

Racial/Ethnic Differences in Rates of Depression Among Preretirement Adults

Dorothy D. Dunlop, PhD, Jing Song, MS, John S. Lyons, PhD, Larry M. Manheim, PhD, and Rowland W. Chang, MD, MPH

Depression and other mental illnesses are leading causes of disability and premature mortality in the United States, costing more than \$150 billion in 1997.¹ Later life depression is particularly costly because of associated mortality, excess disability, and interactions with other physical health problems.^{2–5}

While it is generally believed that mental disorders are at least as prevalent among ethnic minority groups as among the White population of the United States,^{6,7} there is a paucity of information on the prevalence of mental disorders among minority groups.⁸ Earlier epidemiological studies based on community or clinical samples have limited generalizability.^{9–11} Community-based samples, such as the Epidemiological Catchment Area Study,¹² reflect demographic and cultural characteristics of specific geographic locations and cannot be extrapolated to the national experience.¹³

Studies that assess depressive disorders through the use of national probability samples are needed to make inferences to the nation as a whole. The National Comorbidity Survey, which involved a sample of US residents aged 15 to 54 years, gathered epidemiological data on selected psychiatric disorders defined by the *Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition (DSM-III-R)* and provided evidence of ethnic/racial differences in these disorders.^{13,14}

The goal of the current study was to estimate prevalence rates of *DSM*-based major depression in an older cohort (aged 54 to 65 years) of individuals who took part in the Health and Retirement Survey (HRS). The prevalence of depression in this largely preretirement national cohort is of particular interest because it has been reported that incidence rates of major depression increase in the sixth decade of life¹⁵; moreover, it is important to determine the effect on this cohort of the deleterious health sequelae of depression,^{2,10} since these individuals' medical costs will imminently be covered through Medicare.

Objectives. We estimated racial/ethnic differences in rates of major depression and investigated possible mediators.

Methods. Depression prevalence rates among African American, Hispanic, and White adults were estimated from a population-based national sample and adjusted for potential confounders.

Results. African Americans (odds ratio [OR]=1.16, 95% confidence interval [CI]=0.93, 1.44) and Hispanics (OR=1.44, 95% CI=1.02, 2.04) exhibited elevated rates of major depression relative to Whites. After control for confounders, Hispanics and Whites exhibited similar rates, and African Americans exhibited significantly lower rates than Whites.

Conclusions. Major depression and factors associated with depression were more frequent among members of minority groups than among Whites. Elevated depression rates among minority individuals are largely associated with greater health burdens and lack of health insurance, factors amenable to public policy intervention. (*Am J Public Health.* 2003;93:1945–1952)

We sought to estimate the prevalence of major depression within 12 months of the HRS interview among older minority and White Americans and investigate factors associated with differences in prevalence rates that might be altered by clinical, public health, or public policy interventions. In addition, since racial/ethnic differences in sociodemographic (other than race/ethnicity),^{2,16,17} health,^{2,17–20} and economic^{16,17,21} characteristics may be entangled in observed depression frequencies,^{22,23} we evaluated the influence of such factors on racial/ethnic differences in rates of depression.

METHODS

Overview

We analyzed data from the 1996 HRS, which involved a national probability sample of noninstitutionalized members of the 1931 to 1941 US birth cohort and a 2:1 oversampling of African Americans and Hispanics relative to Whites.^{24,25} The interview conducted in the 1996 HRS included a one-time assessment of major depressive episodes through the use of a short form of the World Health Organization's Composite International Diagnostic Interview (CIDI-SF), which was completed by 94% of the cohort.^{25,26}

The 1996 cohort comprised 8447 individuals who were aged 54 to 65 years at the time of the interview. Analyses used person-weights, strata, and sampling error codes for the 1996 HRS data developed at the University of Michigan to allow valid inferences to the US population as a whole.²⁷ Our analyses were restricted to the 7690 people who completed the CIDI-SF and identified themselves as African American, Hispanic, or White. For analytical purposes, we eliminated 190 individuals who reported "other" racial/ethnic backgrounds or for whom race/ethnicity information was not available. In addition, we did not include 484 persons with missing information on depression status and 83 persons with insufficient data in any of the following areas: income, wealth, activities of daily living, education level, and alcohol consumption.

Outcome Variable

We used the term *major depression* to refer to the presence of a *DSM*-based major depression episode^{14,28} as measured via the CIDI-SF.²⁹ The full CIDI has been shown to have excellent validity and reliability among individuals of different nationalities.^{13,30–32} The CIDI-SF has established reliability, as demonstrated by good probability rates in terms of identifying cases of major depression

consistent with the CIDI.^{33,34} The short form includes only those questions needed to ascertain diagnoses defined in the revised third edition of the *DSM*; also, a 12-month time frame is used in capturing current depression, and questions have been reorganized to minimize interview burden. A major depressive episode is defined as a CIDI-SF symptom score of 3 or above on a 0 to 7 scale.³⁵

Explanatory Variables

Sociodemographic characteristics examined included race/ethnicity, age, gender, and living arrangements. HRS race/ethnicity data were used to classify people into 3 mutually exclusive groups: Hispanic, (non-Hispanic) African American, and (non-Hispanic) White. Members of other racial/ethnic groups were excluded from the present analyses. The HRS also provided categorical information on marital status (married, divorced/widowed, never married/other) and family structure (children, grandchildren, parents, parental caregiver).

Health needs were assessed via self-reported information on physical health, health behaviors, and functional limitations. Physical health status was based on respondents' reports of being informed by a physician of the presence of (1) potentially life-threatening chronic diseases, including cancer, heart disease (e.g., heart attack, coronary artery disease, congestive heart failure), lung disease, and stroke, or (2) other chronic diseases, including arthritis or rheumatism, diabetes, and hypertension. Obesity was classified as a body mass index above 30, as determined from self-reported height and weight data.

