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Pain Treatment among Underserved Older Adult African Americans

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Grants/Funds	X		X		X		X	
	CMS & NIMHD		CMS & NIMHD		CMS & NIMHD		CMS & NIMHD	
Honoraria		X		X		X		X
Speaker Forum		X		X		X		X
Consultant		X		X		X		X
Stocks		X		X		X		X
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Abstract

Older adult African Americans who experience pain are especially at high-risk for under assessment and treatment. This study examined the patterns and correlates of pain medication use that include the following: severity of pain, medical conditions, and access to care. Four hundred African American older adults aged 65 years and older were recruited from 16 churches located in South Los Angeles. Structured face-to-face interviews and visual inspection of each participant's medications were conducted. More than 39% of participants were 75 years and older and 65% were female. Forty-seven percent used at least one type of pain medication. The frequency of pain medication use by pharmaceutical class was as follows: non-opioid (33%), opioid (12%), adjuvant (9%), and other drug (8%). Furthermore, 77% of non-opioids were Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) and were used among 25%, 28%, 26%, and 28% of participants with hypertension, stroke, kidney disease, and gastrointestinal problems, respectively. Among participants who used NSAIDs, 98%, 69%, and 65% experienced Potentially Inappropriate Medication (PIM) use, drug duplication, and drug-drug interactions, correspondingly. This study suggests a severe mismanagement of pain among underserved African American older adults, particularly among individuals with co-morbidity, multiple providers, and limited access to health care. The use of pain medication was associated with drug-drug interactions, drug duplication, and PIM use. Our data shows that a large number of participants with severe pain are either not taking pain medication or experience PIM use. One out of four participants was taking NSAID pain relievers, which can cause serious side effects among aged African Americans with multiple chronic conditions.

Keywords

Pain; Medication; Older Adults; African American

INTRODUCTION

Most studies conducted on pain and pain management in the United States suggest that three major factors consisting of age, race and ethnicity influence the prevalence, severity, and management of pain.¹ A review of the literature shows considerable evidence demonstrating substantial ethnic disparities in the prevalence, treatment, progression, and outcomes of pain-related conditions.^{2, 3} Recent reports from the Institute of Medicine (IOM) confirm that African Americans have a lower likelihood of pain assessment and management.⁴ The IOM encourages federal and state agencies and private organizations to accelerate the collection of data on pain incidence, prevalence, and treatments, particularly among vulnerable populations.⁵

One of the most vulnerable populations is older adult African Americans, whose health and quality of life are reportedly more adversely affected by pain than their white counterparts.⁶ Research on the treatment of pain on this segment of the population is limited, particularly how the use of pain medication contributes to drug-drug interactions, medication duplication, and PIM use. Although pain management guidelines among older adults are extensive and well-established,⁷⁻¹¹ there is a dearth of information regarding whether these published guidelines are actually employed in the management of pain among this

underserved population. Additional data regarding pain medication use and its correlates, as well as information regarding resulting complications, will inform future research studies focused on interventions to increase adherence to pain management guidelines and improve quality of life.

It is well established that older adult African Americans often suffer from multiple chronic conditions, which may require the use of multiple and complex medications, usually prescribed by multiple providers for effective treatment.^{7, 9, 12} Co-morbidities, such as hypertension, stroke, kidney disease, diabetes mellitus and gastrointestinal disorders, are primarily managed with pharmacologic therapy, which may have an impact on the use of pain medications and the management of pain in this population. Additional research is needed to document which categories of pain medications are prescribed to this population in the presence of multiple co-morbidities, which can affect pain management.

This study examined patterns and correlates of pain medication use in underserved, older adult African Americans. In addition, we examined an important but under-explored area of inappropriate use of pain-medication and drug interaction, duplication, and PIM use among underserved older adults. We expected to document the following:

- A higher use of non-opioid than opioid, adjuvant, or other pain medications, particularly among participants with major co-morbidity;
- A higher level of drug interaction, duplication, and PIM use with the use of non-opioid medication than other classes of pain medications;
- An under-utilization of pain medication among underserved older adults with severe pain;
- An under-utilization of pain medication among participants with less access to health care; and
- A higher use of pain medication among participants with multiple providers.

