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## The Relationship between Pain, Disability and Gender in African Americans

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### Abstract

Older African Americans consistently report diminished capacities to perform activities of daily living (ADL) compared to other race groups. It remains unclear the extent to which bodily pain is related to declining abilities to perform ADL/ADL disability in African Americans and if this relationship exists in both African American men and women to the same degree. In order for nurses to provide optimal care for older African Americans, a better understanding of the relationship between bodily pain and ADL disability and how it may differ by gender is needed. The aim of this study was to examine if pain, age, education, income, marital status and/or comorbid conditions were associated with ADL disabilities in older African American women and men. This was a cross-sectional descriptive study. The sample included 598 participants (446 women, 152 men) from the first wave of the Baltimore Study on Black Aging. African American women (Odds Ratio (OR) = 4.06; 95% confidence interval [CI] 2.63–6.26) and African American men (OR= 6.44; 95% CI =2.84–14.57) who reported bodily pain had greater ADL disability than those who did not report bodily pain. Having two or more comorbid conditions was also significantly associated with ADL disability in African American women (OR=3.95; 95% CI:

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2.09–7.47). Further work is needed to understand pain differences between older African American women and men in order to develop interventions that can be tailored to meet the individual pain needs of both groups.

## Keywords

Activities of Daily Living; Disability; Pain Management; African Americans; Aging

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## Introduction

Older African Americans experience a disproportionate rate of Activities of Daily Living (ADL) disability in comparison to non-Hispanic Whites (Fuller-Thomson, Yu, Nuru-Jeter, Guralnik, & Minkler, 2009; Thorpe Jr, Szanton, Bell, & Whitfield, 2013; Whitson et al., 2011). ADL disability is defined as difficulty in accomplishing activities of daily living such as eating, drinking, bathing etc. (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963). ADL disability is significantly related to higher mortality rates, poorer health outcomes, and more cognitive decline in African Americans. (Ayotte, Allaire, & Whitfield, 2013; Furner, Giloth, Arguelles, Miles, & Goldberg, 2004; World Health Organization, 2015). It is essential to identify factors that are related to ADL disability in older African Americans because addressing these factors may provide essential knowledge needed to decrease the disparities in ADL disability experienced by older African Americans (Thorpe Jr et al., 2011, 2013).

It is well documented that pain can contribute to ADL disability in older adults (Andrews, Censer, Yelin, & Covinsky, 2013; Eggermont et al., 2014). Pain is related to ADL disabilities in African Americans (Baker & Whitfield, 2006); however, it is unknown if this relationship differs in men versus women. To date there is scant literature on pain outcomes within African American women and men and how they are related to ADL disability. It is important to know if a relationship between pain and ADL disability exists within older African American women and men and if a difference exists between gender groups, in order to determine if interventions targeting pain should be tailored by gender (Wilson, 2006).

Previous studies have examined the association between pain and ADL disability by comparing African American men and/or women to other racial/ethnic groups (Green, Baker, Sato, Washington, & Smith, 2003; Wildgaard et al., 2011). Researchers have reported that a significant relationship exists between pain and disability within African Americans and non-Hispanic White samples (Cano, Mayo, & Ventimiglia, 2006; Green, Hart-Johnson, & Loeffler, 2011; Kutner, Zhang, Allman, & Bowling, 2014; Leveille, Bean, Ngo, McMullen, & Guralnik, 2007; Rejeski, Miller, Foy, Messier, & Rapp, 2001). Researchers have also reported that African Americans experienced more disability related pain than other racial ethnic groups (Ndao-Brumblay & Green, 2005; Ruehlman, Karoly, & Newton, 2005) and African American women experience more pain related disability than non-Hispanic White women in particular (Ndao-Brumblay & Green, 2005). Within African American samples, researchers have reported that more pain was significantly related to

poorer physical functioning (Baker & Green, 2005; Baker & Whitfield, 2006; Walker, Harrison, Brown, Thorpe, & Szanton, 2016).

