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Racial and Ethnic Disparities in the Treatment of Dementia Among Medicare Beneficiaries

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Objectives. Numerous studies have documented disparities in health care utilization between non-Hispanic White and minority elders. We investigated differences in anti-dementia medication use between non-Hispanic White and minority community-dwelling Medicare beneficiaries with dementia.

Methods. Using multivariate analysis with generalized estimating equations, we estimated prevalence ratios (PRs) for anti-dementia medication use by race/ethnicity for 1,120 beneficiaries with dementia from years 2001 through 2003 of the Medicare Current Beneficiary Survey.

Results. After adjusting for demographics, socioeconomics, health care access and utilization, comorbidities, and service year, we found that anti-dementia medication use was approximately 30% higher among non-Hispanic Whites compared to other racial/ethnic groups (PR = 0.73, 95% confidence interval [CI] = 0.59, 0.91). As for individual racial/ethnic groups, prevalence disparities remained significant for non-Hispanic Blacks (PR = 0.75, 95% CI = 0.57, 0.99) and non-Hispanic others (PR = 0.50, 95% CI = 0.26, 0.96) but were attenuated for Hispanics (PR = 0.84, 95% CI = 0.59, 1.20).

Discussion. Results provide evidence that racial/ethnic disparities in utilization of drugs used to treat dementia exist and are not accounted for by differences in demographic, economic, health status, or health utilization factors. Findings provide a foundation for further research that should use larger numbers of minority patients and consider dementia type and severity, access to specialty dementia care, and cultural factors.

***Key Words*:** Dementia—Health disparities—Anti-dementia medication—Medicare beneficiaries.

IN general, disease burden falls disproportionately on minority populations. Even at older ages, minorities tend to have poorer health status, whether measured by disease incidence, prevalence, or severity (National Center for Health Statistics, 2007). Eliminating health disparities is one of two overarching goals of *Healthy People 2010* (U.S. Department of Health and Human Services, 2000), the disease prevention and health promotion agenda of the U.S. Department of Health and Human Services. The Institute of Medicine's 2002 groundbreaking report *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care* (Smedley, Stith, & Nelson, 2003) and the *National Healthcare Disparities Report* (Agency for Healthcare Research and Quality, 2006) documented disparities in health care access. Disparities extend to inequalities in access to medications. Older minorities are less likely than majority elders to utilize prescription drugs or to increase their numbers of prescriptions over time (Briesacher, Limcangco, & Gaskin, 2003).

Dementia is a chronic and serious disease, with an estimated worldwide societal cost of $315.4 billion in 2005 (Wimo, Winblad, & Jonsson, 2007). According to findings from the 2002 Medicare Current Beneficiary Survey (MCBS), approximately 3.4 million Medicare beneficiaries are diagnosed with Alzheimer's disease and related disorders, more than half of whom (approximately 2 million) live in the community (Gruber-Baldini, Stuart, Zuckerman, Simoni-Wastila, & Miller, 2007; Stuart et al., 2007). Non-Hispanic Blacks with dementia are more likely to be undiagnosed or misdiagnosed relative to non-Hispanic Whites (Clark et al., 2005; Leo, Narayan, Sherry, Michalek, & Pollock, 1997); however, with population-based sampling and careful diagnostic techniques employing neuropsychological and laboratory testing following National Institute of Neurological and Communicative Disorders and Stroke–Alzheimer's Disease and Related Disorders Association (NINCDS-ADRDA) criteria, the prevalence of dementia may be relatively higher in minority populations. One community-based survey, with diagnoses confirmed using clinical testing and NINCDS-ADRDA criteria, found the prevalence of Alzheimer's disease among African American men to be 2.5 times greater than the prevalence among non-Hispanic White men (Demirovic et al., 2003). Both non-Hispanic Blacks and Latinos transition to long-term care at more advanced stages of dementia (Stevens et al., 2004; Yaffe et al., 2002).