METHODS

The data were collected in 2013 from 400 community-dwelling, underserved, older adult, self-identified African Americans from 16 predominantly African American churches located in Service Planning Area 6 (SPA6) of Los Angeles County. Home to over one million residents, SPA6 is disproportionately harmed by health disparities compared to the rest of Los Angeles County.¹³ A good example is the hospitalization rate for heart failure, which is significantly higher for SPA6 compared to the rest of Los Angeles County (rate of 700/100,000 population for South LA versus 350/100,000 population for LA County). All participants were provided a monetary incentive. The sampling frame for this study consisted of the listing of 16 predominantly African American Churches. In addition to posting flyers announcing the proposed project at respective churches, the coordinator of this project assisted church leaders to convene pre- or post-Sunday sermon meetings to introduce the program project to the parishioners. The recruitment flyers and presentations indicated that the study was design to document use of prescription and over the counter

medication use among African Americans aged 65 and older and did not mention pain management or assessment of pain as an objective of the survey. All participants met at least twice with study staff. At initial meeting participants were provided informed consent and were enrolled into the study. All enrolled participants were asked to bring all their medications, both OTC and RX, as well as all other medications that they were taking within the last two weeks prior to interviews to the interview sites regardless of where they obtained the medications. Two co-authors of this study, both trained physicians, conducted the face-to-face interviews in a private room at participating sites.

Use of medication was assessed by the drug inventory method. All medications that were taken by participants within two weeks prior to the interviews were inspected. The interviewer transcribed from the container label the name of the medication, strength of the drug, expiration date, instructions, special warnings, providers' information, etc. This study was approved by the Charles R. Drew University Institutional Review Board. Less than 5% of individuals who were approached refused to participate. Written informed consent was obtained from participants. Our study collected data on the following:

Severity of Pain

Pain was measured using the four subscales outlined in the Short-Form McGill Pain Questionnaire-2 (SF-MPQ-2).^{14, 15} Participants self-reported the level to which they experienced each of the four subscales, which is composed of 22 pain items experienced in the past week using an 11-point numeric rating scale. Severe pain was defined according to the World Health Organization scale, which was 7 to 10 on the 11-point numeric rating scale mentioned above.¹⁶

Pain Medication

Pain medication was classified using the four categories of recommended drugs from American Geriatric Society (AGS) guidelines.⁹ The guidelines classify recommended drugs for pain as follows: 1) Non-Opioid; 2) Opioid; 3) Adjuvant Drug; and 4) Other Drug. Research staff examined the medication type and frequency and assessed the drug-drug interactions, medication duplication, and PIM use using the American Geriatric Society's Beers Criteria and the health-line drug-drug interaction online tool.^{17, 18}

Co-morbidity and Access to Care

Participants self-reported "Yes" or "No" to a list of medical conditions, such as arthritis, back pain, kidney disease, stroke, hypertension, etc. Furthermore, participants' access to care was measured by the number of providers accessed by participants for medication within a 12 month period prior to the interviews. In addition, participants were asked if any co-payment is required to visit their care providers and for medications.

Statistical Analysis

Descriptive statistics was used to measure the frequency, mean, and standard deviation of all variables. Furthermore, we used the chi-square test to examine associations between pain medication used and demographic characteristics, co-morbidities, and medication complications. In addition, multiple logistic regression was employed to examine the

correlates of using pain medications, adjusting for demographic characteristics and enabling factors.

RESULTS

This study included 400 African Americans who were between the ages of 65 to 94 years. Sixty-one percent of participants were between the ages of 65-75 years of age and 65% of participants were female. Four out of five participants reported their marital status as not married and 25% reported having no high school diploma. Over 42% and 79% needed to provide a co-payment when visiting the doctor and getting a prescription filled, respectively. Almost 63% indicated that they suffer from arthritis and 36% and 13% reported severe low back pain and migraine headaches, respectively. More than 50% of participants had severe pain (7-10 on a scale of 0 to 10) for at least one of the pain items measured by the SF-MPQ-2 instrument. Another 21% of participants described their level of pain as moderate (4-6 on a scale of 0 to 10) for one of the pain items. Only 29% had no or mild pain (Table 1).