Functional limitations were assessed based on reports of physical and daily task limitations. The number of physical limitations was enumerated from respondents' reports of difficulty with, inability to perform, or avoidance of 4 tasks involving the lower extremities: walking several blocks, climbing several flights of stairs without resting, pulling or pushing large objects, and lifting or carrying objects weighing more than 10 lb (4.5 kg).

Limitations in basic activities of daily living (ADLs) or instrumental ADLs (IADLs) were ascertained from respondents' reports (e.g., unable to complete task, receive help/use a device in completing task). ADL tasks included dressing, eating, using the toilet, bathing, walk-

ing across a room, and transferring in and out of bed; IADL tasks included preparing a hot meal, shopping, using the telephone, taking medication, and managing money. Health behaviors also were assessed, including reports of current smoking, alcohol consumption (categorized as none in past 3 months, less than an average of 3 drinks per day, 3 or more drinks per day), and lack of regular vigorous exercise (fewer than 3 times per week).

Economic resources reflected access to health care, as measured via financial ability to pay for medical care (income, wealth, and health insurance coverage), human capital (education level), and employment status. Family income represented the preceding year's income of the respondent and his or her spouse/partner from all sources. Wealth reflected household net worth in terms of both housing and nonhousing equity.³⁶ For analytic purposes, we dichotomized income and wealth using the lowest 1996 HRS population-weighted quartiles of \$19 792 and \$10 000, respectively. We used imputed estimates developed at the University of Michigan when partial income or wealth information was provided.³⁶

We classified health insurance coverage as Medicare, Medicaid, other government insurance, or private insurance. We dichotomized education level as completion of less than 12 years of schooling versus completion of 12 or more years. Finally, we categorized employment status as follows: working, retired/home-maker, and otherwise not employed (looking for work, disabled, or other).

Statistical Analysis

We used weighted analyses to account for the complex HRS sampling design, thus allowing valid representation of the national population. We used χ^2 tests in making separate comparisons between the demographic, health, and economic characteristics of African American and Hispanic adults and those of White adults.

We employed multiple logistic regression analyses to model racial/ethnic differences in probability of depression after controlling for explanatory factors. We estimated logistic regression odds ratios (ORs) and 95% confidence intervals (CIs) using Taylor series methods, with between-cluster robust estimation, to adjust for the complex sampling design. SUDAAN software was used in conducting these analy-

ses.^{37,38} The logistic models first adjusted for racial/ethnic differences in depression related to sociodemographic characteristics and then sequentially adjusted for health needs and economic resources.

We used direct standardization rates to illustrate the effects of explanatory factors on racial/ethnic differences, with the HRS White subpopulation as the reference group.³⁹ In this approach, we calculated adjusted prevalence rates by estimating probabilities of depression from the multiple logistic model for (1) each member of the White reference sample, and then, (2) as (hypothetically) a member of the African American subpopulation, and (3) as (hypothetically) a member of the Hispanic subpopulation.

We restricted our analyses to the 94% of respondents who completed the CIDI-SF depression assessment. To allow us to make population statements regarding major depression prevalence rates, we statistically adjusted for potential bias due to missing depression assessments by including respondents at an additional sampling stage and readjusting sample weights using standard sampling methodology.⁴⁰ Respondents with complete CIDI-SF information were compared with nonrespondents to identify potential differences in characteristics such as age, gender, race/ethnicity, hearing problems, education level, activity limitations, nonresponse to sensitive income and wealth questions, and geographic region. The sampling weight used for respondents who provided CIDI-SF information was calculated as the 1996 HRS sampling weight multiplied by the inverted probability of completing a depression assessment given these characteristics; this probability was estimated via logistic regression. We used a nominal 5% alpha significance level in our statistical tests.

RESULTS

Table 1 shows demographic, health need, and economic characteristics, according to race/ethnicity, among 7690 members of the study cohort aged 54 to 65 years. In comparison with White respondents, both African American and Hispanic respondents were significantly more likely to be unmarried or not living with a partner and to have grandchildren. African Americans were more likely than

TABLE 1—Distribution of Characteristics Among 7690 Members of the 1996 Health and Retirement Survey Cohort, by Race/Ethnicity