Minorities also may be less likely to be prescribed anti-dementia medications. One study found that, considered together, minority patients (non-Hispanic Blacks, Asians, and Latinos) in Alzheimer's disease research centers in California had 40% lower odds of acetylcholinesterase inhibitor use compared to Whites (Mehta, Yin, Resendez, & Yaffe, 2005). Thus, there may be racial/ethnic disparities in dementia incidence, prevalence, access to health care services, and health care utilization.

The U.S. Food and Drug Administration has approved two classes of drugs to treat symptoms of cognitive deficit in

Alzheimer's disease and related disorders: cholinesterase inhibitors (donepezil, rivastigmine, galatamine, and tacrine) and an N-methyl-D-aspartate receptor antagonist (memantine). Using a national data set of community-dwelling Medicare beneficiaries, we investigated the use of these prescription anti-dementia medications to compare prevalence by non-Hispanic White or minority race/ethnicity.

Methods

Data Source

The study sample consisted of 1,606 person-years of observation of 1,120 community-dwelling Medicare beneficiaries with a reported diagnosis of dementia from the MCBS for years 2001 through 2003. The MCBS is a continuous sample of U.S. Medicare recipients conducted by the Centers for Medicare & Medicaid Services. Although the use of sampling weights for single years of the MCBS would allow it to be nationally representative of Medicare beneficiaries, we could not use weights in our analysis because individuals may have crossed years. Furthermore, because the MCBS oversamples certain groups (e.g., those younger than 65 years of age), our unweighted sample was not necessarily representative of Medicare beneficiaries as a whole. The MCBS uses a rotating panel design; beneficiaries or their proxies are interviewed in their homes three times per year for a maximum of 4 years by using computer-assisted personal interviewing technology. Respondents are asked a battery of questions relating to demographic characteristics, health status, pharmaceutical and other health care utilization and expenditures, and health insurance coverage. The MCBS links survey information to Medicare Parts A and B claims that contain diagnostic indicators as well as payment information. We excluded 42 observations from the analysis because of a missing value; all observations analyzed had complete information.

Measures

The dependent variable was the annual prevalence of use of any anti-dementia medication, namely donepezil (Aricept®), rivastigmine (Exelon®), galantamine (Razadyne®/Reminyl®), or memantine (Namenda®), by non-Hispanic Whites and minorities. Respondents self-reported medication use. In addition to querying respondents about specific medications used, interviewers reviewed medication containers as part of the thrice-yearly in-home interview during Years 2, 3, and 4. Respondents were asked to keep all medication containers, insurance slips, and receipts for medications, and the interviewers reviewed these materials at each interview. If a medication named in a previous round of interviewing was not listed, the respondent was queried about its use during the period. Thus, prescription fills were recorded, but actual medication use was not observed. We determined race/ethnicity, our variable of interest, from the self-report from the in-home computer-assisted personal interviewing interview. We determined dementia diagnosis status from the presence of *International Classification of Diseases*–9 codes 331.0, 331.1, 331.2, 331.7, 290.xx (excluding 290.8 and 290.9), 294.xx (excluding 294.9), or 794.xx on one or more inpatient hospital, skilled nursing facility, home health, hospital outpatient, or physician supplier/carrier claim or from self-/proxy report ("sample person ever told had Alzheimer's disease or dementia"). We determined dementia status from claims alone for 49.9% of respondents, from self-reports only for 23.7%, and from both sources for 26.4%. We chose covariates from a literature review and from preliminary analysis. Covariates included age (less than 65 years, 65–74, 75–84 and 85 years and older), gender, U.S. census region, residence in a metropolitan statistical area, income, education, marital status, source of dementia diagnosis (claims data, self-/proxy report, or both), source of survey information (self-report or proxy respondent for at least half of the interviews), prescription drug insurance coverage, use of other medication classes, and year of observation. We estimated comorbid disease burden by using a count of comorbid disease classes.

