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Racial Differences in Medication Use Among Older Long-stay Veteran Nursing Home Care Unit Patients

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Abstract

Objective—To examine racial differences in medication use by older long-stay Veterans Affairs Nursing Home Care Unit (NHCU) patients.

Design—Longitudinal study

Settings—133 VA NHCUs

Participants—Three thousand four hundred and eighty veterans aged 65 years admitted or older between January 1, 2004 and June 30, 2005 for 90 days or more.

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Main Outcomes Measures—Prevalence of those taking 9+ medications (i.e., polypharmacy) and medications from specific therapeutic medication classes. Racial differences were determined using 0.05 level chi-squared tests.

Results—The sample consisted of 14.3% who were black. Blacks compared to whites (all comparisons $p < 0.05$ except where noted otherwise) were younger (13.6% vs 17.4%, 85+ years of age), had less depression (22.24 vs 29.79%), less allergies (9.82% vs 20.36%), and a similar rate of moderate to severe pain (22.65% vs 24.05; $p = 0.49$). The percent of polypharmacy was similar by race (blacks 73.35 vs whites 75.18%; $p = 0.62$) as was the prevalence of medication class use with the exceptions that blacks were less likely than whites to take central nervous system (CNS) medications (75.75% vs 80.14%; $p = 0.02$) and antihistamines (13.03% vs 16.8%; $p = 0.04$). Specifically, blacks were less likely than whites to receive a selective serotonin reuptake inhibitor (SSRI) antidepressant (20.84% vs. 27.17%; $p < 0.01$) or a second generation antihistamine (3.41% vs 6.51%; $p < 0.01$) but more likely than whites to receive opioids (14.63% vs. 11.27%; $p = 0.03$).

Conclusions—There appears to be racial differences in the overall use of antihistamines and CNS medications and some of their subclasses.

Keywords

Aged; Race; Nursing Home; Drug Utilization

INTRODUCTION

There is limited information about the prescribing of medications in nursing homes. This information is important to consultant pharmacists in order for them to be able compare medication prescribing in the facilities they provide services. The earliest data regarding medication prescribing comes from the Systematic Assessment of Geriatric drug use via Epidemiology (SAGE) database that was created by researchers from the Center for Gerontology and Health Care Research at Brown University using Minimum Data Set (MDS) information from five states starting in 1992.¹ Doshi et al provided information about nursing home medication prescribing using national data from the 1997 Medicare Current Beneficiary Survey.² The most recent data comes from the work of Tobias et al. which examined medication use in 328 nursing homes nationally.³

There is growing evidence that access to and quality of medical care may be a more of a problem for older blacks than whites.⁴⁻⁶ There are a number of studies that have examined racial differences in drug use among community dwelling older adults.⁷ These studies generally show that community dwelling black elderly take fewer prescription and non prescription drugs than their white counterparts overall and for specific chronic diseases.⁷ There is mixed information about the quality of care for black compared to white nursing home patients.⁸ There is even more limited information about racial differences in the use of medications in nursing homes. Studies using the SAGE database have documented racial differences in prescribing for several chronic conditions.⁹⁻¹¹ To the best of our knowledge, to date there have been no studies that have explored whether there are racial differences in medication use among older veterans residing in Veterans Affairs (VA) nursing homes care units (NHCUs). The VA NHCUs also represents a unique long-term care environment to study since unlike traditional nursing homes, the patients tend to be primarily men. Information about racial differences is important as these VA nursing homes are part of the countries' largest integrated health care system where financial barriers to receiving care are minimized.^{12,13}

The objective of this hypothesis generating study was to examine racial differences in medication use by older long stay VA NHCUs patients. To accomplish this objective the creation of a new database is described which merges MDS and dispensed medications data from the

VA Pharmacy Benefits Management (PBM) Services for 133 VA NHCUs from around the US.

