Prescription and Nonprescription Drug Use among Black and White Community-Residing Elderly

ABSTRACT

Objectives. To examine and compare concomitants of prescription and nonprescription drug use of Black and White community-dwelling elderly.

Methods. Information on prescription and nonprescription drug use, demographic and health characteristics, and use of health services was obtained from a probability-based sample of Black (n = 2152) and White (n = 1821) community-resident elderly in the Piedmont area of North Carolina. Descriptive statistics were calculated. Linear regression, in which sample weights and design effects were taken into account, was used for the final models.

Results. For prescription drug use, 37% and 32% of the variance was explained for Whites and Blacks, respectively (6% and 5% for nonprescription drugs). Health status and use of medical services were the strongest predictors of prescription drug use for both races (with Medigap insurance also important for Whites and Medicaid important for Blacks). Demographic characteristics and self-assessed health were significant factors in the use of nonprescription drugs. Race independently predicted use of both types of drugs but explained only a small proportion of the variance.

Conclusions. Health status and use of health services are importantly related to prescription drug use. Nonprescription drug use is difficult to explain. (*Am J Public Health.* 1993;83: 1577–1582)

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Introduction

The elderly, who represent 12% of the population, have been reported to take 30% of all prescription medications.[1] Higher prescription drug use has been reported for persons who are older, female, and in poorer health; who have more impaired activities of daily living; and who have a secondary reimbursement source (e.g., health insurance or Medicaid). Those who have a higher income, who are employed, or who have had more years of education, and those who are Black have been found to be less likely to use prescribed medications.[1–11] The finding of lower medication drug use among Blacks[11] is particularly perplexing because, by most criteria, their health is poorer[12]; consequently, their use of medications would be expected to be greater than that of non-Blacks.

Although the elderly are also frequent users of nonprescription drugs,[5] information on the factors associated with the use of such drugs is scantier than that for prescription drugs. In general, reported findings indicate that women and those who are White are more likely to be taking nonprescription drugs, but the association of nonprescription drug use with age is unclear.[4,5,10,11] A number of reasons for nonprescription drug use have been proposed: these drugs may be used by persons who perceive medical care to be unavailable, by those who are more anxious, or as a substitute for or in conjunction with prescription drugs.[2,13–15] Factors consistently reported to be associated with prescription drug use (e.g., income, education, socioeconomic level, health status) are not consistently related to use of nonprescription drugs.[16]

Few studies have examined racial differences in drug use while taking into account interrelated predictors of such use.[13–15,17–22] The main purpose of the present study, then, was to examine determinants of the use of prescription and nonprescription drugs by elderly Black and White community residents using a multivariate approach. Second, we wished to determine whether the model that explains prescription drug use would also explain nonprescription drug use.

Methods

Sample

The data come from the in-home baseline survey (1986 to 1987) of the Duke Established Populations for Epidemiologic Studies of the Elderly.[23,24] In brief, the study sample consists of a stratified

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probability household sample of 4163 community residents aged 65 or older living in five adjacent urban and rural counties in the Piedmont area of North Carolina. To increase statistical precision, Blacks were oversampled, constituting 54% of those interviewed compared with 35% of the same age population. Analysis weights take initial nonresponse into account, correct for the oversampling of Blacks, and allow inference to the five-county area at the time of the survey. The Duke study was approved by the Duke University Medical Center Institutional Review Board, and informed consent was obtained from each participant before data were gathered.

The present analysis excluded 30 subjects who were neither Black nor White, and 160 subjects with only proxy data since information on their self-assessed health status was unavailable. Hence, the analysis data set included 2152 Black and 1821 White elderly, of whom 1727 (80.3%) and 1588 (87.2%), respectively, responded to each item analyzed.

Data Collection

Information was obtained by means of a 90-minute, in-person interview in the home. The interview schedule has been published.[23] Relevant available data include (1) demographic characteristics; (2) limited information on health conditions (i.e., the presence of a heart condition, stroke, cancer, diabetes, hypertension), self-assessed health (a single item), and physical health functioning; and (3) measures of use of selected health care services and professionals, income, and health insurance.

The name, strength, and dosage form of each medication taken in the prior 2 weeks or to be taken as needed were recorded.[11]

Drug Data Entry

Each drug was assigned a unique four-digit generic code from the DPICS and INDPICS coding system[5] using a locally developed interactive data entry program,[11] and each was further numerically coded to indicate whether it was a prescription or nonprescription product. Reliability of drug data entry, which was tested by re-entering a 5% sample, was found to be highly satisfactory, with the rate of coding errors estimated to be 1.63% (95% confidence interval = 0.71%, 2.55%).