Baseline Characteristic	White (n = 5760), % or Mean (95% CI)	African American (n = 1268), % or Mean (95% CI)	African American vs White: <i>P</i> ^a	Hispanic (n = 662), % or Mean (95% CI)	Hispanic vs White: <i>P</i> ^a
Sociodemographics					
Age, y, mean	59.3 (59.3, 59.4)	59.4 (59.2, 59.6)	NS ^b	59.2 (58.9, 59.4)	NS ^b
Female	51.3 (50.2, 52.3)	56.8 (54.4, 59.3)	<.001	54.4 (50.6, 58.2)	NS
Marital status					
Married/lives with partner	78.0 (76.7, 79.2)	53.5 (50.9, 56.0)	<.001	66.0 (61.6, 70.4)	<.001
Divorced/widowed	19.0 (17.8, 20.1)	39.5 (36.9, 42.1)		29.1 (25.0, 33.1)	
Single	3.0 (2.5, 3.5)	7.1 (5.7, 8.4)		4.9 (2.6, 7.2)	
Lives alone	14.3 (13.3, 15.2)	21.4 (19.7, 23.1)	<.001	14.4 (11.0, 17.8)	NS
Has child	93.2 (92.4, 93.9)	92.7 (90.9, 94.4)	NS	92.2 (89.6, 94.8)	NS
Has grandchild	77.4 (75.4, 79.3)	82.3 (79.8, 84.8)	.002	82.5 (79.1, 85.8)	.026
Parent alive	55.1 (53.4, 56.8)	46.4 (43.7, 49.1)	<.001	51.4 (47.8, 55.0)	NS
Helps parent with basic activities	18.6 (17.5, 19.7)	16.5 (14.0, 19.1)	NS	15.0 (12.0, 18.1)	.045
Health needs					
Chronic conditions					
None reported	23.2 (21.9, 24.6)	12.1 (10.4, 13.9)	<.001	21.3 (18.1, 24.5)	NS
Potential life threatening					
Cancer	7.6 (7.0, 8.2)	5.9 (4.4, 7.4)	NS	6.5 (4.4, 8.6)	NS
Heart disease	16.5 (15.3, 17.6)	17.7 (15.7, 19.7)	NS	12.2 (10.1, 14.3)	.005
Lung disease	9.5 (8.5, 10.5)	8.5 (7.2, 9.8)	NS	7.1 (3.9, 10.2)	NS
Stroke	3.2 (2.7, 3.8)	6.0 (4.5, 7.4)	.001	3.3 (0.7, 5.9)	NS
Other chronic condition					
Arthritis	48.4 (46.8, 50.0)	53.6 (50.4, 56.8)	.007	44.6 (38.7, 50.4)	NS
Diabetes	10.4 (9.6, 11.1)	23.3 (20.7, 25.9)	<.001	18.5 (15.4, 21.7)	<.001
Hypertension	39.1 (37.6, 40.6)	62.7 (60.0, 65.4)	<.001	44.5 (40.0, 49.0)	NS
Obesity	23.2 (21.8, 24.7)	36.3 (34.0, 38.7)	<.001	29.1 (24.5, 33.7)	.043
Functional limitations					
Physical limitations					
None	54.4 (52.5, 56.4)	39.9 (36.8, 43.0)	<.001	42.9 (38.0, 47.8)	.002
One	20.1 (19.0, 21.2)	18.7 (16.0, 21.4)		18.0 (14.6, 21.4)	
Multiple	25.4 (23.9, 27.0)	41.4 (38.5, 44.4)		39.1 (34.2, 44.0)	
Daily task limitations					
None	93.1 (92.3, 93.9)	83.8 (81.6, 85.9)	<.001	86.0 (82.4, 89.5)	.017
IADL only	3.1 (2.5, 3.7)	5.8 (4.2, 7.4)		6.8 (4.6, 9.1)	
Any ADL	3.8 (3.3, 4.3)	10.5 (8.8, 12.1)		7.2 (4.8, 9.6)	
Health behavior					
Current smoker	24.5 (23.0, 26.1)	28.1 (25.3, 30.9)	.045	22.2 (18.6, 25.8)	NS
Alcohol use					
None in past 3 months	60.6 (58.2, 63.1)	73.6 (70.8, 76.3)	<.001	70.3 (65.6, 75.1)	.012
Less than 3 drinks/day	36.3 (33.8, 38.8)	24.3 (21.9, 26.7)		28.3 (23.7, 32.8)	
3 or more drinks/day	3.1 (2.7, 3.5)	2.1 (1.2, 3.0)		1.4 (0.0, 2.9)	
Lack of regular exercise	46.8 (45.1, 48.5)	56.9 (54.0, 59.8)	<.001	60.5 (56.1, 65.0)	<.001
Economic resources					
Education less than 12 years	19.5 (17.7, 21.4)	41.5 (37.4, 45.6)	<.001	62.4 (55.6, 69.2)	<.001

Continued

Whites to be female and to live alone and were less likely to have a living parent. Notably, African Americans reported more chronic conditions than Whites (88% vs 77% reporting at least one such condition), particularly arthritis, diabetes, hypertension, stroke, and obesity.

Hispanics were similar to Whites in terms of chronic conditions, except that they exhibited a higher rate of diabetes and a lower rate of heart disease. African Americans and Hispanics had disproportionately more physical or functional limitations than Whites; were significantly less likely to consume alcohol or engage in regular exercise; had less education, income, and wealth; were less likely have health insurance coverage; and were more likely to be unemployed.

Table 2 shows prevalence rates of 12-month major depression (i.e., CIDI-SF score of 3 or higher) and associated odds ratios according to sociodemographic, health need, and economic resource characteristics. Major depression was most prevalent among Hispanics (10.8%), followed by African Americans (8.9%) and Whites (7.8%). The odds of depressive disorders among older Hispanics were 44% greater than among Whites (OR=1.44; 95% CI=1.02, 2.04), representing a significantly greater prevalence of major depression.

A comparison of Tables 1 and 2 shows that many characteristics more frequently reported by African Americans and Hispanics were strongly associated with higher rates of major depression. Table 2 indicates that younger age, female gender, being widowed or divorced, living alone, and providing care for a parent each significantly increased the odds of depression. All of the health needs (i.e., chronic diseases, functional limitations, and health behaviors) evaluated were significantly associated with major depression. Similarly, the presence of fewer economic resources—less education, income, or wealth; lack of private health insurance coverage or employment—was associated with a greater frequency of depression. Since these depression-associated factors were more common among members of minority groups than among Whites, it is of interest to examine the relationships of these factors to the greater prevalence rates of depression in minority racial/ethnic groups.

Table 3 shows standardized prevalence rates of major depression among African Americans

TABLE 1—Continued

Household income less than 25th percentile	20.3 (18.6, 22.1)	45.4 (42.4, 48.4)	<.001	54.0 (45.1, 63.0)	<.001
Family wealth less than 25th percentile	18.2 (16.3, 20.0)	57.0 (54.0, 60.1)	<.001	59.2 (50.9, 67.5)	<.001
Health insurance					
Private/other	75.6 (74.1, 77.2)	53.8 (51.1, 56.5)	<.001	44.9 (39.1, 50.6)	<.001
Government only	17.2 (15.9, 18.5)	32.4 (29.5, 35.3)		26.9 (22.6, 31.2)	
No health insurance	7.2 (6.2, 8.1)	13.8 (12.1, 15.4)		28.3 (23.0, 33.5)	
Employment					
Working	55.8 (54.0, 57.5)	47.6 (44.8, 50.4)	<.001	47.2 (41.8, 52.6)	.029
Retired/homemaker	33.7 (32.2, 35.1)	29.1 (25.5, 32.7)		33.0 (28.1, 38.0)	
Not employed	10.6 (10.0, 11.5)	23.3 (20.8, 25.9)		19.7 (14.5, 24.9)	

Note. CI = confidence interval; ADL = activities of daily living; IADL = instrumental ADL.