There are biological differences as well as different societal expectations that exist between African American men and women that may influence their trajectory to disability. For example, biological (e.g. hormonal) changes after menopause often predispose women to developing various types of arthritis, which may initiate the disablement process in women (Neogi & Zhang, 2013). Using accommodations such as special shoes may be a threat to women's femininity expectation within society and lack of use of these accommodations may influence disability outcomes (Harrison, Stuijbergen, Walker, Scott, & Choban, 2011). Men may have societal expectations to show strength and independence and this may affect their decision to report pain or address their pain, which may be related to their disability outcomes (Evans, Frank, Oliffe, & Gregory, 2011). Further knowledge of ADL disability outcomes in the two groups may assist nurses and health care entities in improving health care and rehabilitation for the respective genders (Griffith, Ellis, & Allen, 2013; Harrison et al., 2011). When examining differences among African American men and women, researchers can begin to tease out how pain may influence ADL disability in older African American men and older African American women.

The aim of this study was to examine if pain, age, education, income, marital status and/or comorbidities were associated with ADL disabilities in older African American women and men. The theoretical framework used for this study is the disablement process model developed by Verbrugge and Jette (1994). There are various factors that may influence any part of the disablement process (Verbrugge & Jette, 1994). Pain can be considered a biological factor that can influence disablement outcomes (Harrison, 2009). In the current study we sought to understand if the biological factor of pain was associated with ADL disability in older African American women and/or men.

The current study is unique in that we examined outcomes in a specific racial/ethnic group and did not compare across race/ethnicities. By examining the within group variability, researchers studying health disparities can provide further knowledge surrounding what specific factors may adversely affect this group (Whitfield, Allaire, Belue, & Edwards, 2008). A better understanding of bodily pain and its effects on ADL disability is important information for nurses in order for them to provide optimal care for older African Americans. Because pain management is a critical nursing role, knowledge provided from this study may guide the development of effective strategies to minimize pain, which may improve the ability to perform ADL.

## Methods

### Design

A cross-sectional study design was used for this study to determine if bodily pain and other factors were significantly associated with ADL disability in older African American men and women. Data were taken from the Patterns of Cognitive Aging (PCA) study, which is part of a larger group of aging studies known as the Baltimore Study of Black Aging

(BSBA). The overarching goal of the BSBA was to examine the trajectory of cognition, health, and other critical factors in older African Americans.

## Participants

Participants were recruited from 29 senior independent living housing facilities that consisted of African Americans primarily living in the West Baltimore area. Participants were provided information sessions in each of the buildings and called the BSBA project office if they were interested in the study. All participants signed a written informed consent agreement approved by the institutional review boards at Pennsylvania State University and Duke University. Participants received \$30 compensation for the first interview and \$60 for the second. Participants were individually tested in their apartment buildings by a trained interviewer. Each interviewer was given two weeks of training on the instrument and recruitment protocols. Their work was subjected to random checks for accuracy. Data collection lasted 18 months and took place between 2006 and 2008. The exclusion criteria included: (1) cognitive impairment as indicated by a Mini-Mental State Examination (MMSE) cut-off score of 20; (2) inability to communicate verbally with interviewer. The interviews lasted 2.5 hours on average and consisted of a face-to-face interview, a battery of cognitive tests, and information collected on physical and mental health. The analytic sample for this study included 152 men and 446 women for a total of 598 participants with complete information on gender and bodily pain.

## Measures

### ADL Disability

ADL disability, the outcome variable for this study, was derived from participants' reports of difficulty in performing basic ADL. ADL were measured across seven areas including eating, dressing, grooming, walking, bathing, toileting, and transferring in and out of bed (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963). The possible responses for each task were: (1) never need help, (2) have difficulty but can do without help, (3) have difficulty and need help, (4) and never do the activity. Higher scores on the scales indicated poorer function/ability to perform the task. Researchers have previously used these measures in samples that included African Americans (Cummings, Neff, & Husaini, 2003; Furner, Giloth, Arguelles, Miles, & Goldberg, 2004; Thorpe Jr, Szanton, Bell, & Whitfield, 2013).

