

Risk Factors for Suicide in Blacks and Whites: An Analysis of Data From the 1993 National Mortality Followback Survey

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Objective: Data on risk factors for suicide in blacks in the United States are needed, given the dramatic increase in the black suicide rate from 1980 to 1997. The 1993 National Mortality Followback Survey represented an unprecedented opportunity to identify risk factors for suicide in blacks and to determine whether race differences (black versus white) in risk factors exist.

Method: Multiple logistic regression analyses were used to compare cases of suicide (150 suicides in blacks and 1,279 suicides in whites) with cases of accidental deaths (737 cases in blacks and 3,458 cases in whites). Predictors of interest were 18 items tapping four domains: antisocial behavior, substance use/abuse, depressive symptoms, and psychotic symptoms.

Results: Four items distinguished suicides from accidental deaths in both black and whites: death ideation, suicidal ideation, bizarre behavior, and making violent threats. Items in two of the four domains discriminated risk for suicide in whites more strongly than in blacks: reports of community complaints and problem drinking. No variable conferred greater risk for suicide in blacks than in whites.

Conclusions: The current study underscores the need for examination of race differences in risk factors for suicide. It is also essential to examine variables that were unavailable in the National Mortality Followback Survey data set, particularly racism, perceived discrimination, and feelings of alienation from the dominant culture.

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Suicide is the fifth leading cause of years of potential life lost before age 75 (1) and the 11th leading cause of death (2) in the United States. Historically, whites have had higher suicide rates than blacks, but between 1980 and 1995 the overall rate in blacks increased, driven by a dramatic increase among male adolescents and young adult men (3). Yet suicide among blacks remains poorly understood. Eight published case-control studies of suicide in the United States conducted since 1985 (4–11) have yielded data for only 97 blacks, and only a handful of prospective studies examining suicidal behavior and its correlates have reported data stratified by race (12–14). It is difficult, therefore, to draw meaningful conclusions about factors relevant to suicide in blacks, and the formulation and implementation of suicide prevention programs targeting at-risk blacks have been compromised.

Postmortem, case-control studies of predominantly white samples have established that antisocial behavior (7, 9, 15), substance use/abuse (15–17), mood disorders (15–18), and nonaffective psychotic disorders (15, 16, 18) confer risk for suicide. Only Kung and associates (19) attempted to identify race differences in risk factors. Using the 1986 National Mortality Followback Survey data set, Kung and colleagues reported that use of mental health services conferred risk for suicide in both blacks and whites. Whites who had at least a high school education, lived alone, and held blue-collar jobs were at greater risk;

these demographic variables did not distinguish suicides in blacks. Heavy drinking was associated with suicide in whites, but not in blacks. Only 25 suicides in blacks were included in the 1986 National Mortality Followback Survey, so the nil findings for demographics and drinking could be ascribed to the small sample size.

The 1993 National Mortality Followback Survey oversampled black decedents and yielded a sample of 150 suicides in blacks. We used that data set to determine if antisocial behavior, substance use/abuse, depressive symptoms, and psychotic symptoms amplified risk among blacks. We also investigated whether there were race differences in risk factors for suicide.

Method

The 1993 National Mortality Followback Survey (20) was conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention. The National Mortality Followback Survey is a multicomponent survey that examined a nationally representative sample of individuals age 15 years and older who were residing in and died in the United States in 1993, excluding South Dakota. A sample of 22,957 death certificates was drawn for the 1993 Current Mortality Sample. This subgroup is a 10% systematic sampling of death certificates received at the National Center for Health Statistics from state vital statistics offices. Death certificates do not provide data on situational (e.g., place of death) parameters surrounding the death. The 1993 National Mortality Followback Survey oversampled deaths due to homi-

TABLE 1. Demographic Characteristics of White and Black Accident and Suicide Decedents in a Representative Sample of Deaths in the United States in 1993^a

Characteristic	White				Black			
	Accident Decedents (N=3,458)		Suicide Decedents (N=1,279)		Accident Decedents (N=737)		Suicide Decedents (N=150)	
	N	%	N	%	N	%	N	%
Age group (years)								
15 to 24	609	17	180	14	140	19	43	28
25 to 44	1,053	30	413	32	283	38	72	48
45 to 64	580	16	310	24	161	21	17	11
≥65	1,216	35	376	29	153	20	18	12
Gender								
Male	2,005	58	893	69	515	69	131	87
Female	1,453	42	386	30	222	30	19	12
Education								
Less than high school	463	13	130	10	118	16	9	6
Some high school	608	17	213	16	178	24	48	32
Completed high school	1,469	42	536	41	308	41	59	39
Some college	527	15	223	17	96	12	23	15
≥4 years college	391	11	177	13	37	5	11	7
Married								
Yes	1,216	35	505	39	199	27	39	26
No	2,242	64	774	60	538	73	111	73