METHODS

Study Design, Setting, and Sample

This was a longitudinal study of patients admitted to any one of the 133 VA NHCUs (now called Community Living Centers) located in the US between January 1, 2004 and June 30, 2005. Patients were included if they were 65 years of age or older at admission and were long-stay patients (minimum of 90 days). Those who were younger, short stay (< 90 days length of stay), respite or hospice patients were excluded. This study was approved by the Pittsburgh VA Research and Human Subjects Committees.

Data Sources

All veterans receiving care in a VA NHC were evaluated using the Minimum Data Set (MDS). MDS version 2.0 is a standardized tool to identify the functional, psychological and health status needs of residents, generate a care plan, and evaluate the quality of care for these residents.¹⁴ All MDS data was collected via resident interviews, staff interviews, and from reviews of resident records. For all nursing home patients the MDS was completed at baseline (within 14 days of admission), quarterly thereafter (within 90 days of previous evaluation) and with any significant change in status (e.g., major change in cognitive function or functional status decline). The MDS is one of the most reliable secondary data sources of nursing home residents.¹⁵ An electronic version of the MDS was stored in a data warehouse in Austin, Texas and was made available through a Data Use Agreement approved by Dr. Christa Hojlo who nationally is the Director VA Nursing Home Care. The VA PBM Services provided all prescription data for the defined study cohort. These data included the following information for each drug dispensed: 1) start and stop date; 2) drug name; 3) strength; and 4) VA therapeutic class.

Sample Characteristics

The MDS and VA PBM data sources were merged together based on a Health Insurance Portability and Accountability Act compliant unique patient identifier. The combined database allowed for the identification of baseline demographic characteristics (i.e., age, gender, education and race), and baseline health status factors (individual diseases as noted in Section I of the MDS). Race/ethnicity has five choices on the MDS: 1) American Indian/Alaskan Native, 2. Asian/Pacific Islander 3) Hispanic, 4) White, not of Hispanic origin and 5) Black, not of Hispanic origin. For purposes of this study only those participants that were Black or White were included due to small numbers in the other three groups combined (n=212). The individual diseases from the MDS were further grouped into six categories: 1) neurological/psychiatric problems; 2) pain-related disorders; 3) cardiac diseases; 4) endocrine problems; 5) thrombotic disorders; and 6) respiratory problems. To supplement the specific pain related diseases, data from the baseline MDS evaluation was used to create a dichotomous variable for moderate/severe pain. To supplement the neurological/psychiatric problems, data from the baseline MDS evaluation was used to create a dichotomous variable for depressive symptoms using the Depression Rating Scale (DRS). The DRS considers 7 items and scores of ≥ 3 indicate a high likelihood of depression.¹⁶

Data from the baseline MDS evaluation was used to determine problems with cognition (i.e., Cognitive Performance Score [CPS]) and functional status. The CPS which has been shown to be reliable and valid considers five items and for purposes of this study was defined as a dichotomous variable: intact-moderate impairment (scored from zero-four) vs severe/very severe impairment (scored five or six).¹⁷ The MDS also measures the amount of assistance

needed from staff for five functional status items (bathing, dressing, grooming, toileting, eating) and were rated on a 0 to 4 scale, where 0 represents total independence, 1 = supervision alone, 2 = physical assistance short of weight-bearing assistance, 3 = need for weight bearing assistance, and 4 = complete dependence. The summated score ranges from 0 to 20 points, where 0 indicates no dependence on others at all, and 20 denotes individuals who are completely dependent in all activities of daily living. For purposes of analyses, a continuous variable with a range from 0 to 20 points was created for functional status.¹⁸

Medication Use Measures

A dichotomous variable for polypharmacy (defined as 9+ medications by the Centers for Medicare & Medicaid Services using information from Section O of the MDS) was created.¹⁴ Using VA PBM data for medications dispensed during the first 90 days of the VA NHCU stay, the prevalence of drug use for the 24 major VA therapeutic classes was calculated.¹⁹ Four major non-drug classes (IP000 [intrapleural medications], IR000 [irrigation/dialysis solutions], PH000 [pharmaceutical aids/reagents], XA000 [prosthetics/supplies/devices]) were excluded.