^aStatistical difference from White value based on unadjusted P value < .05 from χ^2 test. Other results deemed not significant (NS).

^bDifference in mean ages assessed with 2-tailed t test.

and Hispanics relative to Whites after control for explanatory factors. In calculating these standardized rates, we initially adjusted for sociodemographic characteristics and then adjusted for health needs (factors amenable to public health interventions) and for economic resources (factors potentially amenable to public policy interventions).

The prevalence of major depression in the White adult reference group was 77.5 per 1000 respondents. The original standardized depression prevalence of 88.5 per 1000 among older African Americans (relative to Whites) was reduced 17% (to 73.1 per 1000) when sociodemographic differences were taken into account. After further control for health needs, this rate was reduced by another 17% (to 58.1 per 1000) to a level significantly below that of comparable White respondents, reflecting the greater health need burden among African Americans. Adjustment for economic differences reduced the African American standardized depression rate an additional 7% (to 52.3 per 1000).

Among Hispanics, adjustment for sociodemographic, health, and economic differences sequentially reduced standardized depression prevalence rates 10% (from 107.8 to 96.8 per 1000 respondents), 8% (to 87.7 per 1000), and 12% (to 74.8 per 1000), respectively. Although major depression occurs more frequently among older minority group members than older Whites, adjusted prevalence rates

among those with similar sociodemographic, health, and economic profiles were similar between Hispanics and Whites and significantly lower for African Americans than for Whites.

Table 4 shows the relative association of demographic, health, and economic factors with odds of major depression estimated in the multiple logistic regression analysis. In the case of older adults with similar sociodemographic, health, and economic profiles, depression was significantly less prevalent among African Americans than among Whites (OR=0.62; 95% CI=0.49, 0.79) and occurred with similar frequency among Hispanics (OR=0.92; 95% CI=0.61, 1.38) and Whites, consistent with the standardized results presented in Table 3. Physical limitations were the factor most strongly associated with major depression, more than doubling the odds of depression after other factors had been taken into account.

In addition, the odds of depression were significantly greater among women, those who were widowed or divorced, and those providing care for their parents; however, after control for other factors, odds were lower among those aged 60 to 65 years than among those in the late-50s age group. Other characteristics that significantly increased the odds of major depression, after control for other factors, included potential life-threatening illness, ADL limitations, lack of regular exercise, tobacco use, and being unemployed or uninsured. Re-

liance on government health insurance marginally increased the odds of depression.

Additional analyses explored the interaction of race/ethnicity with risk factors for depression. Relationships were similar across racial/ethnic groups, except that among Hispanics chronic conditions were more strongly associated, and low income was less strongly associated, with major depression. Finally, we conducted sensitivity analyses using the more stringent criterion of a CIDI-SF score of 5 or above, recommended by some researchers as the cutoff for clinical relevance.³³ When this criterion was used, the overall prevalence estimate of major depression was reduced to 5.5% (5.2% among Whites, 6.8% among African Americans, and 7.3% among Hispanics), but the relationships of other depression risk factors with racial/ethnic differences were similar.

DISCUSSION

In this study, we used a national probability sample to examine differences in prevalence rates of major depression between African Americans and Hispanics aged 54 to 65 years and Whites in the same age group. Reports of major depression were more frequent among Hispanics (a rate of 107.8 per 1000 respondents) and African Americans (88.5 per 1000) than among Whites (77.5 per 1000), and the difference was statistically significant for Hispanics. However, after adjustment for sociodemographic, health, and economic factors, depression was found significantly less frequently among African Americans than among Whites and with similar frequency among Hispanics and Whites. Elevated rates of depression were related to the presence of potentially life-threatening diseases, functional limitations, absence of health insurance coverage, and lifestyle factors such as smoking and exercise, all factors that vary across ethnic/racial groups.

Our study involved notable strengths relative to previous investigations. The HRS included sufficient numbers of African Americans and Hispanics to allow evaluation of differences in major depression among these minority groups. Furthermore, we were able to evaluate the contribution of various risk factors to rates of major depression from the strong methodological platform of a national probability sample. Our results are methodologically more reliable

TABLE 2—Prevalence Rates of 12-Month Major Depression, by Demographic, Health, and Economic Characteristics (n = 7690)

Baseline (1996) Characteristic	No.	Depressed Population, %	Depression Odds Ratio (95% Confidence Interval)
Race/ethnicity			
White	5760	7.75	Reference
African American	1268	8.85	1.16 (0.93, 1.44)
Hispanic	662	10.78	1.44 (1.02, 2.04)
Sociodemographics			
Gender			
Male	3367	5.91	Reference
Female	4323	10.06	1.78 (1.51, 2.10)
Age, y			
Less than 60	3965	9.35	Reference
≥ 60	3725	6.64	0.69 (0.59, 0.81)
Marital status			
Married/lives with partner	5658	6.57	Reference
Divorced/widowed	1765	13.26	2.17 (1.78, 2.66)
Single	267	7.85	1.21 (0.81, 1.82)
Lives alone	1144	11.55	1.62 (1.28, 2.06)
Has child	7194	8.15	1.19 (0.86, 1.64)
Has grandchild	6151	8.33	1.18 (0.93, 1.50)
Parent alive	4063	7.58	0.87 (0.71, 1.06)
Helps parent with basic activities	1383	10.12	1.37 (1.10, 1.70)
Health needs			
Chronic conditions			
None	1590	3.56	Reference
Potential life threat			
Cancer	574	11.21	1.49 (1.14, 1.93)
Heart disease	1261	15.77	2.66 (2.23, 3.18)
Lung disease	699	18.11	2.92 (2.27, 3.74)
Stroke	294	16.98	2.44 (1.69, 3.52)
Other conditions			
Arthritis	3844	10.79	2.08 (1.77, 2.44)
Diabetes	1025	12.23	1.72 (1.36, 2.18)
Hypertension	3365	10.44	1.71 (1.40, 2.10)
Obesity	2011	9.79	1.34 (1.14, 1.57)
Functional limitations			
Physical limitations			
None	3857	3.23	Reference
One	1553	7.09	2.29 (1.66, 3.15)
Multiple	2280	17.79	6.48 (5.19, 8.11)
Daily task limitations			
None	7011	6.71	Reference
IADL Only	279	18.62	3.18 (2.12, 4.77)
ADL	400	26.41	4.99 (3.80, 6.55)
Health behavior			
Currently smokes	1872	11.59	1.77 (1.47, 2.12)
Alcohol use			
None in past 3 months	5008	9.59	Reference