^a Data are from the 1993 National Mortality Followback Survey (20), conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention. The survey examined a nationally representative sample of 22,957 individuals age 15 years and older who were residing in and died in the United States, excluding South Dakota, in 1993. Responses were provided by next of kin of the decedents.

cide, suicide, and unintentional injury. Next of kin, identified on the death certificate, were contacted and asked to participate in the survey. Respondents were asked to provide information by telephone on the decedent's background characteristics, lifestyle, health, and type of care received in the last year of life. Interviewers provided no clarification or operational definitions. The directions were as follows: "Now I'm going to read a list of behaviors. Please tell me how frequently (name of decedent) engaged in these behaviors during the last year of life. We would like to know if (name of decedent) engaged in the behavior often, sometimes, rarely, or never."

For our analysis, suicide decedents (N=1,488; 157 blacks and 1,331 whites) were compared with fatal accident decedents (N=4,395; 783 blacks and 3,612 whites). The latter included decedents of motor vehicle accidents (drivers, passengers, motorcycle operators, pedestrians), poisoning, falls, and other accidents (e.g., drowning, choking). The dependent variable was cause of death, suicide or accident. The use of an accident victim comparison group allows for control of sudden death and the subsequent bereavement (21), acknowledging that there may be differences in grief response after different causes of death. Misclassification of suicides by drivers as accidents is infrequent and has a negligible influence on suicide statistics (22, 23).

We restricted the sample to white and black non-Hispanics. There were 4,943 white and 940 black accident and suicide decedents. Records for 206 (4.2%) whites and 53 (5.6%) blacks were excluded from the analysis because of missing data for one or more of the following covariates: education, marital status, age, or gender. As for gender, among suicides decedents in the National Mortality Followback Survey, the male-female ratio was 6.9:1 for blacks and 2.3:1 for whites. Demographic information is presented in Table 1. Predictors were grouped into four domains: antisocial behavior, substance use/abuse, depressive symptoms, and psychotic symptoms. The items composing these domains are presented in Table 2.

All statistical analyses were conducted with SUDAAN software (24). SUDAAN uses Taylor series approximation methods to compute variances that allow adjustment for the multistage cluster sampling strategy. Weights were used to adjust for survey oversampling and nonresponse to yield population estimates of sui-

cide. The SUDAAN LOGISTIC procedure uses generalized estimating equation techniques to fit generalized linear models to binary outcomes. All models were adjusted for gender, age group (see Table 1 for breakdown), education, and marital status.

Differences between blacks and whites were examined in a two-step process. First, separate regression analyses were conducted for blacks and whites. Eighteen predictors in four domains (antisocial behavior, substance use/abuse, depressive symptoms, and psychotic symptoms) were tested in separate models containing the baseline covariates. Second, to test whether there were significant differences, models for the overall sample that included an interaction term for race and the individual predictors were run, and the significance of the interaction was tested. Preliminary analyses showed a significant three-way interaction between race, gender, and age group. Therefore, the race-stratified analyses included a term for the interaction of gender and age group, and the analyses that combined data for blacks and whites included a three-way interaction of race, gender, and age group. To guard against type I error, a Bonferroni adjustment was used to set the significance level at 0.003.

Results

Table 3 shows the results of the stratified analyses. Four items distinguished suicides from accidents in both blacks and whites: death ideation, suicidal ideation, bizarre behavior, and withdrawn behavior. Use of marijuana was found to be a significant risk factor for suicide in whites.

Table 4 shows the results for race-by-variable interactions. Reports of community complaints and problem drinking more strongly discriminated risk for suicide in whites than in blacks. No variable conferred greater risk in blacks than in whites.

Discussion

The 1993 National Mortality Followback Survey provided an unprecedented opportunity to identify risk fac-

TABLE 2. Responses to Survey Items Measuring Four Psychological/Psychiatric Risk Factors for Suicide Among White and Black Accident and Suicide Decedents in a Representative Sample of Deaths in the United States in 1993^a