Statistical Analysis

Dichotomous and categorical variables (e.g., age, gender, education) were summarized as frequencies and percents of the respective totals. The continuous variable for functional status dependence was summarized as a mean and standard deviation. Chi-square tests (or Fisher's exact tests) and t-tests (or Wilcoxon rank sum tests for non-normally distributed variables) were used to assess the comparability of baseline patient characteristics by race.²⁰ Chi-square tests were conducted to compare the use of any of the 24 major therapeutic medication classes by race. A priori, it was decided to examine medication use within subclasses when statistically significant racial differences ($p < 0.05$) were found in any of the 24 major classes. All statistical computing was performed using SAS® software (version 9; Cary, NC).

RESULTS

Table 1 shows the characteristics of the sample ($n=3480$) stratified by race. Blacks represented 14.3% of the sample and tended to be younger, and more likely to have several chronic diseases (i.e., cerebrovascular accident, diabetes, hypertension, seizure disorders, schizophrenia) and less likely to have depression or allergies. Blacks and whites had similar rates of pain-related disorders.

Blacks were as likely as whites to take 9 or more medications (74.35% vs 71.18%, respectively; $p=0.62$). Medication prescribing was similar by race for almost all of the major VA medication classes listed in Table 2. The only medications classes less likely ($p < 0.05$) to be used by blacks when compared to whites were central nervous system (CNS) agents and antihistamines. Table 3 further examines the types of CNS agents and antihistamines used by race. There were no racial differences ($p > 0.05$) in overall antipsychotic, antiepileptic, antianxiety/sedative hypnotics or dementia treatments. However blacks were less likely ($p < 0.01$) than whites to receive an antidepressant but more likely ($p=0.03$) than whites to receive opioids. Examining further specific subgroups of drug classes revealed that blacks were less likely ($p < 0.05$) to receive selective serotonin reuptake inhibitors (SSRIs), atypical antipsychotics, and second generation antihistamines than their white counterparts.

DISCUSSION

To the best of our knowledge, this is the first study to examine racial differences in medication use for older long stay residents of VA NHCUs. There appeared to be racial differences in the

overall use of CNS medications and for individual subclasses. Of particular note is that blacks were less likely than whites to be prescribed antidepressants especially newer agents such as the SSRIs. This is consistent with that found by previous studies of both community dwelling and nursing home elderly but not however consistent with a more recent nursing home study where antidepressant use did not differ by race.^{9,22,23} One possible explanation for the racial differences in overall antidepressant use in the current study may be the higher rate of MDS reported depression or severe depressive symptoms as determined by the reliable Depression Rating Scale in whites compared to blacks.¹⁵ Despite these racial differences, it is interesting to note that the rate of antidepressant use (40%) in the current study was nearly 150% greater than those with a depression diagnosis (27%). This may reflect antidepressants use for other labeled indications (e.g., anxiety, neuropathic pain) and perhaps off label use (e.g., treatment of behavioral complications of dementia). It also may reflect the increasing effort over the past decade to correct the problem of undertreatment of depression in nursing homes.²³ Indeed there has been a rise in antidepressant use from 14% in the late 1980's, to currently being nearly 50% in older nursing home residents.²⁴

It is informative to also examine that blacks were also less likely than whites to receive antihistamines especially the newer less sedating second generation antihistamines.²⁵ This difference may reflect that blacks in the current study were nearly half as likely to have allergies as whites. Of potential concern regardless of race was that there was relatively high use of older first generation antihistamines. It is well accepted that first generation antihistamines should generally be avoided because they are highly anticholinergic and their use can increase the risk of important geriatric syndromes including delirium and falls.²⁶⁻²⁸ Moreover, diphenhydramine was the first generation antihistamines used in nearly half of patients (data not shown). A previous pharmacokinetic study showed that the systemic clearance of diphenhydramine is significantly reduced in older adults and its half-life at 13.5 hours is nearly twice as long as that seen in younger adults.²⁹ A recent study also showed that this agent has questionable efficacy treating insomnia in older adults when compared to a moderate duration of action benzodiazepine (i.e., temazepam).³⁰ Therefore, diphenhydramine should not be used for sleep in older adults.