Analysis

We compared use or nonuse of anti-dementia medications by using chi-square tests and *t* tests. Multivariate analysis with generalized estimating equations (GEE) estimated the conditional effect of race/ethnicity on anti-dementia drug use, controlling for the covariates listed above. This analysis yielded prevalence ratios (PRs) rather than prevalence odds ratios. With 26% of the sample using medication, odds ratios would not have been an accurate estimation of actual prevalence. Odds ratios are always further from the null value of 1.0 with the disparity increasing with higher prevalence (Rothman & Greenland, 1998). GEE is especially useful for investigations with binary outcomes and correlated data. With efficient parameter estimation and accurate standard errors, GEE is better at correcting for clustering and other types of correlation (Hanley, Negassa, Edwardes, & Forrester, 2003). Standard errors are recalibrated to account for similarity of measures, or correlation, by the same individual across differing lengths of observation (Fitzmaurice, Laird, & Ware, 2004). Logistic regression analysis is less suited to this analysis. Logistic regression does not consider nonindependence due to correlation; it also yields prevalence odds ratios rather than PRs and thus would have overestimated the association of race/ethnicity and medication use. We assumed a binomial distribution and used a log link function to report PRs. We calculated PRs and their associated 95% confidence intervals (CIs) by using PROC GENMOD in SAS 9.1.3 (Deddens, Petersen, & Lei, 2003). Because the usual tests of model fit are not valid for GEE models, we assessed goodness of fit by using an experimental technique based on aggregates of residuals with an associated *p* value of .9060, indicating a satisfactory model (SAS Institute, 2003).

Results

The ethnic/racial distribution of the sample was 76.3% non-Hispanic White, 11.7% non-Hispanic Black, 8.1% Hispanic, and 3.8% non-Hispanic other (see Table 1). The mean age of the sample was 80 years ($SD = 11$), and nearly 60% were female. Approximately 26% of the sample received at least one anti-dementia medication, most commonly donepezil and less frequently rivastigmine, galantamine, or memantine. The sample differed significantly by race for anti-dementia medication use, age, income, education, marital status, region, urban residence, and proxy response. Whites most often used

Table 1. Characteristics of the Sample by Racial/Ethnic Group ($N = 1,120$)