Table 1 reports that pain medications are more likely to be used by participants: who were women, who were not married, who were diagnosed with arthritis, low back pain, and migraine headache, who had no co-payment for physicians' visit and those who visit three or more providers. In addition, as expected, the level of pain was associated with the use of pain medications. While 57% of participants with severe pain used pain medications, 52% and 25% of participants with moderate and none or mild pain used pain medications.

Pain Medication Use

Over 47% of participants were taking pain medications. One out of three participants used at least one non-opiate medication for pain, whereas 12%, 9%, and 8% of participants used opioid, adjuvant, and other pain drugs, respectively. Among participants taking non-opioids, 77% were taking NSAID pain relievers. The frequency of NSAID pain reliever use among those taking non-opioids was as follows: Ibuprofen (30%), Naproxen (14%), Meloxicam (14%), and high dose Aspirin (13%). Furthermore, among participants taking opioids, the two most commonly used medications were Hydrocodone (65%) and combination Hydrocodone/Acetaminophen (15%). Regarding the adjuvant drugs, the most commonly used medication was Gabapentin (88%). Among participants taking other drugs, Tramadol (61%) and Prednisone (32%) were the two most common. Of the 187 participants who used any pain medication, 63% used only one class of pain medication; however, 26% and 11% were concurrently taking two and more than two classes of pain medications, respectively (Supplement - Table 1).

Drug Interaction, Duplication, and PIM Use

Table 2 shows the complications associated with the use of pain medications among our sample. This table reports a statistically significant association between taking pain medications and drug-drug interaction, medication duplication, and use of PIM. Those who use any pain medication are 14% (60% – 46%), 16% (62% – 46%), and 26% (83% – 57%) more likely to have severe drug-drug interactions, medication duplications, and use of PIM than non-pain medication users, respectively (Table 2 – first two rows). Of the non-opioid

pain medications, the NSAIDs are more likely to contribute to drug-related issues such as duplication, interaction and PIM use than other classes of pain medications.

Almost 60% of participants who use any pain medications reported taking Ibuprofen, Naproxen, Tramadol, Meloxicam, Aspirin (325 mg), and Gabapentin. Interestingly, the data reveal a high rate of interactions between the most commonly used NSAIDs (Ibuprofen, Naproxen and Meloxicam) and three medications that are commonly prescribed for cardiovascular disease. Correspondingly, 39%, 47% and 83% of the participants who were taking Ibuprofen, Naproxen, and Meloxicam were also concurrently taking ACE-Is, Aspirin and Diuretics.

Major Co-morbidities

Supplement - Table 2 reports the use of pain medications among participants diagnosed with hypertension, stroke, chronic kidney disease (CKD), diabetes, and gastro-intestinal (GI) problems. This table shows that the NSAIDs were taken by participants regardless of their chronic conditions. For example, a similar percentage (26%) of participants with and without CKD were taking NSAIDs for pain. Surprisingly, 28% and 25% of participants with and without GI problems were taking NSAIDs, respectively. Similarly, the opioid-based pain medications were used by participants regardless of whether they were diagnosed with hypertension, diabetes, stroke or CKD. Only participants who were diagnosed with GI problems were more likely to use opioid medication than their counterparts with no GI conditions (22% vs. 9%).