Continued

than estimates of major depression based on national administrative health data,^{41,42} which are problematic as a consequence of ethnic disparities in use of health care.^{43,44}

Other reports based on clinical or community samples cannot be generalized to the national experience.⁴⁵ US national studies other than the National Comorbidity Survey, involving younger adults, have assessed depressive symptoms, which are an inadequate measure for diagnostic purposes.⁴⁶ In contrast, we used *DSM* criteria to estimate prevalence rates of 12-month major depression among a probability sample of older US adults and evaluated the effects of sociodemographic, health, and economic differences on relative frequencies of major depression among members of ethnic minority groups.

Limitations common to studies involving secondary databases may have affected our findings. For example, the 1996 HRS cohort represented people only in the 55- to 65-year age range. Also, the CIDI-SF ascertains major depressive episodes within the past 12 months but does not distinguish between episodes that involve major depressive disorder, bipolar disorder, or psychotic disorder.²⁶ Relationships between depression and potential mediators are complex and may be bidirectional,²⁸ and we were unable to determine the nature of such relationships in the present cross-sectional study. Moreover, we classified people into one of 3 mutually exclusive racial/ethnic groups for analytic purposes, which may prevent comparisons with studies involving other categorizations. Finally, some of the differences revealed in our multiple comparisons could have been due to chance.

We estimated the overall prevalence of 12-month major depression at 5.5% to 8.1% among adults aged 54 to 65 years; the upper estimate was based on the recommended CIDI-SF criterion,³⁵ while the lower estimate reflected a more stringent criterion.^{28,47} Our estimates are somewhat lower than the corresponding National Comorbidity Survey estimate, based on a modified version of the CIDI, of 10.8% among individuals aged 15 to 54 years. However, the lower prevalence rates we observed are consistent with reports of declines in the frequency of major depression (not depressive symptoms) in the older age group sampled.⁴⁸

TABLE 2—Continued

Less than 3 drinks/day	2484	5.26	0.52 (0.41, 0.67)
3 or more drinks/day	198	8.87	0.92 (0.59, 1.43)
Lack of regular exercise	3802	11.08	2.27 (1.84, 2.79)
Economic resources			
Education less than 12 years	2061	11.74	1.80 (1.48, 2.20)
Household income less than 25th percentile	2133	13.51	2.35 (1.98, 2.79)
Family wealth less than 25th percentile	2176	14.10	2.54 (2.01, 3.21)
Health insurance			
Private/other	5311	5.78	Reference
Government only	1569	14.36	2.73 (2.28, 3.28)
No health insurance	810	12.50	2.33 (1.66, 3.27)
Employment			
Working	4096	5.15	Reference
Retired/homemaker	2590	8.09	1.62 (1.34, 1.96)
Not employed	1004	20.76	4.83 (3.83, 6.07)

Note. In instances in which 95% confidence intervals exclude 1, odds ratios and confidence intervals are shown in boldface. ADL = activities of daily living; IADL = instrumental ADL.

TABLE 3—Standardized Prevalence Rates of Depression, by Race (n = 7690)

Adjustment Factor	Prevalence per 1000 Respondents		
	White	African American	Hispanic
Unadjusted	77.5	88.5	107.8 ^a
Demographics ^b	77.5	73.1	96.8
Health needs ^c	77.5	58.1 ^a	87.7
Economic access ^d	77.5	52.3 ^a	74.8

^aAssociated logistic regression coefficient significant at .05 level.

^bAdjusted for sociodemographics (race/ethnicity, age, gender, marital status, living alone, has child, has grandchild, parent alive, helps parent with basic activities).

^cAdjusted for sociodemographics and health needs (arthritis, cancer, diabetes, hypertension, heart disease, lung, stroke, obesity, cognitive impairment, functional limitations, physical limitations, smoking, alcoholic use, exercise).

^dAdjusted for sociodemographics, health needs, and economic access (education, income, wealth, health insurance, employment).

The greater prevalence of depression among ethnic minority groups observed here, particularly among Hispanics, is consistent with findings from other national studies. Results from the 1993 through 1996 Behavioral Risk Factor Surveillance System studies, which involved samples of the noninstitutional US adult population, showed mental distress (i.e., recent mental health problems over a span of 14 days or more) to be more frequent among members of minority groups (Hispanics: 10.3%; African Americans: 9.7%) than among Whites (8.3%).¹ Our finding of significantly

greater prevalence rates of major depression among Hispanics are compatible with National Comorbidity Survey results showing significantly higher rates of 30-day major depression among Hispanics (8.1%) aged 15 to 54 years than among Whites (4.7%) in the same age group but similar rates among African Americans (3.8%) and Whites.¹⁴

For the purpose of identifying ways in which to reduce disparities, we explored the contributions of sociodemographic, health, and economic factors to differences in major depression. Consistent with other studies indicating

TABLE 4—Odds Ratios for 12-Month Major Depression: Multiple Logistic Regression Analysis (n = 7690)