It was interesting to note that in the present study blacks were more likely than whites to receive opioid analgesics. This is in contrast with a recent study of primary care patients with chronic non malignant pain that showed that blacks were less likely than whites to receive opioid analgesics.³¹ Of concern though is that in the current study regardless of race that one in four patients still reported having moderate to severe pain. Unfortunately this is consistent with previously published evidence that chronic pain in older adults, whether due to malignant or nonmalignant causes, is under-treated in nursing home settings.^{32,33}

The lack of racial differences in some drug classes warrants further discussion. The rate of dementia treatments for both races was similar but was given to only half of those with Alzheimer's and other dementia. This is interesting to note because blacks had higher rates of severe cognitive impairment than whites as measured by the reliable and valid Cognitive Performance Scale.¹⁶ The use of hormones/synthetics (e.g., antidiabetics), and blood product modifiers (e.g., antithrombotic agents including warfarin) were similar for both blacks and whites. However, one would have expected that these agents should have been used more frequently since blacks have a higher prevalence of diabetes and cerebrovascular accidents. This is consistent with a previous study of older nursing home patients that showed that blacks had lower rates of antidiabetic medication compared to whites.¹⁰ Similarly, a previous study of older nursing home patients with a previous history of a stroke found that blacks were less likely to receive antithrombotics than whites.¹¹

A major strength of this study is the development of a comprehensive database that links medication prescribing with patient characteristics for residents of VA NHCUs. Such a database allows more detailed analyses of medication prescribing in this setting by patient characteristics and indications for use, as well as site-to-site variation. However, there are limitations to this study worth noting. First, since this was a hypothesis generating study causal relationships can not be assessed. Second, inherent limitations in the MDS data limit the types of longitudinal analyses that can be conducted. Finally, since the sample was limited to elderly veterans residing in VA NHCUs, our findings may not be generalizable to younger veterans in these settings or elderly in non-VA nursing homes.

Despite these potential limitations, there appears to be racial differences in the overall use of antihistamines and CNS medications and some of their subclasses. This data should be useful to consultant pharmacists to raise awareness of potential racial differences in medication prescribing and serve as a benchmark for comparing prescribing in the facilities they serve.

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Abbreviations

CNS, Central Nervous System; CPS, Cognitive Performance Score; DRS, Depression Rating Scale; MDS, Minimum Data Set; NHCU, Nursing Home Care Unit; PBM, Pharmacy Benefits Management; SAGE, Systematic Assessment of Geriatric drug use via Epidemiology; SSRI, Selective Serotonin Reuptake Inhibitors; VA, Veterans Affairs.

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Table 1
Admission Characteristics of Elderly VA NHCU Long Stay Patients by Race