Multivariate Correlates of Pain Medications

Table 3 reports the result of multiple logistic regression adjusted odd ratios (OR) between independent variables and the use of pain medications. Five out of 11 variables were significantly associated with the use of pain medications. Adjusting for demographic characteristics and other related variables, level of pain was the strongest correlate of pain medication used. Participants with severe pain were almost three times (CI: 1.44 – 5.67) more likely to use pain medications compared to their counterparts with no or mild level of pain. The odds of being in the group of survey respondents who used at least one pain medication is two times (CI: 1.18 – 4.06) higher among individuals who were not married than their counterparts. Participants with co-payments were less likely to use pain medications (OR = 0.60; CI: 0.37 - 0.98). In addition, adjusting for all other variables, participants who reported visiting greater than or equal to 3 providers took more pain medications (OR = 3.56; CI: 2.05 – 6.21). Finally, when demographic characteristics and level of pain were adjusted, participants who were diagnosed with arthritis and back pain were 1.75 (CI: 1.05 – 2.92) and 1.76 (CI: 1.07 – 2.91) times more likely than their counterparts to use pain medications, respectively.

DISCUSSION

This study suggests a severe mismanagement of pain among underserved, older African American adults, particularly among individuals with co-morbidity, multiple providers, and limited access to health care. We reported a higher level of severe pain than previous studies

that reported severe pain in about 27% of older adult African Americans.¹⁹ A similar population-based study documented that 26% of a sample of 1,000 community-dwelling older adults experienced dreadful pain. This study found that while 68% of their participants took pain medications, 17% with dreadful pain took no medication for pain.²⁰ Our data show that 47% of participants took pain medications and 43% with severe pain do not take any pain medication. The reasons for such a high prevalence of severe pain and underutilization of pain medication in this sample could be attributed to the fact that participants of this study were recruited from the SPA6. South Los Angeles, with a population of more than one million, is one of the most disadvantaged and underserved communities in the United States.^{13, 21}

According to the AGS guidelines, the recommended drugs for pain among older adults were categorized into the following four pharmaceutical classes: non-opioid, opioid, adjuvant drug, and other drugs.⁹ The two major pharmaceutical classes commonly used to treat pain are NSAIDs and opioids. Previous studies have shown that among African Americans, in comparison to their white counterparts, NSAIDs are frequently used (50% vs. 47% ; $P = 0.46$), whereas opioids were taken significantly less (32.0% vs. 46% ; $P = 0.006$) to treat pain.²² In our study, it was found that one in four participants were taking NSAID pain relievers.

The major concerns in the use of NSAIDs among older adults are cardiovascular risk, nephrotoxicity, gastrointestinal toxicity, and drug-drug interactions.^{9, 23} The NSAID-associated gastrointestinal toxicity increases in frequency and severity with age. The use of Cox-2 inhibitors such as Celecoxib has been recommended among those elderly populations with a history of gastrointestinal disease to reduce the gastrointestinal adverse effects of NSAIDs. Our study shows that among participants with gastrointestinal problems, 28% were taking NSAID pain relievers. Moreover, none of the participants in our study were taking Cox-2 inhibitors. A recent meta-analysis examined the cardiovascular safety of NSAIDs and found there is limited evidence to suggest any NSAIDs are safe to use, and also reported that the use of NSAIDs negatively affect individuals with hypertension.²⁴ Among our study population, 25% of participants with hypertension were taking NSAID pain relievers and only 21% of these participants used Naproxen, which has been reported to be the least harmful NSAID for cardiovascular health.

Furthermore, it has been reported that NSAIDs, particularly Ibuprofen and Diclofenac, should be used with caution among older adults with a history of stroke.^{9, 24} Our data show that 28% of participants with a history of stroke were taking NSAIDs and 12% of them were taking Ibuprofen or Diclofenac. Chronic use of NSAIDs has been shown to compromise renal medullary blood flow and predispose to serious renal complications.²⁵ In our study, 26% of participants who reported suffering from kidney problems used NSAIDs. Moreover, thromboembolic effects related to NSAID use may interfere with the antithrombotic effect of Aspirin, which is frequently used among older adult populations to prevent cardiovascular disease.²⁶ It has been recommended that Aspirin should be given at least two hours before Ibuprofen because when Aspirin is combined with Ibuprofen, platelets are inhibited and the anti-aggregation effect of Aspirin on platelets dramatically drops. Our findings show that among participants taking Ibuprofen, almost half were also taking Aspirin. It seems that this

population would greatly benefit from discussing proper use of Ibuprofen and Aspirin with their providers.