Characteristic	Odds Ratio for Depression	95% Confidence Interval
Race/ethnicity		
White	Reference	
African American	0.62	0.49, 0.79
Hispanic	0.92	0.61, 1.38
Sociodemographics		
Female	1.39	1.17, 1.65
Aged 60–65 years	0.61	0.49, 0.75
Marital status		
Married/lives with partner	Reference	
Divorced/widowed	1.53	1.14, 2.07
Single	1.06	0.62, 1.83
Lives alone	1.05	0.77, 1.43
Has child	1.32	0.87, 1.98
Has grandchild	0.92	0.71, 1.19
Parent alive	1.06	0.83, 1.36
Helps parent with basic activities	1.47	1.13, 1.91
Health needs		
Life-threatening condition(s)	1.60	1.31, 1.96
Other chronic condition(s)	1.17	0.87, 1.58
Physical limitation(s)	2.35	1.88, 2.94
Any IADL limitation	1.25	0.88, 1.77
Any ADL limitation	1.74	1.25, 2.43
Current smoker	1.34	1.10, 1.64
Alcohol use		
None in past 3 months	Reference	
Less than 3 drinks/day	0.84	0.65, 1.08
3 or more drinks/day	1.16	0.69, 1.92
Lack of regular exercise	1.34	1.06, 1.69
Economic resources		
Education less than 12 years	1.05	0.85, 1.29
Household income less than 25th percentile	0.96	0.73, 1.26
Family wealth less than 25th percentile	1.20	0.87, 1.66
Health insurance		
Private/other	Reference	
Government only	1.28	1.01, 1.64
No health insurance	1.49	1.10, 2.02
Employment		
Working	Reference	
Retired/homemaker	1.28	0.99, 1.66
Not employed	1.77	1.27, 2.48

Note. In instances in which 95% confidence intervals exclude 1, odds ratios and confidence intervals are shown in boldface. ADL = activities of daily living; IADL = instrumental ADL.

that demographic factors attenuate disparities in depression,^{49,50} adjustment for demographic and social factors reduced standardized prevalence rates by 17% among African Americans and 10% among Hispanics. Of particular interest are the results observed when we additionally adjusted for health needs and economic factors, since these factors are amenable to policy intervention.

Further adjustment for health needs reduced depression prevalence rates an additional 17% among African Americans and an additional 8% among Hispanics, reductions comparable to the initial attenuation from sociodemographic differences. Final adjustment for economic differences reduced African American rates a further 7% and Hispanic rates by 12%. These findings demonstrate strong and separate contributions of health needs and economic disparities to the greater frequency of major depression found among ethnic minority groups.

We also evaluated the relative contributions of other factors to major depression. Among sociodemographic characteristics, the strongest factors were being divorced or widowed (OR=1.53) and providing care for a parent (OR=1.47), followed by female gender (OR=1.39). Of note is the strong association of caregiving with major depression, comparable to the well-known risk of depression resulting from the loss of a spouse through death or divorce.^{1,22} This finding points to the potential importance of providing social support for caregivers to reduce the burden associated with this complex role.

The health needs most strongly associated with major depression were physical limitations (OR=2.35) and ADL limitations (OR=1.74), followed by the presence of a potentially life-threatening condition (OR=1.60), lack of regular exercise (OR=1.34), and tobacco use (OR=1.34), all factors more common among members of ethnic minority groups. The strong association between depression and functional limitations is particularly notable, since such limitations are consequences of disease processes.⁵¹ While it is well known that life-threatening conditions such as heart disease and cancer⁵²⁻⁵⁴ are strongly associated with depression, our findings point to the importance of not only disease prevention but management of disease consequences.

The economic factors most strongly associated with major depression were lack of employment (OR=1.77) and lack of health insurance coverage (OR=1.49). Of note is the absence of statistically significant effects related to education, income, and wealth after control for other sociodemographic, health, and medical access variables. Although these factors were individually associated with greater frequencies of depression, consistent with other studies,⁵⁵⁻⁵⁸ their effects were diluted when the influence of other factors was considered. Specifically, barriers imposed by lower access to medical care (via health insurance coverage) and by stress related to being out of the workforce were more directly related to major depression. We cannot determine from this study whether depression is the cause or effect of these economic barriers, but the strong association points to the importance of access to mental health care among the high-risk group examined here.

Our findings regarding the high frequency of major depression among older African Americans and Hispanics are relevant in formulating policies regarding medical treatment, public health interventions, and research. Disparities in depression frequencies are related to specific health and economic factors that are amenable to public policy intervention. The high frequency of major depression among older Hispanics and African Americans observed here must be considered in light of minority groups' lower rates of use of mental health services.^{59,60}

Confirmation of our findings in longitudinal studies of depression may lead to reductions in racial/ethnic disparities in depression rates through public policies that promote both mental health care and general medical care targeted at minority groups. Our finding that lack of health insurance coverage is strongly associated with frequency of major depression particularly implicates the need for health insurance carriers to facilitate better access to medical care among ethnic minority groups.

Furthermore, the strong relationship of health needs to depression frequency, including functional limitations and potentially life-threatening conditions, points to the importance of public health interventions involving disease prevention and management. Given the clear association between frequency of major depression and greater health burden

and fewer economic resources, factors common to older ethnic minority individuals, more effective treatment, public health, or public policy programs that increase access to mental health care and general medical care may lead to long-term reductions in racial/ethnic disparities in depression. ■

About the Authors

Dorothy D. Dunlop, Jing Song, and Larry M. Manheim are with the Institute for Health Services Research and Policy Studies, Feinberg School of Medicine, Northwestern University, Chicago, Ill, and the Multidisciplinary Clinical Research Center in Rheumatology, Northwestern University. John S. Lyons is with the Multidisciplinary Clinical Research Center in Rheumatology, Northwestern University, and the Departments of Psychiatry and Behavioral Science and Preventive Medicine, Feinberg School of Medicine. Rowland W. Chang is with the Multidisciplinary Clinical Research Center in Rheumatology, Northwestern University; the Departments of Preventive Medicine, Medicine, and Physical Medicine and Rehabilitation, Feinberg School of Medicine; and the Arthritis Center, Rehabilitation Institute of Chicago.

Requests for reprints should be sent to Dorothy D. Dunlop, PhD, Institute for Health Services Research and Policy Studies, Northwestern University, 339 E Chicago 7th Floor, Chicago, IL 60611 (e-mail: ddunlop@northwestern.edu).

This article was accepted May 14, 2003.