A binary variable was created for each ADL task, which indicated whether the participants had any difficulty performing tasks in that area. After summing across the seven areas, a dichotomous variable for ADL disability was created to identify those participants who had difficulty in at least one of the tasks (ADL disability) or no difficulty with tasks (no ADL disability). Researchers have previously used this method to measure ADL disability (Freedman, Martin, Schoeni, & Cornman, 2008; Thorpe Jr et al., 2013; Thorpe, Szanton, & Whitfield, 2009).

### Pain

Bodily pain was the main independent variable for this study. Participants were asked to rate their overall severity of bodily pain with the following responses: (1) indicating none at all,

(2) indicating slight, (3) indicating moderate, (4) indicating quite a bit, and (5) indicating extreme. Bodily pain was made into a dichotomous variable that included two categories with one category consisting of none at all, or slight and the other category consisted of moderate, quite a bit, and extreme. This question was part of the Short Form Health Survey 36 (RAND Health, 2015).

### **Demographic Characteristics**

The demographic characteristics included in this study were age, gender (1=female, 0=male), marital status (1=married; 0=not married), education, and income. Age was a continuous variable measured by number of years. Education was measured as a binary variable that was created to identify those participants who were high school graduates. Family income was based on participants' responses to 1 of 23 categories ranging from \$100 per month to \$2,300 or more per month. The income categories were divided into \$100 increments.

### **Comorbid Health Conditions**

Participants were asked if they had been diagnosed with any of the following medical conditions: angina, asthma, arthritis, cancer, diabetes, stroke, heart attack and/or hypertension. Each of the conditions were coded as binary variables (1=present; 0=absent) and then the conditions were summed to create a variable that represented the total number of comorbid health conditions. The comorbid health conditions variable was then dichotomized as having two or more comorbid conditions or having one to zero comorbid conditions. Measuring comorbid health conditions as a binary variable is consistent with other studies examining comorbid health conditions (Anderson et al., 2004; Thorpe et al., 2009).

### **Analytic Approach**

Descriptive statistics were calculated to provide demographic data for the sample. Student's t tests were used for continuous variables and Chi-square tests were used for categorical variables in order to calculate means and differences by gender for the demographic measures, comorbid health conditions, and ADL disability. Logistic regression was used to examine the relationship between pain and ADL disability, which is the recommended method when the outcome variable is categorical (Tabachnick & Fidell, 2013). In order to determine the impact of each block of variables on the parameter estimate for bodily pain, we examined three logistic regression models. Separate models were run in women and men. Analyses were conducted using SAS, version 9.1.3, software (SAS Institute, Inc., Cary, NC).

## **Results**

### **Sample Description**

The baseline characteristics of the total sample by gender groups are presented in Table 1, with means, standard deviations (SD) and/or percentages shown. The mean age of the total sample was 69.1 ( $SD=9.77$ ) years. Over half of the sample were high school graduates, female, reported two or more comorbid conditions, and reported ADL disability. When

examining the distribution of the baseline characteristics by gender, women were older on average and had a higher proportion reporting two or more comorbid conditions than men. A higher proportion of women were high school graduates. A total of 59% (n=263) of the women reported ADL disability compared to 50% (n=76) of the men. A total of 53% (n=236) of the women reported having moderate to extreme bodily pain and 40% (n=61) of the men reported moderate to extreme bodily pain.

