*	5.9	(5.8)	7.9	(5.6)	6.4	(5.7)
Alcohol dependence (lifetime, %)**	34.3		55.4		40.0	
History of treatment at 12-year follow-up						
Total number of drug treatments	8.0	(15.4)	7.1	(9.4)	7.8	(14.0)
Total number of alcohol treatments	0.4	(1.9)	0.3	(1.5)	0.3	(1.8)

* $p < 0.05$; ** $p < 0.01$ on χ^2 test or t -test between blacks and whites.

FIGURE 1. Cocaine use and treatment over time among participants by race (*N* = 243).

was no significant racial difference in the number of lifetime drug or alcohol treatments, however.

Figure 1 displays longitudinal patterns of cocaine use and treatment participation by plotting the average number of months (cumulative, not necessarily consecutive) of cocaine use and substance abuse treatment per year over the interview period (including 5 years prior to entry into the present study) by race. Cocaine use for both blacks and whites peaked at 10.2 months for blacks and 9.8 months for whites in the year preceding baseline, fell sharply as subjects entered treatment (4.5 months for blacks and 3.3 months for whites), and declined gradually over the following 12-year period. The average number of months of cocaine use for blacks remained higher than the average for whites, ranging from 5.1 months in the third year after baseline to 3.3 months 12 years after baseline for blacks, compared to 3.3 and 1.4 months for whites. The average duration of treatment experiences ranged from 3 days to about 2 weeks for blacks and 1.1 to 1.2 months for whites 5 years and 1 year preceding baseline, respectively. The cumulative time in treatment jumped to 5 1/2 months for blacks and 6.1 months for whites during the year of initial treatment entry for the present study, declined in Years 1 through 3 and leveled off in Years 4 through 12.

The modeling results of the series of mixed-model analyses are summarized in Table 3. The first model (Table 3a) showed that blacks, on average, used cocaine significantly more months each year than did whites (*b* = 1.24, *p* = 0.016). With each additional year, the predicted numbers of months that blacks and whites used cocaine in a given year declined (0.167 months for whites and 0.141 months for blacks). The decreasing slopes of black and white cocaine use were not significantly different.

The second model showed that there was no difference between the two groups in months in treatment during the baseline year (*p* = 0.28, Table 3b). The number of months in treatment for both blacks and whites fell steeply initially (slope at 1 year after baseline = $-0.95 + (0.06)(1) = -0.89$) compared to a decade after baseline (slope = $-0.95 + (0.06)(10) = -0.35$). The decreasing patterns over the analysis period were not significantly different between blacks and whites.

TABLE 3. Mixed-model analysis predicting cocaine use and treatment participation over the 12-year follow-up period among participants (N = 243)

Variable	Coefficient estimate	Standard error	Degrees of freedom	p value
(a) Mixed model predicting months of cocaine use per year over 12 years				
Intercept	3.35	0.44	241	<0.0001
Year	−0.167	0.047	241	0.0001
Black (reference = whites)	1.24	0.51	241	0.016
Year*Black	0.026	0.055	241	0.64
(b) Mixed model predicting months of treatment per year over 12 years				
Intercept	4.00	0.41	241	<0.0001
Year	−0.95	0.12	241	<0.0001
Black (reference = white)	−0.52	0.48	241	0.28
Year*Black	0.19	0.14	241	0.18
Year*Year	0.06	0.008	241	<0.0001
Year*Year*Black	−0.01	0.009	241	0.27

Utilization of Health and Mental Health Services and Social Support

No significant difference was found in medical treatment utilization between racial groups (Table 4). Approximately two-thirds of both blacks and whites reported visiting an emergency room since their last interview, with a mean number of 1.9 visits for blacks and 3.6 visits for whites. However, a significantly higher proportion of whites than blacks had outpatient and inpatient mental health treatment. Whites also reported significantly longer stays in inpatient mental health facilities compared to blacks.