Characteristic	Non-Hispanic White ($n = 855$; 76.3%)	Non-Hispanic Black ($n = 131$; 11.7%)	Hispanic ($n = 91$; 8.1%)	Non-Hispanic Other ($n = 43$; 3.8%)	Total ($N = 1,120$)
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Use of any anti-dementia drug ($p = .0022$)	245 (28.7)	26 (19.9)	15 (16.5)	5 (11.6)	291 (26.0)
Male gender	365 (42.7)	42 (32.1)	34 (37.4)	14 (32.6)	455 (40.6)
Age ($p < .0001$)					
Less than 65 years	33 (3.9)	5 (3.8)	18 (19.8)	5 (11.6)	61 (5.5)
65–74 years	135 (15.8)	23 (17.6)	17 (18.7)	8 (18.6)	183 (16.3)
75–84 years	383 (44.8)	52 (39.7)	23 (25.3)	16 (37.2)	474 (42.3)
85 years or more	304 (35.6)	51 (38.9)	33 (36.3)	14 (32.6)	402 (35.9)
Income ($p < .0001$)					
100% FPL or less	130 (15.2)	64 (48.9)	52 (57.1)	16 (37.2)	262 (23.4)
101%–149% FPL	187 (21.9)	35 (26.7)	20 (22.0)	10 (23.4)	252 (22.5)
150%–300% FPL	301 (35.2)	29 (22.1)	15 (16.5)	9 (20.9)	354 (31.6)
More than 300% FPL	237 (27.7)	3 (2.3)	4 (4.4)	8 (18.6)	252 (22.5)
Education ($p < .0001$)					
0–8 years	164 (19.2)	59 (45.0)	46 (50.6)	10 (23.3)	279 (24.9)
9–12 years (no high school graduation)	146 (17.1)	38 (29.0)	18 (19.8)	4 (9.3)	206 (18.4)
High school graduate	28.7 (18.7)	18 (13.7)	16 (17.6)	15 (34.9)	294 (26.3)
Postsecondary education	300 (35.1)	16 (12.2)	11 (12.1)	14 (32.6)	341 (30.5)
Marital status ($p < .0001$)					
Currently married	390 (45.6)	35 (26.7)	33 (36.3)	17 (39.5)	475 (42.4)
Widowed	389 (45.5)	79 (60.3)	35 (38.5)	20 (46.5)	523 (46.7)
Never married/divorced/separated	76 (8.9)	17 (13.0)	23 (25.3)	6 (14.0)	122 (10.9)
Region ($p < .0001$)					
East	181 (21.2)	16 (12.2)	10 (11.0)	3 (7.0)	210 (18.8)
Midwest	191 (22.3)	20 (15.3)	4 (4.4)	7 (16.3)	222 (19.8)
South	325 (38.0)	85 (64.9)	62 (68.1)	12 (27.9)	484 (43.2)
West	158 (18.5)	10 (7.6)	15 (16.5)	21 (48.8)	204 (18.2)
Residence in urban MSA ($p = .0008$)	615 (71.9)	91 (69.5)	83 (91.2)	31 (72.1)	820 (73.2)
Proxy respondent for half or more interviews ($p = .0011$)	328 (38.4)	62 (47.3)	52 (57.1)	22 (51.2)	464 (41.4)
Source of diagnosis information					
Claims data only	436 (51.0)	60 (45.8)	43 (47.3)	20 (46.5)	559 (49.9)
Self-/proxy report only	192 (22.5)	36 (27.5)	24 (26.4)	13 (30.2)	265 (23.7)
Both claims and self-/proxy report	227 (26.6)	35 (26.7)	24 (26.4)	10 (23.3)	296 (26.4)
Prescription drug insurance coverage	631 (73.8)	91 (69.5)	65 (71.4)	33 (76.7)	820 (73.2)
Hospitalized during study period	318 (37.2)	51 (38.9)	31 (34.1)	16 (37.2)	416 (37.1)
SNF stay during study period	116 (13.6)	15 (11.5)	8 (8.8)	6 (14.0)	145 (13.0)
Hospice utilization during period	46 (5.4)	10 (7.6)	3 (3.3)	4 (9.3)	63 (5.6)
Number of comorbid disease classes					
0–4	190 (22.2)	37 (28.2)	27 (29.7)	10 (23.3)	264 (23.6)
5–6	151 (17.7)	28 (21.4)	12 (13.2)	12 (27.9)	203 (18.1)
7–10	271 (31.7)	34 (26.0)	22 (24.2)	11 (25.6)	338 (30.2)
11 or more	243 (28.4)	32 (24.4)	30 (33.0)	10 (23.3)	315 (28.1)
Use of other drug classes[a]	711 (83.2)	112 (85.5)	70 (76.9)	33 (76.7)	956 (82.7)
Year					
2001	261 (30.5)	34 (26.0)	27 (29.7)	9 (20.9)	331 (29.6)
2002	237 (27.7)	42 (32.1)	28 (30.8)	14 (32.6)	321 (28.7)
2003	357 (41.8)	55 (42.0)	36 (39.6)	20 (46.5)	468 (41.8)

Notes: FPL = federal poverty level; MSA = metropolitan statistical area; SNF = skilled nursing facility.

[a]Cardiovascular, antidepressant, or antipsychotic medication.

$p \geq .05$ except where shown.

anti-dementia medication (28.7%, $p = .0022$), were in the highest income group (27.7%, $p < .0001$), had education beyond high school (35.1%, $p < .0001$), and were currently married (45.6%, $p < .0001$); Hispanics most often were younger than 65 years of age (19.8%, $p < .0001$), lived in urban metropolitan areas (91.2%, $p < .0018$), lived in the South (68.1%, $p < .0001$), and had a proxy respondent for at least half of the interviews (57.1%, $p = .0011$).

