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Racial Differences in Anticholinergic Use among Community-Dwelling Elders

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Abstract

Objective—Few studies have examined racial differences in potentially inappropriate medication use. The objective of this study was to examine racial disparities in using prescription and/or non-prescription anticholinergics, a type of potentially inappropriate medication, over time.

Design—Longitudinal.

Setting—Health, Aging, and Body Composition Study (years 1, 5, and 10)

Participants—Three thousand fifty-five black and white community-dwelling older adults at year one

Main Outcome Measure—Highly anticholinergic medication use as per the 2012 American Geriatrics Society Beers Criteria.

Results—Blacks represented 41.4% of the participants at year 1. At year 1, 13.4% of blacks used an anticholinergic medication compared to 17.8% of whites, and this difference persisted over the

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ensuing ten-year period. Diphenhydramine was the most common anticholinergic medication reported at baseline and year 5 and meclizine at year 10 for both races. Controlling for demographics, health status and access to care factors, blacks were 24-45% less likely to use any anticholinergics compared to whites over the years considered (all $p < 0.05$).

Conclusion—The use of prescription and/or non-prescription anticholinergic medications was less common in older blacks than whites over a ten-year period, and the difference was unexplained by demographics, health status and access-to-care.

Keywords

aged; cholinergic antagonists; drug utilization; African -American

INTRODUCTION

Older adults are heavy consumers of both prescription and non-prescription medications.¹ Of concern is that some of the medications used by older adults maybe potentially inappropriate.² One commonly used therapeutic class of potentially inappropriate medications is anticholinergics.³⁻⁶ While the use of certain anticholinergic medications may be indicated for treating conditions such as allergic rhinitis, or Parkinson's disease, their benefit may be offset by their potential for adverse drug events such as cognitive impairment, mydriasis, flushing, dry mouth, constipation and urinary retention.^{7,8}

It has been well described that in the U.S. there are health disparities in quality of care particularly among minority groups.⁹ Typically these studies have focused on the underuse of important chronic prescription medications such as statins in which older Blacks are less likely than older whites to receive these medications.¹⁰ Blacks are also less likely than whites to use non-prescription medications such as analgesics or vitamins.¹¹ Less is known about racial differences in potentially inappropriate medication use although some studies suggest that older blacks are at less risk than older whites.¹²⁻¹⁵

Given this background, the objective of our study was to examine potential racial disparities in prescription and/or non-prescription anticholinergic medication use over time.

METHODS

Study Design, Data Source and Sample

This study utilizes data from the Health, Aging and Body Composition (Health ABC) Study; a prospective, population-based study of community-dwelling older adults.¹⁶ At baseline, the study sample include 3055 active older adults (70-79 years old) who were able to walk ¼ mile, climb 10 steps, lived in Pittsburgh, PA or Memphis, TN in 1997-1998 and provided complete medication information. The University of Pittsburgh and University of Tennessee Memphis Institutional Review Boards approved this study; each participant gave informed consent before data collection began.

Data Collection/Management

For the current study, in-home or in-clinic surveys of participants were conducted by trained interviewers at years 1 (baseline), 5 and 10 to collect information about demographics and medications. For medications, participants were asked to show the interviewer all prescription and non-prescription medications they had taken in the previous two weeks.¹⁷ From the medication vials/packages, the trained interviewer copied the drug name and dosage form. The medication data was then entered into a database and categorized using the Iowa Drug Information System (IDIS) codes for uniformity.¹⁷

Dependent and Independent Variables

The dependent variable was operationally defined as use of any prescription and/or nonprescription highly anticholinergic medication as per the 2012 American Geriatric Society Beers Criteria.² The primary independent variable was race that was self-reported as being either black or white by the participant.^{16,18} No participants reported as belonging to other races. No information was collected about ethnicity. Based on previous literature, we controlled for demographic variables for gender, education, marital status, site, and age.^{9,10-14,19} We also included variables for self-rated health and number of prescription drugs to control for health status.^{10,11,18,19} Finally, to control for access-to-care, we employed whether the participant had a primary care physician as a summary marker.^{10,11,18,19}

Statistical Analysis

Appropriate descriptive statistics were used to summarize the data. We compared the baseline variables between races using chi-square, *t*- and Kruskal-Wallis tests. To obtain adjusted results, we fitted generalized estimating equations (GEE) models with any anticholinergic use as the dependent variable; race (black/white), year (1/5/10) and their interaction as fixed effects of interest; other independent variables as fixed effect covariates; and an unstructured working correlation matrix to account for the presence of same participants at multiple years.²⁰ Appropriately constructed contrasts were used to make between-race comparisons at each year. We repeated our analyses using only prescription and only over-the-counter medications in the anticholinergic drugs as a post-hoc sensitivity assessment. SAS® version 9.3 (SAS Institute, Inc., Cary, North Carolina) was used for all statistical analyses.