Blacks reported a wider social support network than did whites. There was a significant difference between the two groups, with whites reporting significantly fewer numbers of people that they could turn to for social support.

Substance Use at the 12-Year Follow-Up

Table 5 shows the percentages of substance use in the year preceding the 12-year follow-up. A significantly higher proportion of blacks (43.3%) compared to whites (20.0%) reported cocaine use in the previous year ($p < 0.01$). In contrast, a greater percentage of whites (13.9%) reported methamphetamine use compared to blacks (3.9%; $p < 0.01$). Use of tobacco and marijuana among blacks and whites was nearly identical, with slightly over 61% of blacks and whites reporting tobacco use and nearly half reporting marijuana use. Alcohol use was similar for blacks and whites, although lifetime alcohol dependence was higher among whites as reported earlier.

Health and Mental Health Status at the 12-Year Follow-Up

Participants' medical conditions at the 12-year follow-up were examined for racial group differences (Table 5). Univariate analysis showed that blacks had worse health status regarding genitourinary disease than did whites ($p < 0.05$), although whites fared worse in terms of hepatitis, cirrhosis, and STDs ($p < 0.01$ for those three health indicators). In addition, whites had a lower SF-36 general health score ($p < 0.05$) and more severe SCL somatization and depression scores ($p < 0.05$) than did blacks.

TABLE 4. Health services, mental health services, and social support among participants

	Black (N = 178)	White (N = 65)	Total (N = 243)
Physical health services			
Emergency room visits (%)	62.4	66.2	63.4
Medical treatment in public clinic or hospital (%)	41.0	29.2	37.9
Mean number of medical treatments	1.41 (2.94)	1.17 (3.44)	1.34 (3.08)
Mental health services			
Outpatient mental health treatment (%)*	31.5	46.2	35.4
Months in outpatient mental health treatment	16.63 (41.07)	19.51 (43.20)	17.40 (41.57)
Times in outpatient mental health treatment	2.49 (12.23)	1.49 (3.16)	2.23 (10.62)
Inpatient mental health treatment (%)**	18.5	33.8	22.6
Months in inpatient mental health treatment*	9.81 (31.66)	25.20 (51.72)	13.88 (38.49)
Times in inpatient mental health treatment	2.08 (10.05)	1.43 (3.97)	1.90 (8.83)
Social support			
Number of people providing social support in the past 12 months*	4.96 (3.08)	4.12 (2.42)	4.74 (2.94)
0*	12.9	10.8	12.4
1–2	10.7	10.8	10.7
3–4	19.7	36.9	24.3
5–6	20.8	24.6	21.8
7+	36.0	16.9	30.9

* $p < 0.05$; ** $p < 0.01$ on χ^2 test or t -test between blacks and whites.

We further examined racial differences in these medical conditions in a multivariate analysis controlling for socioeconomic status, healthcare utilization, and addiction severity. Whites were still significantly more likely to have hepatitis ($p < 0.01$) and sexually transmitted diseases ($p < 0.05$) compared to blacks. Blacks continued to be more likely to have genitourinary disease than were whites ($p < 0.05$).

After controlling for all covariates in the multivariate analysis, there were no significant racial differences on *SF-36* and *SCL* scales.

DISCUSSION

The study results suggest that black male veterans who are dependent on cocaine exhibit health status that is generally similar to that of their white counterparts. Contrary to expectations, whites reported worse health status than blacks for two medical conditions (hepatitis and sexually transmitted diseases) in the present study. Furthermore, whites demonstrated higher mortality, even though their levels of cocaine use were lower than were those of blacks. While not found in the multivariate

TABLE 5. Substance use, health, and mental health status at the 12-year follow-up (N = 243)