In addition to the race/ethnicity comparisons shown in Table 1, we also performed bivariate comparisons between

Table 2. Multivariate Analysis of Prevalence Ratios for Anti-Dementia Medications for Non-Hispanic White Versus Minority Medicare Beneficiaries ($N = 1{,}606$ person-years of observation)

	Unadjusted Model		Adjusted Model	
Variable	PR	95% CI	PR	95% CI
Minority race vs non-Hispanic White	0.61	0.48, 0.77	0.73	0.59, 0.91
Age[a]				
Less than 65 years			0.45	0.18, 1.09
65–74 years			0.99	0.78, 1.26
75–84 years			1.01	0.86, 1.20
Female gender			0.99	0.85, 1.14
Region[b]				
North			0.93	0.72, 1.21
South			1.17	0.94, 1.44
Midwest			1.04	0.85, 1.28
Urban/suburban residence			1.30	1.09, 1.57
Income level[c]				
100% FPL or less			0.83	0.63, 1.09
101%–149% FPL			0.96	0.77, 1.20
150%–300% FPL			0.93	0.80, 1.08
Education[d]				
8 years or fewer			1.00	0.93, 1.07
9–12 years (no high school graduation)			0.94	0.79, 1.12
High school graduate			0.94	0.81, 1.10
Marital status[e]				
Widowed			0.90	0.77, 1.06
Never married/divorced/separated			0.33	0.17, 0.61
Proxy respondent			0.82	0.71, 0.95
Source of diagnosis[f]				
Claims data only			0.37	0.31, 0.44
Self-/proxy report only			0.35	0.28, 0.44
Number of comorbid conditions[g]				
0–4			1.09	0.89, 1.33
5–6			1.08	0.88, 1.32
7–10			1.09	0.89, 1.34
No supplemental prescription drug coverage			0.76	0.63, 0.92
Hospital stay			0.97	0.80, 1.20
Skilled nursing facility stay			0.74	0.54, 1.02
Hospice stay			0.51	0.28, 0.92
Use of other drug classes[h]			1.50	1.16, 1.95
Year[i]				
2001			0.97	0.85, 1.12
2002			0.88	0.77, 1.01

Notes: PR = prevalence ratio; CI = confidence interval; FPL = federal poverty level.

[a]85 years or older is the reference group.
[b]East is the reference group.
[c]Greater than 300% FPL is the reference group.
[d]Postsecondary education is the reference group.
[e]Currently married is the reference group.
[f]Diagnosis from both claims data and self-report is the reference group.
[g]11 or more comorbid conditions is the reference group.
[h]Cardiovascular, antidepressant, or antipsychotic medications.
[i]2003 is the reference group.

Table 3. Multivariate Analysis of Prevalence Ratios for Anti-Dementia Medications for Non-Hispanic White Versus Specific Racial/Ethnic Groups of Medicare Beneficiaries

	Unadjusted Model		Adjusted Model	
Group	PR	95% CI	PR	95% CI
Non-Hispanic Blacks	0.68	0.50, 0.91	0.75	0.57, 0.99
Hispanics	0.61	0.43, 0.88	0.84	0.59, 1.20
Non-Hispanic Other	0.38	0.19, 0.77	0.50	0.26, 0.96

Note: Non-Hispanic Whites is the reference group. PR = prevalence ratio; CI = confidence interval.

anti-dementia medication users and nonusers (data not shown). Compared to those not receiving anti-dementia medication, anti-dementia medication users were older ($M = 81.3$ years vs 79.7, $t = -2.89$, $p = .0040$), were more often currently married (53.6% vs 38.5%, $\chi^2 = 40.2$, $p < .0001$), used more cardiovascular (80.1% vs 74.1%, $\chi^2 = 4.2$, $p = .0401$) and antidepressant medications (38.1% vs 29.1%, $\chi^2 = 8.2$, $p = .0041$), more frequently had prescription drug insurance (79.4% vs 71.1%, $\chi^2 = 7.6$, $p = .0058$), and were more likely to have their dementia status ascertained both from claims data and from self-report (52.2% vs 17.4%, $\chi^2 = 134.7$, $p < .0001$). Relative to nonusers, anti-dementia medication users were less likely to use the services of hospitals (27.9% vs 40.4%, $\chi^2 = 14.6$, $p = .0001$), hospices (2.1% vs 6.9%, $\chi^2 = 9.4$, $p = .0022$), or skilled nursing facilities (7.2% vs 15.0%, $\chi^2 = 11.5$, $p = .0007$). They were also less likely to live in poverty (13.1% vs 27.0%, $\chi^2 = 24.7$, $p < .0001$). There were no other significant differences between medication users and nonusers.