Model Development

A health care services use model[25] was chosen to explore prescription and nonprescription drug use. Specifically, use of medications was expected to be influenced by demographic characteristics, health status, and factors that facilitate or hinder drug use.

The demographic characteristics included race (Black/White), sex, age and education (both in years), marital status (married/not currently married), and current residence in an urban or rural area.

Health status was assessed by three measures. The first, a medical status score, summarized the medical impact of five common chronic health conditions (heart condition, stroke, cancer, diabetes, and hypertension). These physical health conditions were the only ones present that had any medication-related relevance. The medical status score reflected the averaged evaluations (summed over all five conditions) made by 36 clinicians experienced in the care of the elderly; the evaluations were made regarding the extent to which each condition had an impact on health status. In making these evaluations, the clinicians considered all available information. For instance, in rating heart condition, they took into account any report of heart attack and, if there were any such reports, factored in how many, how recently, and whether there was a related hospitalization. The manner of development of the medical status scale ensured that it had content validity; it also had construct validity, summary scores being related to selected aspects of health services use, self-rated health, and activities of daily living in the expected manner. Thus, this measure is valid and maximizes the information available.

The two additional measures of health status included self-rated health (a 4-point scale in which 0 = poor and 3 = excellent) and a measure of functional physical health (three items of the Rosow and Breslau scale,[26] in which the score was the number of items the subject had difficulty performing, with missing values imputed where possible).

Items facilitating or hindering drug use included the number of outpatient visits in the past 12 months to a medical professional for a physical health problem, whether the same health care professional was usually seen on each visit, and hospitalization in the previous year. Additionally, they included not being on Medicaid (which in North Carolina pays for prescription medications); enrollment in Medicare (which financially facilitates access to medical care and hence to receipt of a prescription); supplementary health insurance (which may pay toward prescription medications); and adequacy of income.

Statistical Analysis

Descriptive statistics were calculated separately for Blacks and Whites. To examine the impact of missing data, use of prescription and nonprescription drugs by full and partial responders was compared using Student's t test. For all other variables (demographic, health status, facilitating/hindering characteristics), information on the individual comparisons was combined and an omnibus test was carried out (Fisher's Inverse Chi-Square Method based on P values derived from Wilcoxon's signed rank test or the Kruskal-Wallis statistic).[27]

For prescription and nonprescription drugs, the proportions of Black and White respondents using at least one drug were compared using chi-square tests. Comparison of mean drug use by race was made using Student's t test.

Multivariate models were constructed using forward linear regression, introducing blocks of demographic, health status, and facilitating/hindering variables successively as predictors of the number of drugs used. Separately for prescription and nonprescription drug use, models were run for Blacks, Whites, and both races combined; the latter model included an indicator variable for race. All models used analysis weights. Initial models were run in SAS, using procedure REG[28]; final models considered sample design effects and were implemented in SURREGR.[29,30]

To determine the impact of excluding partial responders from the models, all but the final stage of each series of models was run with partial responders included where they were not automatically deleted by the software.

Results

Sample Characteristics

Table 1 shows the characteristics of responders in the current sample. For both Blacks and Whites, those who responded to each item were less impaired than those who did not ($P < .0001$). On average, partial responders reported more prescription and fewer nonprescription drugs than full responders. They tended to be older, less educated, in poorer functional and self-assessed health, and more likely to have been hospitalized in the previous year. If Black, they were less likely to be married; if White, they were more likely to be female and less likely to have

supplementary health insurance. The exclusion of partial responders from analysis appears to have had little impact on the findings.

Prevalence and Extent of Drug Use, Both Types

In the present study, 76% of White and 74% of elderly Black community residents took at least one prescription drug, a nonsignificant difference. However, Black users took significantly fewer prescription drugs (mean = 2.79, SD = 1.75) than did White users (mean = 3.19, SD = 2.20; $t = 5.53$, $df = 2693$; $P < .0001$). Only 67% of Blacks compared with 76% of Whites ($\chi^2 = 43.26$, $df = 1$; $P < .0001$) reported taking nonprescription drugs. Of those reporting such use, Blacks again took significantly fewer nonprescription drugs (mean = 1.69, SD = 1.01) than did Whites (mean = 1.89, SD = 1.18; $t = 4.86$, $df = 2804$; $P < .0001$).

Although here the health status of Blacks appears to be similar to that of Whites, Blacks use fewer drugs of either type. They are also less likely than their White counterparts to be married and to have supplementary health insurance; they also have less education and are in more straitened economic circumstances.