Contributors

D.D. Dunlop, L.M. Manheim, and R.W. Chang planned the study. J. Song analyzed the data. D.D. Dunlop supervised the analyses. D.D. Dunlop, L.M. Manheim, J.S. Lyons, and R.W. Chang contributed to the interpretation of the analyses. D.D. Dunlop wrote the article, and all authors made substantive suggestions for revisions.

Acknowledgments

This research was supported in part by grants from the National Institute of Arthritis and Musculoskeletal and Skin Diseases (P60-AR48098), the National Center of Medical Rehabilitation Research (R01 HD045412-01), and the Arthritis Foundation. Public data from the Health and Retirement Survey are sponsored by the National Institute of Aging and administered by the University of Michigan.

We gratefully acknowledge assistance from Linda Perloff, PhD.

Human Participant Protection

This study received an exemption from human subjects review by the Northwestern University institutional review board for the present analyses of public data.

References

- Centers for Disease Control and Prevention. Self-reported frequent mental distress among adults—United States, 1993–1996. *MMWR Morb Mortal Wkly Rep.* 1998;47:326–331.
- Penninx BW, Leveille S, Ferrucci L, van Eijk JT, Guralnik JM. Exploring the effect of depression on physical disability: longitudinal evidence from the established populations for epidemiologic studies of the elderly. *Am J Public Health.* 1999;89:1346–1352.