We compared the prevalence of anti-dementia medication by racial/ethnic group (see Table 2). In the unadjusted model, the PR comparing all minorities to non-Hispanic Whites was 0.61 (95% CI = 0.48, 0.77). The adjusted model included demographics (gender, age, marital status, and geographic location), socioeconomic status (income and education), source of diagnosis (claims data, self-report, or both), self- or proxy reporting, comorbidity count, health care utilization variables (prescription insurance status, hospital, skilled nursing facility and hospice stay, use of other drug classes), and year. The PR for the adjusted model was 0.73 (95% CI = 0.59, 0.91). In the final model, urban or suburban residence (PR = 1.30, 95% CI = 1.09, 1.57) and use of other drug classes (PR = 1.50, 95% CI = 1.16, 1.95) were associated with higher prevalence of use. Being never married, divorced, or separated (PR = 0.33, 95% CI = 0.17, 0.61); having a single source for dementia diagnosis (PR = 0.37, 95% CI = 0.31, 0.44, for claims data only; PR = 0.35, 95% CI = 0.28, 0.44, for self-report only); being a proxy respondent rather than a self-report (PR = 0.82, 95% CI = 0.71, 0.95); lacking supplemental prescription insurance coverage (PR = 0.76, 95% CI = 0.63, 0.92); and using hospice services (PR = 0.49, 95% CI = 0.27, 0.89) predicted lower prevalence of anti-dementia drug use. We repeated the analyses with individual minority racial/ethnic groups entered simultaneously in both models (see Table 3). Prevalence disparities remained significant for non-Hispanic Blacks (PR = 0.75, 95% CI = 0.57, 0.99) and non-Hispanic others (PR = 0.50, 95% CI = 0.26, 0.96) but were attenuated for Hispanics (PR = 0.84, 95% CI = 0.59, 1.20).

Discussion

Relative to non-Hispanic Whites, community-dwelling minority Medicare beneficiaries with dementia had an approximately 30% lower prevalence of anti-dementia medication use in the years 2001 through 2003. The finding of lower prevalence among minority Medicare beneficiaries was extremely robust, persisting even after we adjusted for demographic, economic, health status, health care access, and utilization factors. Our findings are similar in magnitude to the 40% lower prevalence for non-Whites found by Mehta and colleagues (2005) in their investigation of acetylcholinesterase inhibitor use in California Alzheimer's disease centers in the years 1999 through 2003. Our study reinforces their findings by using a national community-dwelling sample rather than one from a specialty clinical setting. When we examined racial/ethnic groups individually, PRs remained statistically significant for non-Hispanic Blacks and non-Hispanic others but lost significance for Hispanics, possibly because of the small numbers in each minority group. Of interest is that the smallest group, the heterogeneous "non-Hispanic other" category, had the greatest disparity in prevalence. In our sample, the 43 non-Hispanic others included those reporting more than one race/ethnicity ($n = 16$), Asian or Pacific Islander ($n = 15$), North American native ($n = 7$), don't know ($n = 3$), and other ($n = 2$). Numbers were too small within this group to determine whether prevalence was similar across these subcategories or whether one or two subcategories strongly influenced the disparity.

Although we cannot fully explain this disparity from our investigation, our findings suggest that between-race differences are not due to demographic, economic, health status, access, or utilization variables. Disparities may be due to differences in attitudes toward dementia in diverse cultures in the United States, as well as cultural bias in cognitive measurement (Manly & Espino, 2004). They might arise also from differences in psychosocial environment (e.g., neighborhood effects) or discrimination experienced by members of minority groups, both of which have been proposed to be important determinants of the mental health of non-Hispanic Blacks (Williams & Earl, 2007). If dementia is less often correctly diagnosed in minorities, as reported by Clark and colleagues (2005) and Leo and associates (1997), our disparity findings may underestimate the unmet treatment need among minorities with dementia that has not been diagnosed.