RESULTS

Table 1 shows characteristics of black and white participants at baseline. Blacks were more likely than whites to be female, and be recruited from Pittsburgh. However, they were less likely than whites to report any college education, being married, having excellent/very good/good self-rated health or having a primary care physician. Blacks and whites were of similar age and took on average the same number of prescription medications. By year 10, 50.3% of the sample remained; only 6.1% were lost to follow-up, and the remainder had died.

Table 2 shows that fewer blacks than whites used prescription or non-prescription or either type of anticholinergic medications at year 1, year 5 and year 10. Multivariable analyses controlling for age, sex, site, education, marital status, self-rated health, number of prescription drugs and having a primary care physician showed that blacks were 33% less likely to take a prescription or nonprescription anticholinergic medication than whites at baseline (adjusted odds ratio=AOR 0.67, 95% confidence interval=CI 0.53-85; p=0.0009), 24% at year 5 (AOR 0.76, 95% CI 0.60-0.97; p=0.0287), and 45% at year 10 (AOR=0.55, 95%CI 0.37-0.82; p=0.0031). Similar trends were seen between races when prescription and non-prescription anticholinergic drug use was examined separately at baseline where likelihood of anticholinergic use was 29-30% less (AOR 0.70, 95% CI 0.53-0.92 and AOR 0.71,95% CI 0.50-1.03; respectively), 12-52% less at year 5 (AOR 0.88, 95% CI 0.67-1.16 and AOR 0.48, 95% CI 0.29-0.77; respectively) and 35-54% less year 10 (AOR 0.65, 95% CI 0.40-1.06 and AOR 0.46, 95% CI 0.26-0.83; respectively).

Tables 3 and 4 shows the most common prescription and non-prescription anticholinergic medications taken by black and white participants over the ten year period. The most common agent used by blacks and whites at years 1 and 5 was diphenhydramine. The most common agent used by blacks and whites at year 10 was meclizine.

DISCUSSION

We found that for both blacks and whites that the use of highly anticholinergic prescription medications at year 10 was similar to use at year 1. In contrast, Sumukadas et al. recently reported a study from Scotland in which they the use of prescription anticholinergic medications dispensed by pharmacies increased from 20.7% to 23.7% over a ten year period.⁶ In their work, it is important to note that the classification of anticholinergics used included low potency agents as well as a number of other medications such as carisoprodol, metoclopramide, and perphenazine for which there is not universal agreement on their anticholinergic potency.²¹

We also found that fewer blacks than whites used prescription and/or non-prescription anticholinergic medications at baseline and over the ten-year period. Our finding of a lower utilization of prescription anticholinergics by blacks compared to whites is consistent with previous studies potentially inappropriate medications.¹²⁻¹³ It is important to note that blacks and whites took a similar number of prescription medications at baseline and any differences in other health status and/or access to care factors were controlled for in our multivariable analyses. The finding of lower use of over-the-counter anticholinergics in blacks versus whites may be a reflection of their preference to using home or folk remedies instead for the common indications that anticholinergics are used.^{11,19}

What are the implications of our findings for consultant pharmacists? First, pharmacists advising patients, regardless of race, about the use of over- the-counter medications should be cognizant of avoiding recommending products with highly anticholinergic potency. For example, for the treatment of allergies instead of recommending agents like diphenhydramine, one of the most common agent used in this study, they should consider advising the use of second generation antihistamines (e.g., loratadine) that have less sedative

and anticholinergic properties.²² Second, pharmacists receiving new prescriptions for highly anticholinergic medications for older black or white older persons should consider discussing with the prescriber and patient safer but equally effective alternatives. For example, for patients receiving a new prescription for a tertiary tricyclic antidepressant for neuropathic pain, alternatives such as a selective serotonin reuptake inhibitor (e.g., duloxetine) or gamma-aminobutyric acid agonists (e.g., gabapentin) may be preferred.²³ Finally, these results also highlight the importance of conducting a complete medication reconciliation focusing not only on prescription medications but also those chosen for use by older black and white patients themselves over-the-counter.²⁴ This is particularly important in older adults with preexisting problems such as cognitive impairment since over-the-counter anticholinergic medications can exacerbate this condition.²