Variables	White (n=2981) %	Black (n=499) %	P value
<u>Demographics</u>			
Age			
85+	17.44	13.63	<0.01
75–84	53.67	42.28	
65–74	28.88	44.09	
Male gender	96.98	97.80	0.32
Education			
Above high school	22.98	15.63	<0.001
High school	46.46	46.69	
Below high school	29.39	36.67	
Missing	1.17	1.00	
<u>Neurological/Psychiatric Conditions</u>			
Depression diagnosis	29.79	22.24	<0.01
Depressive symptoms (DRS >3)	7.51	3.41	<0.01
Bipolar disease	3.89	1.40	<0.01
Schizophrenia	8.76	13.63	<0.01
Alzheimer's Disease	12.38	8.82	0.02
Other dementia	25.86	29.46	0.09
Anxiety	10.40	4.21	<0.01
Seizure disorder	4.80	8.62	<0.01
<u>Pain Related Disorders</u>			
Cancer	16.97	18.84	0.31
Moderate/severe pain	24.05	22.65	0.49
Arthritis	27.91	26.85	0.63
<u>Cardiac Conditions</u>			
Hypertension	65.48	75.75	<0.01
Arteriosclerotic heart disease	25.56	18.04	<0.01
Congestive heart failure	17.95	13.63	0.02
Cardiac dysrhythmias	16.54	8.82	<0.01
<u>Endocrine Diseases</u>			
Diabetes mellitus	35.69	45.49	<0.01
Osteoporosis	6.27	3.61	0.02
<u>Thrombotic Disorders</u>			
Cerebrovascular accident	16.74	23.05	<0.01
Deep vein thrombosis	1.95	2.00	0.93
Transient ischemic attack	1.98	0.80	0.07
<u>Respiratory Problems</u>			
Chronic obstructive pulmonary disease	28.88	23.05	<0.01
Allergies	20.36	9.82	<0.01
<u>Cognitive/Functional Status</u>			

<u>Variables</u>	White (n=2981) %	Black (n=499) %	P value
Cognitive Performance Scale			
Severe impairment	11.90	14.64	<0.01
Functional status dependence (<u>range from 0- no dependance to 20-fully dependent</u>)	10.32 +/- 5.69	10.69 +/- 6.09	0.21

Table 2

Use of Major VA Medication Classes by Race*

Medication Class Name (Code)	White (n=2981) %	Black (n=499) %	P value
Central Nervous System (CN000)	80.14	75.75	0.02
Cardiovascular (CV000)	71.32	74.35	0.16
Gastric (GA000)	65.38	62.12	0.16
Anti-microbials (AM000)	48.67	45.29	0.16
Dermatological (DE000)	47.00	43.09	0.10
Vitamins (VT000)	42.33	44.89	0.29
Hormones/Synthetics (HS000)	44.78	44.09	0.77
Therapeutic Nutrients/Minerals/Electrolytes (TN000)	35.46	38.28	0.22
Blood Products/Modifiers (BL000)	34.18	37.88	0.11
Respiratory agents (RE000)	23.28	22.85	0.83
Ophthalmic (OP000)	17.04	19.64	0.16
Immunological (IM000)	15.73	18.24	0.16
Musculoskeletal (MS000)	17.21	14.23	0.10
Antihistamines (AH000)	16.77	13.03	0.04
Rectal (RS000)	10.57	10.82	0.86

* ranked by most common classes used by 10% or more of blacks

Table 3
Specific Central Nervous System and Antihistamine Subclass Use by Race

Use Variables	White (n=2981) %	Black (n=499) %	P value
<u>Antidepressants</u>	41.46	34.07	<0.01
Selective serotonin reuptake inhibitor	27.17	20.84	<0.01
Serotonin norepinephrine reuptake inhibitor	1.95	1.20	0.25
Tricyclic antidepressant	2.62	2.81	0.81
Other antidepressants	18.85	15.83	0.11
<u>Antipsychotics</u>	26.07	23.05	0.15
Atypical	23.78	19.44	0.03
Conventional	5.00	6.81	0.09
<u>Anti-dementia</u>	15.36	14.83	0.75
Acetyl cholinesterase enzyme inhibitors	14.12	13.63	0.77
Memantine	3.12	2.61	0.54
<u>Anti-anxiety/Hypnotics</u>	6.31	6.61	0.79
Benzodiazepines	4.66	5.41	0.47
Benzodiazepine receptor agonist (e.g., zolpidem)	0.40	0.40	0.99
Others	1.41	0.80	0.27
<u>Antiepileptics</u>	16.84	19.24	0.19
<u>Opioids</u>	11.27	14.63	0.03
<u>Antihistamines</u>	16.7	13.03	0.04
First generation (e.g., diphenhydramine)	10.27	9.62	0.65
Second generation (e.g., loratadine)	6.51	3.41	<0.01