Previous studies have shown serious risks for older adults using NSAIDs, such as cardiovascular and gastrointestinal disease; therefore, recent clinical trials have shifted focus to examining the safety and effectiveness of opioids among this population.^{7, 10, 11, 27, 28} Our data show that among participants who report pain, only 11% take opioids, which was significantly less than using non-opioids, such as NSAIDs. In addition, recent clinical trials have shown effectiveness in using opioids for pain among older adults with musculoskeletal conditions.⁹ Our data show only 19% and 17% of participants suffering from low back pain and arthritis used opioids, respectfully. These findings are inconsistent with recommendations that suggest opioid treatment might be considered as a more favorable option for individuals suffering from low back pain or arthritis.⁹

Another important objective of this study was to examine the medication-related complications with the use of pain medications. To the best of our knowledge, no study has published medication-related complications among minority older adults. Our study documented a statistically significant association between taking pain medications, particularly NSAIDs, and drug-drug interaction as well as medication duplication among our sample of older adult African Americans. The data revealed that 60% of participants taking pain medications were found to have drug-drug interactions. Additionally, our findings showed that among participants taking pain medications, a significant percentage reported PIM use with the pharmaceutical classes NSAIDs and opioids. The use of NSAID and opioid medications increases the use of PIM by 37% and 21%, respectively. Our data show that the issue of pain-related complication among our sample is severe and needs immediate multidisciplinary investigational intervention.

Another objective of this study was to assess the impact of access to care and number of providers on the use of pain medication. The multivariate analysis shows that participants whose doctor visits required a co-payment were less likely to use any pain medications than their counterparts. However, consistent with other studies, our data show that participants with multiple providers use a higher percentage of any pain medication, including NSAIDs, opioids, adjuvant drugs, and other pain drugs. A recent study among Medicare beneficiaries reports that the mean number of opioid prescriptions per beneficiary increased substantially with multiple providers, and multiple-provider opioid prescriptions was the highest among African American beneficiaries. Yet, elderly patients prescribed opioid from multiple providers were also often prescribed PIM.²⁹ In addition to having co-morbidity that may require multiple providers, it is important to mention that 25% of our sample received medical care from a non-office-based physician, including hospital clinics, emergency rooms, urgent cares, and community clinics. Moreover, almost 10% reported that they are not usually attended by the same doctor when they receive medical care.

These finding points to a multidisciplinary approach that coordinates medication use of older adults by providing both physicians and pharmacists with the ability to view online the prescription histories of patients.²⁹ Additionally, findings from this study echo a recent study conducted by Lancaster and colleagues (2015) that suggests that home-based,

multidisciplinary assessments and reconciliation activities on an ongoing basis are needed to prevent medication related complications.³⁰ Finally, factors that contribute to underutilization of pain medications among minority older adults with *severe pain* require immediate attention.

One of the main limitations of this study was that it used a convenience sample that limits its generalizability. Additionally, our study did not examine non-pharmacologic approaches to pain management. Finally, this study did not address medication adherence.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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NONE

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Table 1
Characteristics of Study Sample and Bivariate Association with Pain Medication Analysis
(N = 400)