There are potential limitations with the current study that deserve mention. Our longitudinal study design only included three cross-sectional time periods, so anticholinergic use in between may not have been captured. While we included relevant demographic, health status and access to care covariates in our multivariable models, reasons such as racial preferences could not be controlled for as this information was not collected. Also, since this study only included well-functioning community-dwelling older adults from Pittsburgh, PA and Memphis, TN the generalizability to elderly in other regions and care settings is not known.

CONCLUSION

The use of anticholinergic medications was less common in older blacks than whites over a ten-year period, and the disparity remained unexplained by demographic, health status and access-to-care factors. Future studies should more thoroughly examine potential reasons for the above racial disparity, and consequences, if any.

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Table 1

Characteristics of the Participants (n=3055)

Variables	Blacks (n=1266) % or Mean \pm SD	Whites (n=1789) % or Mean \pm SD	P value
Female gender	57.11	47.6	<0.0001
Age	73.4 \pm 2.9	73.8 \pm 2.9	0.06
Site (Pittsburgh)	52.13	47.8	0.02
Education, post secondary	26.0	53.6	<0.0001
Married	41.2	64.9	<0.0001
Excellent/very good/ good self-rated health	72.9	91.6	<0.0001
Number of prescription medications	1.7 \pm 2.0	1.7 \pm 1.9	0.06
Has primary care physician	65.3	87.3	<0.0001

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Table 2

Anticholinergic Use by Type and Race Over Time

Anticholinergic Use	Year 1		Year 5		Year 10	
	Blacks N=1266 (%)	Whites N=1789 (%)	Blacks N=1035 (%)	Whites N=1610 (%)	Blacks N=537 (%)	Whites N=1001 (%)
Prescription	8.8	11.4	11.4	11.9	5.0	7.0
Non-prescription	5.4	6.9	2.7	4.9	3.4	6.1
Any	13.4	17.8	13.9	16.3	8.0	12.5

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Table 3

Top Ten Commonly Used Anticholinergic Drugs by Older Blacks Over Time

Year 1 (n=1266)		Year 5 (n=1035)		Year 10 (n=537)	
Generic Name	n	Generic Name	n	Generic Name	n
diphenhydramine	49	diphenhydramine	38	meclizine	7
chlorpheniramine	27	tolterodine	18	oxybutynin	6
amitriptyline	21	oxybutynin	18	tolterodine	5
meclizine	15	chlorpheniramine	14	chlorpheniramine	4
paroxetine	13	paroxetine	14	paroxetine	4
hyoscamine	11	meclizine	10	hyoscamine	3
oxybutynin	10	amitriptyline	10	dicyclomine	2
hydroxyzine	7	atropine	6	hydroxyzine	2
cyclobenzaprine	7	hyoscamine	6	olanzapine	1
doxylamine	6	dicyclomine	5	trospium	1

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Table 4

Top Ten Commonly Used Anticholinergic Drugs by Older Whites Over Time

Year 1 (n=1789)		Year 5 (n=1610)		Year 10 (n=1001)	
Generic Name	n	Generic Name	n	Generic Name	n
diphenhydramine	82	diphenhydramine	51	meclizine	13
chlorpheniramine	41	tolterodine	40	oxybutynin	12
amitriptyline	32	paroxetine	32	tolterodine	9
meclizine	28	meclizine	29	paroxetine	6
paroxetine	19	oxybutynin	26	diphenhydramine	3
hydroxyzine	15	amitriptyline	22	nortriptyline	3
hyoscamine	14	hydroxyzine	10	atropine	3
clemastine	12	chlorpheniramine	10	dicyclomine	2
atropine	11	olanzapine	7	hyoscamine	2
nortriptyline	10	dicyclomine	7	solifenacin	2

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