Predictor and Survey Item	White				Black			
	Accident Decedents		Suicide Decedents		Accident Decedents		Suicide Decedents	
	N	%	N	%	N	%	N	%
Antisocial behavior								
Frequency of making violent threats: "How often did _____ make violent threats or attempts?"								
Missing data	324	9.4	155	12.1	83	11.3	22	14.7
Often/sometimes	206	6.0	223	17.4	59	8.0	31	20.7
Rarely	192	5.6	145	11.3	33	4.5	19	12.7
Never	2,736	79.1	756	59.1	562	76.3	78	52.0
Destruction of property: "How often did _____ destroy property?"								
Missing data	415	11.0	172	13.0	96	12.0	25	16.0
Often/sometimes	123	3.9	125	9.0	24	3.0	17	11.0
Rarely	143	4.5	111	8.0	22	3.0	12	8.0
Never	2,931	81.0	923	69.0	641	82.0	103	66.0
Community complaints: "How often did _____ cause complaints from the community?"								
Missing data	295	8.5	139	10.9	80	10.9	19	12.7
Often/sometimes	105	3.0	81	6.3	29	3.9	11	7.3
Rarely	114	3.3	45	3.5	14	1.9	14	9.3
Never	2,944	85.1	1,014	79.3	614	83.3	106	70.7
Substance use/abuse								
Problem drinking: "In your opinion was _____ an alcoholic or problem drinker ANY time in _____'s life?"								
Missing data	77	2.2	33	2.6	19	2.6	3	2.0
Yes	560	16.2	392	30.6	122	16.6	18	12.0
No	2,821	81.6	854	66.8	596	80.9	129	86.0
Cocaine use: "At any time during the last year of life did _____ use cocaine, crack cocaine, free base, or coca paste?"								
Missing data	304	8.8	174	13.6	111	15.1	23	15.3
Yes	116	3.4	72	5.6	56	7.6	25	16.7
No	3,038	87.9	1,033	80.8	570	77.3	102	68.0
Marijuana use: "At any time during the last year of life did _____ use marijuana or hashish?"								
Missing data	324	9.4	165	12.9	107	14.5	25	16.7
Yes	266	7.7	160	12.5	63	8.5	25	16.7
No	2,868	82.9	954	74.6	567	76.9	100	66.7
Stimulant use: "At any time during the last year of life did _____ use stimulants, such as amphetamines, Preludin, uppers, or speed?"								
Missing data	315	9.1	189	14.8	110	14.9	26	17.3
Yes	98	2.8	57	4.5	12	1.6	4	2.7
No	3,045	88.1	1,033	80.8	615	83.4	120	80.0
Depressive symptoms								
Frequency of saying "I'm no good": "How often did _____ say things like 'I'm no good,' or 'I'm worthless?'"								
Missing data	353	10.2	187	14.6	92	12.5	31	20.7
Often/sometimes	246	7.1	400	31.3	44	6.0	23	15.3
Rarely	146	4.2	86	6.7	20	2.7	5	3.3
Never	2,713	78.5	606	47.4	581	78.8	91	60.7
Death ideation: "During the last month of life, did _____ express a wish to die, or say that _____ wished that death would come quickly?"								
Missing data	382	10.2	228	17.8	91	12.3	31	20.7
Yes	302	8.7	452	35.3	38	5.2	33	22.0
No	2,774	80.2	599	46.8	608	82.5	86	57.3

(continued)

tors for suicide in blacks and to examine potential race differences in suicide. A number of risk factors for suicide were common to both blacks and whites: withdrawn behavior, death ideation, suicidal ideation, and bizarre behavior. There are important differences, however. Whites who died by suicide were more likely to be problem drinkers, a finding that dovetails with the large literature on suicide and substance abuse (25, 26), and prior data on race differences in suicide risk factors (19). As well, the straightforward linear relationship between antisocial behavior

(violent threats, destruction of property, community complaints) and suicide in whites was consistent with studies of predominantly white samples showing that violent behavior (27–29), antisocial behavior (30), and disruptive disorders (30, 31) confer risk for suicide and suicide attempts. However, our data suggest that the association between antisocial behavior and suicide in blacks warrants further empirical scrutiny. Whites who generated "frequent" community complaints, a proxy indicator for antisocial behavior, were at increased risk of suicide by more

TABLE 2. Responses to Survey Items Measuring Four Psychological/Psychiatric Risk Factors for Suicide Among White and Black Accident and Suicide Decedents in a Representative Sample of Deaths in the United States in 1993^a (continued)