**Factors Associated with ADL Disability**—We conducted three models to determine factors associated with ADL disability. In the Model 1 we looked at bodily pain and age, in Model 2 we looked at bodily pain, age, education, income, and marital status, and in Model 3 we looked at the variables in Model 2 as well two or more comorbid conditions in both gender groups. Among the women bodily pain was significantly associated with ADL disability in all three models, and income was significantly associated with ADL disability in Model 2 (OR=0.94; 95% CI: 0.90–0.98) but not Model 3. Among the women in Model 3 the variables that were significantly associated with ADL disability were bodily pain (OR=4.06; 95% confidence interval (CI): 2.63–6.26) and having two or more health conditions (OR=3.95; 95% CI: 2.09–7.47). Among the men bodily pain was the only variable significantly associated with ADL disability (OR=6.44; 95% CI: 2.84–14.57). The association of pain, age, education, income, marital status and/or comorbidities with ADL disability is presented in Table 2.

## Discussion

It is essential that we develop our understanding of how pain relates to ADL disability in older African American women and men in order to address pain and decrease the onset of ADL disability in this growing population. In this study we sought to examine the relationship between bodily pain and ADL disability in a sample of older African American women and men. The findings showed that pain increased the odds of ADL disability in both women and men, which is consistent with previous findings in mixed ethnic samples (Kutner, Zhang, Allman, & Bowling, 2014; Louie & Ward, 2011). These findings demonstrate the importance of adequately managing bodily pain in older African Americans in order to improve their ADL disability outcomes. Among women, having multiple comorbid conditions was also significantly associated with ADL disability. These results are consistent with other studies in which researchers reported that comorbid conditions were significantly related to ADL limitations in older African American women (Dunlop et al., 2005; Thorpe et al., 2016).

In the current study a strong association of bodily pain with ADL disability was shown in both men and women, with men having higher odds of ADL disability than women. Men may experience more pain or poorer health outcomes in later life due to their participation in hard labor jobs and exposure to harsh social and physical environments throughout their lives (Calasanti, 2004; Thorpe et al., 2015). Further work is needed in order to examine how earlier life occupations influence health outcomes in older African American men. Furthermore, this study counters previous assumptions that African American men may not report pain due to societal expectations of strength or masculinity (Evans et al., 2011). The men in our study did report pain and it is demonstrated that their pain had an effect on their

ADL. Further research surrounding pain and treatment of pain in older African American men is needed at this juncture (Burgess et al., 2009).

Among both African American men and women ADL disability was associated with bodily pain. Understanding the pain experience among older African Americans, and how this experience differs by gender, warrants further investigation. Due to the strong cultural and ethnic components that are involved in treating pain it is essential that further work is done to understand the pain experience and symptom duration of pain in older African Americans (Green et al., 2003). Furthermore, it is important to understand factors that may influence older African American men and their treatment options and choices, access to health care, and beliefs surrounding pain. Among the women two or more comorbid conditions were associated with ADL disability. Research identifying better ways of managing multiple comorbid conditions and their symptoms might reduce ADL disability in older African American women.

### **Limitations**

Several limitations were noted in this study. First, findings from this study are limited to older African Americans residing in one geographic location (Mid-Atlantic) and therefore cannot be generalized to all older African Americans. Second, this study used a cross-sectional design therefore causality cannot be assumed. Third, the data from this study was based on self-report, which can contain several potential sources of bias. Lastly, the number of men in the sample was relatively small. Despite the limitations, the knowledge from this study provides insight into significant factors associated with ADL disability in older African American men and women. In addition, although we describe self-report as a limitation it is important to take into account that there is a subjective component to both pain and ADL disability. A person's perceptions and understanding of an illness and/or pain, may shape how they negotiate treatment with their providers (Meghani & Houldin, 2007).

### **Implications for Nursing**

#### **Research Implications**

Without evidence to inform pain management older African Americans may continue to experience high rates of unresolved and/or inadequate pain relief. Further work is needed to help nurses understand which interventions work effectively in community-based settings. Prospective and randomized controlled trials involving community-dwelling older African Americans might help to uncover causal mechanisms, which would highlight specific factors to address that may lead to improved pain. It is also important that future nursing pain management research focuses on how clinical practice, diagnostic tests, and treatment options differ by gender within the clinical setting (LeResche, 2011). In addition, nurse researchers can focus on the mechanism between comorbid conditions, pain and ADL disability among African American women. Effective pain management in minority older adults with comorbid conditions can significantly improve their ability to perform ADL (Gilmour H., 2006). Furthermore, interventions targeting management of symptoms associated with comorbid conditions may decrease the risk of ADL disability among older African American women.