3. Blazer DG. Psychiatry and the oldest old. *Am J Psychiatry*. 2000;157:1915–1924.
4. Turvey CL, Conwell Y, Jones MP, et al. Risk factors for late-life suicide: a prospective, community-based study. *Am J Geriatr Psychiatry*. 2002;10:398–406.
5. Centers for Disease Control and Prevention. Prevalence of disabilities and associated health conditions among adults—United States, 1999. *MMWR Morb Mortal Wkly Rep*. 2001;50:120–125.
6. Somervell PD, Leaf PJ, Weissman MM, Blazer DG, Bruce ML. The prevalence of major depression in black and white adults in five United States communities. *Am J Epidemiol*. 1989;130:725–735.
7. Aneshensel CS, Clark VA, Frerichs RR. Race, ethnicity, and depression: a confirmatory analysis. *J Pers Soc Psychol*. 1983;44:385–398.
8. National Institute of Mental Health Five-Year Strategic Plan for Reducing Health Disparities. Bethesda, Md: National Institute of Mental Health; 2001.
9. DeVellis BM. Depression in rheumatological diseases. *Baillieres Clin Rheumatol*. 1993;7:241–257.
10. Krishnan KR, Delong M, Kraemer H, et al. Comorbidity of depression with other medical diseases in the elderly. *Biol Psychiatry*. 2002;52:559–588.
11. Patten SB. Selection bias in studies of major depression using clinical subjects. *J Clin Epidemiol*. 2000;53:351–357.
12. Regier DA, Myers JK, Kramer M, et al. The NIMH Epidemiologic Catchment Area program: historical context, major objectives, and study population characteristics. *Arch Gen Psychiatry*. 1984;41:934–941.
13. Kessler RC, McGonagle KA, Zhao S, et al. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: results from the National Comorbidity Survey. *Arch Gen Psychiatry*. 1994;51:8–19.
14. Blazer DG, Kessler RC, McGonagle KA, Swartz MS. The prevalence and distribution of major depression in a national community sample: the National Comorbidity Survey. *Am J Psychiatry*. 1994;151:979–986.
15. Eaton WW, Anthony JC, Gallo J, et al. Natural history of Diagnostic Interview Schedule/DSM-IV major depression: the Baltimore Epidemiologic Catchment Area follow-up. *Arch Gen Psychiatry*. 1997;54:993–999.
16. Moscicki EK, Locke BZ, Rae DS, Boyd JH. Depressive symptoms among Mexican Americans: the Hispanic Health and Nutrition Examination Survey. *Am J Epidemiol*. 1989;130:348–360.
17. Black SA, Markides KS, Miller TQ. Correlates of depressive symptomatology among older community-dwelling Mexican Americans: the Hispanic EPESE. *J Gerontol*. 1998;53:S198–S208.
18. Penninx BW, Guralnik JM, Ferrucci L, Simonsick EM, Deeg DJ, Wallace RB. Depressive symptoms and physical decline in community-dwelling older persons. *JAMA*. 1998;279:1720–1726.
19. Fernandez ME, Mutran EJ, Reitzes DC, Sudha S. Ethnicity, gender, and depressive symptoms in older workers. *Gerontologist*. 1998;38:71–79.
20. Aneshensel CS, Huba GJ. Depression, alcohol use, and smoking over one year: a four-wave longitudinal causal model. *J Abnorm Psychol*. 1983;92:134–150.
21. Krause N, Goldenhar LM. Acculturation and psychological distress in three groups of elderly Hispanics. *J Gerontol*. 1992;47:S279–S288.
22. Jones-Webb RJ, Snowden LR. Symptoms of depression among blacks and whites. *Am J Public Health*. 1993;83:240–244.
23. Kessler RC, Neighbors HW. A new perspective on the relationships among race, social class, and psychological distress. *J Health Soc Behav*. 1986;27:107–115.
24. Heeringa S, Connor J. *Technical Description of the Health and Retirement Study Sample Design*. Ann Arbor, Mich: Population Studies Center; 1995. HRS documentation report DR-002.
25. Juster FT, Suzman R. An overview of the Health and Retirement Study. *J Hum Resources*. 1995;30(suppl):S158–S183.
26. *Documentation of Affective Functioning Measures in the Health and Retirement Survey*. Ann Arbor, Mich: University of Michigan, Survey Research Center; 2000.
27. Sampling weights revised for Tracker 2.0 and beyond: Health and Retirement Study. Available at: <http://www.umich.edu/~hrwww/docs/codebook/track020/wghtdoc.pdf>. Accessed April 1, 2002.
28. *Mental Health: A Report of the Surgeon General*. Rockville, Md: US Dept of Health and Human Services; 1999.
29. Wittchen HU. Reliability and validity studies of the WHO-Composite International Diagnostic Interview (CIDI): a critical review. *J Psychiatr Res*. 1994;28:57–84.
30. Andrews G, Peters L. The psychometric properties of the Composite International Diagnostic Interview. *Soc Psychiatry Psychiatr Epidemiol*. 1998;33:80–88.
31. Tacchini G, Coppola MT, Musazzi A, Altamura AC, Invernizzi G. Multinational validation of the Composite International Diagnostic Interview (CIDI). *Minerva Psichiatr*. 1994;35:63–80.
32. Mroczek D, Kessler RS. *Final CIDI Screening Scales With Timing Estimates*. Ann Arbor, Mich: University of Michigan; 1994.
33. Turvey CL, Wallace RB, Herzog R. A revised CES-D measure of depressive symptoms and a DSM-based measure of major depressive episodes in the elderly. *Int Psychogeriatrics*. 1999;11:139–148.
34. Kessler RC, Andrews G, Mroczek D, Ustun B, Wittchen HU. The World Health Organization Composite International Diagnostic Interview Short-Form (CIDI-SF). *Int J Methods Psychiatr Res*. 1998;7:171–185.
35. Nelson CB, Kessler RC, Mroczek D. Scoring the World Health Organization's Composite International Diagnostic Interview Short Form. Available at: http://www.who.int/msa/cidi/cidi_sh_scoring.pdf. Accessed July 16, 2003.
36. Smith JP. Wealth inequality among older Americans. *J Gerontol*. 1997;52:74–81.
37. Williams R. A note on variance estimation for cluster-correlated data. *Biometrics*. 2000;56:218–219.
38. Shah BV, Barnwell BG, Bieler GS. *SUDAAN User's Manual Release 7.5*. Research Triangle Park, NC: Research Triangle Institute; 1997.
39. Korn EL, Graubard BI. *Analysis of Health Surveys*. New York, NY: John Wiley & Sons Inc; 1999.
40. *The Current Population Survey—A Report on Methodology*. Washington, DC: US Bureau of the Census; 1963. Technical paper 7.
41. Skaer TL, Sclar DA, Robison LM, Galin RS. Trends in the rate of depressive illness and use of antidepressant pharmacotherapy by ethnicity/race: an assessment of office-based visits in the United States, 1992–1997. *Clin Ther*. 2000;22:1575–1589.
42. Druss BG, Rosenheck RA, Desai MM, Perlin JB. Quality of preventive medical care for patients with mental disorders. *Med Care*. 2002;40:129–136.
43. Gornick ME, Eggers PW, Reilly TW, et al. Effects of race and income on mortality and use of services among Medicare beneficiaries. *N Engl J Med*. 1996;335:791–799.
44. Dunlop DD, Manheim LM, Song J, Chang RW. Gender and ethnic/racial disparities in health care utilization among older adults. *J Gerontol*. 2002;57:S221–S233.
45. Neighbors HW. The distribution of psychiatric morbidity in black Americans: a review and suggestions for research. *Community Ment Health J*. 1984;20:169–181.
46. Rodin G, Craven J, Littlefield C. *Depression in the Medically Ill: An Integrated Approach*. New York, NY: Brunner/Mazel; 1991.
47. Patten SB. Performance of the Composite International Diagnostic Interview Short Form for major depression in community and clinical samples. *Chronic Dis Can*. 1997;18:109–112.
48. Romanoski AJ, Folstein MF, Nestadt G, et al. The epidemiology of psychiatrist-ascertained depression and DSM-III depressive disorders: results from the Eastern Baltimore Mental Health Survey Clinical Reappraisal. *Psychol Med*. 1992;22:629–655.
49. Neff JA. Race differences in psychological distress: the effects of SES, urbanicity, and measurement strategy. *Am J Community Psychol*. 1984;12:337–351.
50. Vega W, Warheit G, Buhl-Auth J, Meinhardt K. The prevalence of depressive symptoms among Mexican Americans and Anglos. *Am J Epidemiol*. 1984;120:592–607.
51. Institute of Medicine. *Disability in America: A National Agenda*. Washington, DC: National Academy of Sciences; 1991.
52. Koenig HG. Depression in hospitalized older patients with congestive heart failure. *Gen Hosp Psychiatry*. 1998;20:29–43.
53. Hays RD, Wells KB, Sherbourne CD, Rogers W, Spritzer K. Functioning and well-being outcomes of patients with depression compared with chronic general medical illnesses. *Arch Gen Psychiatry*. 1995;52:11–19.
54. Wells KB, Golding JM, Burnam MA. Affective, substance use, and anxiety disorders in persons with arthritis, diabetes, heart disease, high blood pressure, or chronic lung conditions. *Gen Hosp Psychiatry*. 1989;11:320–327.
55. Kennedy GJ, Kelman HR, Thomas C, Wisniewski W, Metz H, Bijur PE. Hierarchy of characteristics associated with depressive symptoms in an urban elderly sample. *Am J Psychiatry*. 1989;146:220–225.
56. Whooley MA, Kiefe CI, Chesney MA, Markovitz JH, Matthews K, Hulley SB. Depressive symptoms, unemployment, and loss of income: the CARDIA Study. *Arch Intern Med*. 2002;162:2614–2620.
57. Capell HA, McEntegart A. Musculoskeletal disorders in the community. *Ann Rheum Dis*. 1999;58:323.
58. Cooper RS. Social inequality, ethnicity and cardiovascular disease. *Int J Epidemiol*. 2001;30(suppl 1):S48–S52.
59. Wells K, Klap R, Koike A, Sherbourne C. Ethnic disparities in unmet need for alcoholism, drug abuse, and mental health care. *Am J Psychiatry*. 2001;158:2027–2032.
60. McAlpine DD, Mechanic D. Utilization of specialty mental health care among persons with severe mental illness: the roles of demographics, need, insurance, and risk. *Health Serv Res*. 2000;35:277–292.