	Black (N = 178)	White (N = 65)	Total (N = 243)
Substance use (%) ²			
Alcohol use	50.6	40.0	47.7
Tobacco	61.2	61.5	61.3
Marijuana ¹	44.3	44.6	44.4
Cocaine/crack ^{1**}	43.3	20.0	37.0
Heroin ¹	2.8	6.2	3.7
Methamphetamine ^{1**}	3.9	13.9	6.7
Daily alcohol use	12.9	18.5	14.4
Medical conditions (%) ³			
Cardiovascular disease	33.7	38.5	35.0
Respiratory disease	10.7	13.9	11.5
Hepatitis**	7.4	33.9	14.6
Cirrhosis	0.6	6.2	2.1
Genitourinary disease*	9.6	1.5	7.4
STDs*	3.4	13.9	6.2
Health status (SF-36) ³			
Physical functioning	81.1 (28.5)	78.3 (30.0)	80.4 (28.9)
Role limitation due to physical health	77.5 (39.6)	72.3 (41.5)	76.1 (40.1)
Emotional well-being	74.0 (20.8)	70.3 (21.2)	73.0 (20.9)
Social functioning	84.6 (27.6)	84.3 (26.1)	84.5 (27.2)
Pain	65.0 (36.5)	58.1 (32.2)	63.1 (35.4)
General health	64.2 (27.2)	56.3 (27.1)	62.1 (27.3)
Mental health (SCL) ³			
Somatization	1.42 (0.47)	1.60 (0.47)	1.47 (0.47)
Obsessive-compulsive	1.56 (0.62)	1.67 (0.73)	1.59 (0.65)
Interpersonal sensitivity	1.53 (0.59)	1.60 (0.54)	1.55 (0.58)
Depression	1.48 (0.58)	1.65 (0.55)	1.52 (0.55)
Anxiety	1.32 (0.51)	1.38 (0.58)	1.33 (0.53)

* $p < 0.05$; ** $p < 0.01$.

¹Adjusted by urinalysis.

² χ^2 test conducted to test for racial differences on substance use.

³Multivariate analysis (logistic regression for medical conditions and GLM for health status and mental health) to test for racial differences, controlling for SES (age, education, employment, marital status), healthcare utilization (ER visits, hospitalization, in/outpatient mental health services), and addiction severity (years of cocaine use, alcohol dependence).

analysis, which controlled for mental health services utilization, whites were found to have significantly higher somatization and depression compared to blacks in the univariate analysis.

It should be noted that the socioeconomic characteristics of the two racial groups in our sample were comparable. Furthermore, with the exception of higher utilization of mental health services by whites, access to health care, including medical, drug, and alcohol treatment, were also similar across the two groups. Thus, it appears that factors other than socioeconomics and access to care may be responsible for the observed racial differences in mortality and morbidity.

While significant racial differences with respect to cirrhosis, general health (SF-36), somatization, and depression (SCL) were found in the univariate analysis,

these differences were obviated in the multivariate analysis when covariates were included. Thus, some of the racial differences can be accounted for by these covariates such as age, ER visits, mental health visits, and alcohol dependence. For example, alcohol dependence was significantly higher among whites in our sample, which may have predisposed them to liver conditions (hepatitis and cirrhosis) known to be exacerbated by alcohol abuse.^{23,26,27}

While extended periods of cocaine and alcohol abuse were expected to negatively affect health, other findings were not anticipated. For example, although blacks reported greater cocaine use (e.g., more average months using during each year) than did whites, blacks generally did not report worse health. Both groups reported similar declines in their cocaine use patterns, showing that both blacks and whites cut back on their use of cocaine once they were in treatment. There were also no differences between blacks and whites in terms of their levels of treatment or changes in the amount of treatment that they received over time. Thus, better health status for blacks cannot be attributed to greater participation in treatment for their cocaine dependence.