Predictor and Survey Item	White				Black			
	Accident Decedents		Suicide Decedents		Accident Decedents		Suicide Decedents	
	N	%	N	%	N	%	N	%
Suicidal ideation: "At any time in the last month of life, did _____ ever talk about taking his or her own life?"								
Missing data	324	9.4	196	15.3	75	10.2	24	16.0
Yes	71	2.1	382	29.9	8	1.1	33	22.0
No	3,063	88.6	701	54.8	654	88.7	93	62.0
Unresponsiveness, withdrawal: "How often did _____ seem unresponsive or withdrawn?"								
Missing data	361	10.4	184	14.4	94	12.8	24	16.0
Often/sometimes	522	15.1	564	44.1	103	14.0	47	31.3
Rarely	245	7.1	126	9.9	54	7.3	13	8.7
Never	2,330	67.4	405	31.7	486	65.9	66	44.0
Crying: "How often did _____ cry for long periods of time for no apparent reason?"								
Missing data	390	11.3	250	19.5	99	13.4	33	22.0
Often/sometimes	152	4.4	227	17.7	43	5.8	16	10.7
Rarely	133	3.8	111	8.7	20	2.7	7	4.7
Never	2,783	80.5	691	54.0	575	78.0	94	62.7
Trouble concentrating: "How often did _____ have trouble concentrating or have difficulty in making decisions?"								
Missing data	429	12.4	255	19.9	119	16.1	29	19.3
Often/sometimes	567	16.4	413	32.3	91	12.3	25	16.7
Rarely	284	8.2	120	9.4	54	7.3	15	10.0
Never	2,178	63.0	491	38.4	473	64.2	81	54.0
Psychotic symptoms								
Bizarre behavior: "How often did _____ engage in bizarre behavior?"								
Missing data	302	8.7	154	12.0	77	10.4	20	13.3
Often/sometimes	210	6.1	233	18.2	50	6.8	19	12.7
Rarely	122	3.5	97	7.6	26	3.5	12	8.0
Never	2,824	81.7	795	62.2	584	79.2	99	66.0
Suspiciousness: "How often did _____ seem suspicious of others or not trust other people?"								
Missing data	359	10.4	195	15.2	101	13.7	26	17.3
Often/sometimes	440	12.7	415	32.4	109	14.8	31	20.7
Rarely	293	8.5	126	9.9	51	6.9	11	7.3
Never	2,366	68.4	543	42.5	476	64.6	82	54.7
Delusions: "How often did _____ have delusions or beliefs not in keeping with reality?"								
Missing data	370	10.7	205	16.0	89	12.1	25	16.7
Often/sometimes	266	7.7	252	19.7	56	7.6	18	12.0
Rarely	107	3.1	74	5.8	20	2.7	12	8.0
Never	2,715	78.5	748	58.5	572	77.6	95	63.3
Hallucinations: "How often did _____ have hallucinations, or see or hear things that weren't there?"								
Missing data	384	11.1	218	17.0	98	13.3	28	18.7
Often/sometimes	160	4.6	112	8.8	43	5.8	14	9.3
Rarely	68	2.0	56	4.4	16	2.2	7	4.7
Never	2,856	78.5	893	69.8	580	78.7	101	67.3

^a Data are from the 1993 National Mortality Followback Survey (20), conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention. The survey examined a nationally representative sample of 22,957 individuals age 15 years and older who were residing in and died in the United States, excluding South Dakota, in 1993. Responses were provided by next of kin of the decedents.

than sevenfold. For blacks, the association between community complaints and suicide was nonlinear. A low or high level of complaints did not confer risk, but a moderate level did (odds ratio=5.6). This finding may be ascribed to race differences in reporting of community complaints, but similar nonlinear patterns were found for destruction of property and making violent threats. Juon and Ensminger (32) found somewhat similar results.

There were some limitations to the current study. First, the 1993 National Mortality Followback survey, a secondary data set, was used in this study. Consequently, additional information that may have been obtained from

practitioners was not available. Second, data collection relied on a phone interview with a proxy respondent. Third, the measures that were used to construct the various domains were brief. In addition, items in the questionnaire that inquired about participation in mental health services in the last year of life and history of emotional/mental health problems were dichotomous. More detailed information about mental health service utilization and mental health history was not available. Fourth, the smaller number of suicides in blacks (N=150) relative to whites (N=1,279) limits statistical power to a greater degree in blacks. These limitations are offset by the

TABLE 3. Psychological/Psychiatric Risk Factors for Suicide Among White and Black Accident and Suicide Decedents