Characteristic of Sample	N (%)	Pain medication used	
		N (%)	P Value
<u>Gender</u>			
Male	141 (35)	52 (37)	0.004
Female	259 (65)	135 (52)	
<u>Age</u>			
< 75 years	242 (61)	113 (48)	0.978
75 years	158 (39)	74 (47)	
<u>Education</u>			
No high school diploma	99 (25)	50 (51)	0.466
High school diploma	141 (35)	68 (48)	
Some college or more	160 (40)	69 (43)	
<u>Marital Status</u>			
Married or Living with Companion	78 (20)	24 (31)	0.002
Not Married	322 (80)	163 (51)	
<u>Co-payment for RX</u>			
No	83 (21)	42 (51)	0.429
Yes	317 (79)	145 (46)	
<u>Co-Payment for Doctor Visit</u>			
No	232 (58)	122 (52)	0.008
Yes	167 (42)	65 (39)	
<u>Providers (# of Physicians)</u>			
One	126 (31)	41 (33)	0.001
Two	123 (31)	48 (39)	
3	150 (38)	98 (65)	
<u>Arthritis</u>			
No	147 (37)	44 (30)	0.001
Yes	251 (63)	142 (57)	
<u>Back Pain</u>			
No	256 (64)	98 (38)	0.001
Yes	142 (36)	88 (62)	
<u>Migraine Headache</u>			
No	349 (87)	155 (44)	0.013
Yes	49 (13)	31 (63)	
<u>Level of Pain</u>			
None-Mild	114 (29)	28 (25)	0.001
Moderate	84 (21)	44 (52)	
Severe	202 (50)	115 (57)	

Table 2
Complications Related to Pain Medication Use (N = 400)

Pain Medication		Complications		
Pharmaceutical Pain Medication Class	N (%)	Drug-Drug Interaction N (%)	Duplication N (%)	Potentially Inappropriate Medication Use N (%)
<u>All Classes</u> ¹				
No	213 (53)	98 (46)	99 (46)	122 (57)
Yes	187 (47)	113 (60)	116 (62)	156 (83)
<u>Non-Opioid</u>				
No	268 (67)	125 (47)	131 (49)	159 (59)
Yes	132 (33)	86 (65)	84 (64)	119 (90)
<u>NSAID</u> ²				
No	298 (74)	142 (48)	149 (50)	179 (60)
Yes	102 (26)	69 (68)	66 (65)	99 (97)
<u>Opioid</u>				
No	352 (88)	180 (51)	182 (52)	236 (67)
Yes	48 (12)	31 (65)	33 (69)	42 (88)
<u>Adjuvant</u>				
No	366 (91)	189 (52)	192 (53)	249 (68)
Yes	34 (9)	22 (65)	23 (68)	29 (85)
<u>Other</u>				
No	369 (92)	189 (51)	199 (54)	255 (69)
Yes	31 (8)	22 (71)	16 (52)	23 (74)

Note: Bolded values were found to be statistically significant $P < 0.05$.

¹Participants taking non-opioid, opioid, adjuvant or other drug.

²NSAID: Non-Steroidal Anti Inflammatory Drugs.

Table 3
Multivariate Logistic Analysis (Adjusted Odds Ratio) of Correlates of Use of Pain Medications (N=400)

Independent Variables	OR (95% CI)
<u>Gender</u>	
Male	1
Female	1.358 (0.82 - 2.25)
<u>Age</u>	
< 75 years	1
75 years	1.05 (0.65 – 1.67)
<u>Education</u>	
No high school diploma	1
High school diploma	1.21 (0.61 – 2.05)
Some college or more	1.24 (0.73 – 2.09)
<u>Marital Status</u>	
Married or Living with companion	1
Not married	2.19 (1.18 – 4.06)
<u>Co-payment for RX</u>	
No	1
Yes	0.71 (0.40 - 1.28)
<u>Co-Payment for Doctor Visit</u>	
No	1
Yes	0.60 (0.37 – 0.98)
<u>Providers (# of Physicians)</u>	
One	1
Two	1.23 (0.69 – 2.17)
3	3.56 (2.05 – 6.21)
<u>Arthritis</u>	
No	1
Yes	1.75 (1.05 – 2.92)
<u>Back Pain</u>	
No	1
Yes	1.76 (1.07 – 2.91)
<u>Migraine Headache</u>	
No	1
Yes	1.20 (0.61 – 2.37)
<u>Level of Pain</u>	
None-Mild	1
Moderate	2.86 (1.44 – 5.67)
Severe	2.36 (1.28 – 4.36)
-2 Log Likelihood	455.8

Independent Variables	OR (95% CI)
Nagelkerke R-Square	0.279
Percentage of correctly predicted outcome	68.8%

Note: Bolded values were found to be statistically significant $P < 0.05$.

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