While the present analysis demonstrated that cocaine use was more persistent among blacks, whites on average started using cocaine at a younger age, which may have negatively impacted their long-term health. In addition to cocaine and alcohol abuse, use of other drugs appeared to influence health status. Whites were more likely to have been using methamphetamine, which has been found to result in worse health status after prolonged use.²⁷

It is important to note that whites in our sample reported having significantly fewer people in their social support network, consistent with a previous study on drug-using veterans.¹⁷ Over one-third of blacks, compared to about 17% of whites, reported that seven or more people provided them with social support in the past year. Having an extensive and stable support network likely contributed to the mental and emotional well being of blacks in this sample and could have had a positive influence on their perceptions of their general health. Whites in our sample, on the other hand, reported more mental health problems (e.g., depression), and they also outnumbered blacks in terms of having received inpatient and outpatient mental health treatment.

This study has several limitations. First, data used in this study came from self-reported interviews, which may be subject to recall or reporting bias. Some minority populations may be less willing to report health problems or may be less aware of them.¹¹ However, instruments employed in this study have been used in many previous studies among populations of a similar nature. Furthermore, a comparison of health conditions reported by these subjects and included in their VA records demonstrated comparable results.²⁸ Second, since the present analyses included only black and white male veterans (and excluded those of Hispanic origin due the small sample size), the present findings may not be generalizable to other ethnic groups, women, or non-veteran populations. Third, although we examined the duration of cocaine use, other aspects of cocaine dependence (e.g., route and frequency of administration) may influence study results. Further analysis should examine whether more severe cocaine use patterns (e.g., use by injection) are related to worse health status.

Despite these limitations, findings of the study have important implications for health services for black and white males who have drug and alcohol problems, particularly among veterans. While research has shown that drug users face economic and other barriers to access to health care, generally,^{29,30} disparities in

access may not be an issue in certain healthcare systems, such as the VA system, that serve patients regardless of their ability to pay. Although there have been some studies suggesting less access to care for blacks at VA facilities,^{31,32} Jha et al.³³ found that for black and white patients who had common diagnoses, overall mortality was lower among black patients than among white patients (4.5 vs. 5.8%, respectively). The mortality rates of the present study's sample are consistent with Jha et al.'s findings. Additionally, our findings on comparable access to drug treatment are consistent with national treatment data noted earlier, which also showed that cocaine-dependent black men appear to have greater access to treatment than do whites.¹⁹

Heavy alcohol use has been found to be a major problem among veterans compared to non-veterans.¹⁸ Our findings are similar to others showing that white veterans in substance abuse treatment have more severe alcohol problems compared to blacks.¹⁷ An underlying culture of drinking may contribute to heavy alcohol use among this population, who often use alcohol as a form a self-medication for physical and mental disorders (e.g., wounds, injuries, post-traumatic stress, depression, etc.) prevalent among veterans. Drug treatment programs for veterans should include routine screening for alcohol problems in order to provide targeted treatment addressing these cultural factors and morbidity associated with excessive drinking in addition to their drug problems.

Black and white cocaine-dependent veterans are a unique population whose health status does not reflect the disparities reported in the general population. However, there is generally nothing known about racial disparities among long-term cocaine-dependent individuals in the general population. Our study findings may be generalizable to those who have relatively high levels of education/employment and access to services. Given the limited racial disparities in health status observed in our sample (particularly when service utilization is controlled in the multivariate analysis), relative to those observed in health conditions among the general population, our study results suggest that access to care may eliminate considerable disparities. Additionally, several of our findings are quite consistent with the general substance abuse literature. For example, the higher percentage of whites than blacks reporting methamphetamine use in our sample is consistent with many documents reporting that methamphetamine use is more prevalent among whites.^{27,34,35} Similarly, as other studies have found, blacks often reported having more people in their social network. Disparities in health status may be reduced for blacks by these protective factors. On the other hand, early initiation of cocaine use and greater use of alcohol and methamphetamine among whites may contribute to their greater risk for worse health. Future studies should tease out the potential long-term health effects of using multiple substances of abuse. Furthermore, identification of additional protective factors could help to address health disparities among various groups.

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