Differences in prescribing patterns for non-Hispanic Whites and other groups might arise in several ways. Minority patients have relatively poorer access to health care, beyond the variation in hospital, skilled nursing facility, and hospice use and prescription drug insurance coverage accounted for by this analysis (Smedley et al., 2003). Less contact with physicians would likely result in fewer prescriptions being written. In our sample, non-Hispanic Whites had an average of 7.7 office visits during the observation period, whereas minorities made 6.9 visits; this difference is nearly statistically significant at the $\alpha = .05$ level ($t = -1.90$, $p = .058$). Additionally, minority elders are placed in long-term care at more advanced stages of dementia (Stevens et al., 2004; Yaffe et al., 2002), perhaps leading to a disproportionate number of more severely demented minority elders remaining in the community. With the exception of memantine, approved in 2003 for moderate to severe dementia of the Alzheimer's type, anti-dementia medications were indicated for use in only mild to moderate disease during our study years (U.S. Food and Drug Administration, 2003); therefore, medication might have been considered inappropriate for community-dwelling minority elders with more advanced dementia and thus not prescribed.

Non-Hispanic Blacks make proportionately more mental health visits to primary care providers rather than to specialists and thus receive fewer prescriptions for psychotropics (Snowden, 2001). Poorer access to specialty dementia care may explain some of the disparity with regard to dementia medications. In addition, non-Hispanic Blacks have higher relative rates of vascular dementia, and medications considered in this investigation were approved for use in Alzheimer's disease rather than for vascular and other types of dementia during the study years. Thus, non-Hispanic Blacks in particular may have received proportionately fewer prescriptions for anti-dementia medications, because the use of these medications was not indicated for dementia types other than Alzheimer's disease. However, even if taken together, it seems unlikely that dementia type and disease severity could account for the entire 30% differential between majority and minority use of anti-dementia medications.

Our study has several limitations. Specific anti-dementia medications and their indications changed within the study years 2001 through 2003 and continue to do so; therefore, findings relating to this class of medications during those years may not hold true for the present or future. Numbers within each specific race/ethnicity group were relatively small; thus, our ability to look at individual groups is limited. We lacked information on caregivers of people with dementia. Caregiver factors may have influenced access to health care for people with dementia; for instance, caregiver psychological distress is associated with a decreased likelihood of receipt of influenza vaccine by the person being cared for (Thorpe et al., 2006).

Issues of disparities need investigation using data sources that contain higher numbers of minorities, thereby allowing for detailed examination of prevalence and use patterns by specific racial and ethnic populations. Further investigation needs to be undertaken with larger numbers of minority participants, accounting for issues of dementia type and severity, medication dose and duration of use, access to specialty dementia care, and consistency in treatment disparities across settings of care. As well, dementia prevalence is greatest in nursing homes and other institutions, and evaluation of racial and ethnic disparities should be considered in this vulnerable population, especially because a recent study reported significant racial disparities in quality nursing home placement (Smith, Feng, Fennell, Zinn, & Mor, 2007). Additionally, the influence of cultural and environmental factors in dementia treatment remains a fertile area worthy of future exploration.

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I. H. Zuckerman planned the study, wrote and revised the manuscript, supervised data analysis and interpretation, and performed data analysis and interpretation. P. T. Ryder wrote and revised the manuscript and performed data analysis and interpretation. L. Simoni-Wastila contributed to interpreting the analytic results and revising the manuscript. T. Shaffer assisted with data analysis, provided statistical expertise, and revised the manuscript. M. Sato contributed to writing the paper and revising the manuscript. L. Zhao provided statistical expertise and contributed to revising the manuscript. B. Stuart acquired the data, helped plan the study, and contributed to revising the manuscript.

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