Risk Factor	White			Black		
	Odds Ratio	95% CI	p	Odds Ratio	95% CI	p
Antisocial behavior						
Frequency of making violent threats						
Often/sometimes	3.4	2.73–4.33	<0.0001	2.6	1.32–5.20	<0.006
Rarely	2.2	1.58–3.19	<0.0001	4.5	2.38–8.41	<0.0001
Never	1.0			1.0		
Destruction of property						
Often/sometimes	3.0	2.29–4.03	<0.0001	2.3	0.84–6.44	0.10
Rarely	1.9	1.24–2.97	<0.004	3.4	1.60–7.30	<0.002
Never	1.0			1.0		
Community complaints						
Often/sometimes	2.0	1.42–2.73	<0.0001	1.4	0.53–3.76	0.49
Rarely	1.0	0.66–1.41	0.84	5.6	2.52–12.49	<0.0001
Never	1.0			1.0		
Substance use/abuse						
Problem drinking						
Yes	2.1	1.76–2.47	<0.0001	0.5	0.28–0.98	<0.05
No	1.0			1.0		
Cocaine use						
Yes	1.4	0.99–1.97	0.06	2.1	1.03–4.06	<0.05
No	1.0			1.0		
Marijuana use						
Yes	1.8	1.43–2.34	<0.0001	1.8	0.91–3.40	0.09
No	1.0			1.0		
Stimulant use						
Yes	1.3	0.86–1.85	0.23	1.5	0.43–4.86	0.55
No	1.0			1.0		
Depressive symptoms						
Frequency of saying, "I'm no good"						
Often/sometimes	6.7	5.49–8.27	<0.0001	2.7	1.28–5.47	<0.009
Rarely	2.6	1.89–3.47	<0.0001	0.9	0.23–3.83	0.92
Never	1.0			1.0		
Death ideation						
Yes	6.3	4.83–8.25	<0.0001	5.5	2.63–11.52	<0.0001
No	1.0			1.0		
Suicidal ideation						
Yes	21.0	15.63–28.21	<0.0001	37.6	16.77–84.06	<0.0001
No	1.0			1.0		
Unresponsiveness, withdrawal						
Often/sometimes	5.4	4.42–6.63	<0.0001	3.4	2.03–5.66	<0.0001
Rarely	3.0	2.28–3.85	<0.0001	1.6	0.68–3.76	0.28
Never	1.0			1.0		
Crying						
Often/sometimes	6.5	4.96–8.50	<0.0001	2.0	0.84–4.86	0.11
Rarely	3.6	2.69–4.85	<0.0001	3.8	1.61–8.89	<0.003
Never	1.0			1.0		
Trouble concentrating						
Often/sometimes	2.9	2.35–3.59	<0.0001	1.4	0.74–2.63	0.30
Rarely	1.9	1.43–2.39	<0.0001	1.8	0.96–3.46	0.07
Never	1.0			1.0		
Psychotic symptoms						
Bizarre behavior						
Often/sometimes	3.6	2.86–4.49	<0.0001	2.5	1.39–4.44	<0.003
Rarely	2.5	1.87–3.45	<0.0001	1.6	0.59–4.49	0.34
Never	1.0			1.0		
Suspiciousness						
Often/sometimes	4.1	3.41–4.86	<0.0001	1.7	0.96–2.86	0.07
Rarely	1.7	1.21–2.24	<0.002	1.1	0.44–2.63	0.87
Never	1.0			1.0		
Delusions						
Often/sometimes	3.0	2.22–3.95	<0.0001	1.9	0.88–4.22	0.10
Rarely	2.4	1.72–3.31	<0.0001	2.2	0.68–6.84	0.19
Never	1.0			1.0		
Hallucinations						
Often/sometimes	1.7	1.10–2.59	<0.02	2.6	1.36–5.00	<0.004
Rarely	2.3	1.59–3.40	<0.0001	1.4	0.33–6.23	0.63
Never	1.0			1.0		

uniqueness of the data set, which offered an unprecedented opportunity to examine suicide in blacks and to include a comparison group of accident decedents.

In summary, depressive symptoms amplify suicide risk in blacks and whites, but there may be important race differences in the contributions to suicide risk of antisocial

TABLE 4. Significant Interactions of Race and Risk Factors Predicting Suicide Among White and Black Accident and Suicide Decedents

Risk Factor	White Decedents		Black Decedents		p
	Odds Ratio	95% CI	Odds Ratio	95% CI	
Community complaints					0.0008
Often/sometimes	7.1	2.2–23.6	1.4	0.5–4.0	
Rarely	3.5	1.4–8.8	5.1	2.3–11.3	
Never	3.6	1.8–7.0	1.0		<0.0001
Problem drinking					
Yes	7.8	3.2–19.2	0.5	0.3–1.0	
No	3.8	1.9–7.5	1.0		

behavior and substance use/abuse. The current study underscores the need for examination of race differences in the relationship between antisocial behavior and suicide. It will also be essential to examine other variables that were unavailable in the National Mortality Followback Survey data set, particularly racism, perceived discrimination, and feelings of alienation from the dominant culture (33–36). Research on the interplay of these culturally relevant variables and established psychiatric risk factors may be warranted.

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