Predictors of Prescription Drug Use

For elderly White community residents (Table 2), demographic characteristics explained a minimum amount of variance (0.8%), those with poor education being heavier consumers of prescription drugs. When health status was also considered, an additional 30% of variance in prescription drug use was explained. For each health measure, poorer standing indicated greater prescription drug use. A further 6.4% of variance was explained by facilitating/hindering characteristics, for a total of 37.2% of variance explained. Of the latter characteristics, the number of visits to a physician, the same physician seen on each occasion, overnight hospitalization in the previous year, and the presence of Medicaid and of supplementary health insurance were significant predictors of prescription drug use. With the inclusion of the facilitating characteristics, level of education lost its significance but area of residence became important: among White elderly, urban area residents were likely to be taking more prescription drugs than rural area residents.

For elderly Black community residents (Table 3), demographic characteristics explained 3.2% of the variance in pre-

TABLE 1—Characteristics of Black and White Responders to the Baseline Survey (Weighted Data with Unweighted n)

Variables[a]	Black Responders (n = 1727) Mean[b]	Black Responders (n = 1727) SD	White Responders (n = 1588) Mean[b]	White Responders (n = 1588) SD
Demographic characteristics				
Female sex	0.63		0.61	
Not currently married (vs married)	0.53		0.44	
Urban residence (vs rural)	0.56		0.57	
Age, y	72.83	5.02	72.79	7.22
Education, y[c]	7.67	3.31	10.37	4.37
Health status characteristics				
Impaired functional status	0.84	0.88	0.75	1.26
Poor medical status	31.54	25.08	30.45	36.36
Better self-rated health	1.49	0.70	1.65	1.07
Facilitating/hindering characteristics				
Physical health visits in past year, n	4.64	4.58	4.60	7.73
Same physician seen on each visit	0.78		0.89	
Overnight hospitalization in past year	0.15		0.16	
Not on Medicaid	0.91		0.97	
On Medicare	0.93		0.97	
No other health insurance	0.63		0.22	
Adequacy of income	0.48		0.80	
Dependent variables				
Prescription drugs reported, n	1.93	1.50	2.30	2.69
Nonprescription drugs reported, n	1.15	0.94	1.42	1.54

[a]See the Methods section for descriptions of variables.
[b]Proportion for dichotomized variables.
[c]More than 17 years coded as 17.

TABLE 2—Concomitants of Use of Prescription Drugs among Elderly White Community Residents (n = 1588): β Coefficients and Standard Errors (SE) in a Forward Multiple Linear Regression Analysis

	Stage 1 Coefficient	Stage 1 SE	Stage 2 Coefficient	Stage 2 SE	Stage 3 Coefficient	Stage 3 SE
Intercept	1.43	.74	2.20	.62	1.76	.70
Demographic characteristics						
Female sex	.19	.13	.20	.11	.17	.11
Not currently married	.07	.13	−.08	.11	−.02	.11
Urban residence	.10	.12	.18	.10	.21	.10*
Age	.02	.01	−.01	.01	−.01	.01
More education	−.05	.02**	.04	.01**	.02	.01
Health status characteristics						
Impaired functional status			.54	.05***	.43	.05***
Poor medical status			.01	.00***	.02	.00***
Better self-rated health			−.61	.06***	−.51	.06***
Facilitating/hindering characteristics						
Number of physical health visits in past year					.56	.06***
Same physician seen on each visit					.61	.15***
Overnight hospitalization in past year					.40	.13**
Not on Medicaid					−.59	.29*
On Medicare					−.07	.26
No other health insurance					−.32	.12**
Adequacy of income					.13	.13
R^2 adjusted	.008		.308		.372	

*$P < .05$; **$P < .01$; ***$P < .001$.

TABLE 3—Concomitants of Use of Prescription Drugs among Elderly Black Community Residents (n = 1727): β Coefficients and Standard Errors (SE) in a Forward Multiple Linear Regression Analysis

	Stage 1		Stage 2		Stage 3	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	1.34	.55	1.30	.51	.80	.51
Demographic characteristics						
Female sex	.73	.10***	.56	.09***	.42	.09***
Not currently married	−.03	.10	−.05	.09	−.01	.08
Urban residence	−.02	.09	.08	.08	.12	.08
Age	.00	.01	.00	.01	.00	.01
More education	.00	.01	.03	.01**	.01	.01
Health status characteristics						
Impaired functional status			.28	.04***	.19	.01***
Poor medical status			.02	.00***	.01	.00***
Better self-rated health			−.44	.05***	−.37	.05***
Facilitating/hindering characteristics						
Number of physical health visits in past year					.54	.05***
Same physician seen on each visit					.55	.09***
Overnight hospitalization in past year					.19	.11
Not on Medicaid					−.49	.14***
On Medicare					.30	.15*
No other health insurance					−.08	.09
Adequacy of income					.06	.09
R^2 adjusted	.032		.229		0.315	

*P < .05; **P < .01; ***P < .001.

TABLE 4—Concomitants of Nonprescription Drug Use among Elderly White Community Residents (n = 1588): β Coefficients and Standard Errors (SE) in a Forward Multiple Linear Regression Analysis

	Stage 1		Stage 2		Stage 3	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	1.84	.42	1.98	.42	1.75	.49
Demographic characteristics						
Female sex	.33	.47***	.33	.07***	.30	.08***
Not currently married	.08	.08	.06	.07	.06	.08
Urban residence	.25	.07***	.26	.07***	.29	.07***
Age	−.01	.01*	−.01	.01*	−.02	.01**
More education	.00	.01	−.02	.01	.02	.01*
Health status characteristics						
Impaired functional status			.08	.04	.06	.04
Poor medical status			.00	.00*	.00	.00*
Better self-rated health			−.14	.04**	−.11	.04*
Facilitating/hindering characteristics						
Number of physical health visits in past year					.13	.04**
Same physician seen on each visit					.13	.10
Overnight hospitalization in past year					−.06	.09
Not on Medicaid					−.05	.20
On Medicare					.18	.18
No other health insurance					−.02	.09
Adequacy of income					−.13	.09
R^2 adjusted	.028		.054		.060	

*P < .05; **P < .01; ***P < .001.

scription drug use, with only sex being statistically significant: Black women were higher users of prescription drugs (or rather, Black men were particularly low users). When health status was also considered, 22.9% of the variance was explained. Poor health status as assessed by each of the three measures predicted increased prescription drug use. Addition of the facilitating/hindering variables increased the amount of variance explained to 31.5%, with making more frequent visits to a physician, consistently seeing the same physician, having Medicaid, and having Medicare being significant predictors of prescription drug use.

Finally, a model was run that included both Black and White elderly residents (tables available from the authors). This model explained 36.6% of the variance in prescription drug use. Race per se was statistically significant and contributed 1.3% to the overall variance. All characteristics found to be significant predictors of prescription drug use in the separate models for White elderly and Black elderly (with the exception of Medicare, significant for Black elderly, and Medigap insurance, significant for White elderly) were statistically significant. Race interaction effects showed that Black elderly with impairments on the Rosow-Breslau[26] and Black elderly women who had been hospitalized in the previous year were likely to use fewer drugs than their White counterparts, whereas White elderly women who reported their health to be poorer were particularly high prescription drug users.

Predictors of Nonprescription Drug Use

Among elderly White community residents (Table 4), all variables combined explained 6.0% of the variance (demographic characteristics explained 2.8%, and the addition of health status explained 5.4%). Female sex, urban residence, younger age, more education, poor self-rated health and medical status, and an increased number of physician visits were statistically significant predictors.

The explanatory power of the model was less for elderly Black community residents (Table 5). In all, 4.8% of the variance in nonprescription drug use was explained. The only important characteristics were being female, considering one's health to be poorer, having supplemental health insurance, and not being on Medicaid.

A model that included information from both Black and White elderly residents explained 6.4% of the variance in

nonprescription drug use. Race per se was statistically significant, contributing 0.7%. All characteristics found to be statistically significant in either the nonprescription model for White elderly or that for Black elderly were also statistically significant in the combined race model, with the exception of Medicaid and supplemental health insurance.

TABLE 5—Concomitants of Nonprescription Drug Use among Elderly Black Community Residents (n = 1727): β Coefficients and Standard Errors (SE) in a Forward Multiple Linear Regression Analysis

	Stage 1		Stage 2		Stage 3	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	0.60	.35	0.73	.35	0.57	.38
Demographic characteristics						
Female sex	.33	.06***	.30	.00***	.29	.06***
Not currently married	−.04	.06	−.04	.06	−.02	.06
Urban residence	.10	.06	.13	.06	.12	.06
Age	.00	.00	.00	.00	.00	.00
More education	.00	.01	.01	.01	.00	.01
Health status characteristics						
Impaired functional status			.04	.03	.04	.03
Poor medical status			.00	.00	.00	.00
Better self-rated health			−.18	.03***	−.18	.04***
Facilitating/hindering characteristics						
Number of physical health visits in past year					.14	.04
Same physician seen on each visit					−.06	.07
Overnight hospitalization in past year					.04	.08
Not on Medicaid					.23	.10*
On Medicare					.14	.11
No other health insurance					−.14	.07*
Adequacy of income					−.10	.07
R^2 adjusted	.017		.044		.048	

*$P < .05$; **$P < .01$; ***$P < .001$.

Discussion

These data allow us to compare the characteristics of Black and White elderly who represent all socioeconomic levels and who live in both urban and rural settings in a defined geographic area. As such, our data are unique, permitting comparisons not hitherto feasible. While descriptive information on the prescription and nonprescription drug use of minority groups exists,[8,11] studies of drug use in the elderly based on multivariate techniques have been restricted by the relative youth of sample members (under age 65), small sample sizes, limited representativeness, and lack of information on race.[6,10,14]

We found that, with other factors controlled, race made a statistically significant, if substantively small, contribution to explaining prescription drug use. The multivariate health care services use model explained up to 37% of the variance in prescription drug use. Demographic characteristics had little explanatory power although, in the absence of other data, they seemed to act as proxies for health status and use of health care services. Similarly, the importance of other characteristics (e.g., living in an urban area where transportation may be easier and pharmacies more numerous) only became evident with concomitant consideration of additional information.

It has been suggested that access to prescription drugs is based on formal health system factors.[13,14] Certainly here, prescription drug use is predominantly explained by health status and use of the health care system, just those factors that can result in a prescription.[31] It is also important to note that having Medicaid (which pays for drugs for the medically indigent) was a significant predictor of prescription drug use.

Although the primary determinants of prescription drug use (i.e., poor health status, more frequent medical visits, and the same physician seen on those visits) are similar for elderly Black and White community residents, there are some unique differences. For example, living in an urban area and recent overnight hospitalization are important in explaining prescription drug use for elderly Whites but not for elderly Blacks.

In common with other investigators,[13–15] we also find that the health services use model explains nonprescription drug use poorly. Access to nonprescription drugs is not bound by medical or legislative constraints. Unlike the case for prescription drug use, demographic characteristics were particularly important: being White, female, younger, better educated, and an urban area resident were predictive of nonprescription use. Indeed, these are the people to whom nonprescription drug use is targeted. While poorer health might also be relevant, it is unclear from these data whether nonprescription drugs substituted for or supplemented the use of prescription drugs.

The nonprescription use models for Black elderly differ from those for White elderly in that they reflect concern about health, particularly by women, and about the availability of some money to spend on it.

In the present study, race per se is a significant predictor of both kinds of drug use. Black elderly, particularly Black men, are likely to take fewer prescription drugs. However, the reasons for this are unclear. Possibly physicians prescribe differently for Black elderly as compared with White elderly.[10] Another possibility is that Black elderly may face restrictions in economic access to drugs. A larger proportion of White elderly than of Black elderly have supplementary health insurance, which may pay for prescription drugs. Conversely, a higher proportion of Black elderly are on Medicaid, and while Medicaid facilitates the use of prescription drugs, not all physicians will accept Medicaid patients and the program places restrictions on the number of reimbursable drugs that can be received in a given time interval. Other financial restrictions may also be present. Thus, the presence of Medicaid modifies but does not close the racial gap in prescription drug use. With respect to nonprescription drug use, Black elderly, in particular Black men, are again low users, but elderly Black users of nonprescription drugs appear to have a financial background comparable to that of White elderly.

The present study has some limitations. For one thing, current analysis is based on cross-sectional data. We are assuming that poor health leads to the use of medical care services, which results in prescriptions and the use of prescription drugs. The reverse is possible but is dis-

tinctly less likely. For another thing, information from some sample members is incomplete; however, this appears to have had little effect on the findings, except perhaps to make them slightly more conservative. More important, the lack of information on psychiatric conditions and on other physical conditions such as arthritis may have decreased the explanatory power of the models, particularly regarding nonprescription drugs. Lastly, current analyses also do not address the issue of appropriateness of drug use. That will be the focus of a future study.

Despite these limitations, the current study provides population-based information for both Black and White elderly residents, showing that the use of prescription drugs is largely governed by the same characteristics for each group (although unique race characteristics still exist). In addition, the study points to the importance of the Medicaid program in equalizing access to prescription drugs, and it shows that an alternative model is needed to explain the use of nonprescription drugs. □

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