In addition, understanding and addressing other factors related to pain and disability may be effective ways to improve pain and disability outcomes in older African Americans. For example, empirical evidence suggests racial discrimination among African Americans is associated with greater bodily pain (Burgess et al, 2009) and disability (Walker, Harrison, Brown, Thorpe, & Szanton, 2016). Very few investigators have studied the effects of pain on ADL disability and whether or not racial discrimination moderates this relationship. In addition, there is a strong emotional/psychological component associated with pain and disability (Linton & Shaw, 2011) and further understanding how these mechanisms intersect with gender in older African Americans may help researchers understand how to develop effective pain interventions in this population. Psychological interventions and other non-pharmacological interventions for pain within older African American groups is a promising area that needs more exploration (Park, Lavin, & Couturier, 2014).

### **Practice Implications**

It is essential that nurses adequately assess pain and effectiveness of pain treatments in older African Americans when pain interferes with daily activities (Puia & McDonald, 2014). Using a holistic, culturally sensitive approach when assessing and treating pain that takes into account individual experiences and beliefs may be an effective way for nurses to approach pain in older African Americans (Booker, Pasero, & Herr, 2015; Booker, 2015; Tait & Chibnall, 2014). Effective pain management in older African Americans and minority older adults with comorbid conditions in general may significantly improve their ability to perform ADL (Gilmour., 2006; Szanton et al., 2011).

### **Conclusion**

In summary, understanding factors that lead to ADL disability in older adults should be a research priority, especially among those who are disproportionately impacted. In this study we provided evidence that in a sample of community dwelling older African Americans, bodily pain is significantly associated with ADL disability in both women and men. This study was unique in that a within group approach was taken to examine factors associated with ADL disability in African American women and men. In this study we identified that comorbid conditions in African American women and bodily pain in both African American men and women are associated with ADL disability, which is a contribution to the literature that effective pain management in African Americans and symptom management of comorbid conditions in African American women may be pathways for improved ADL outcomes in these groups. If older African Americans have improved abilities to perform ADL this may lead to more independence and better quality of life (Stuifbergen, Brown, & Phillips, 2009).

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**Table 1**

Distribution of Select Characteristics of the Total Sample and by Gender for participants in the Baltimore Study on Black Aging

Characteristic	Total (N=598)	Women (N=446)	Men (N=152)	p-value
Age in years (mean and SD)	69.1 ± 9.7	69.9± 9.7	66.6±9.2	0.00
Men (%)	25.4			
High School Graduate (%)	57.1	60.5	47.0	0.00
Income (mean and SD)	10.2±5.7	10.1±5.5	10.5±6.3	0.46
Married (%)	11.2	10.1	14.5	0.13
Two or more prevalent health conditions (%) <sup>†</sup>	80.8	83.4	73.0	0.00
Disability (%) <sup>‡</sup>	56.7	59.1	50.0	0.04
Pain (%)	50.0	53.3	40.1	0.00

<sup>†</sup>Prevalent health conditions consisted of ever being told by a doctor that you have: diabetes, heart disease, hypertension, or arthritis.

<sup>‡</sup>Disability was defined as reported difficulty in performing at least one of the seven basic activities of daily living (i.e. eating, bathing, grooming, walking, dressing, transferring in and out of bed, and using the toilet).

**Table 2**

Logistic Regression Showing Factors Related to ADL Disability by Gender in the Baltimore Study of Black Aging

Characteristic	Odds Ratio (95% Confidence Interval)		
	Model 1	Model 2	Model 3
<b>Women</b>			
Bodily Pain	4.67 (3.10–7.03)	4.48 (2.93–6.83)	4.06 (2.63–6.26)
Age	1.02 (0.99–1.04)	1.02 (0.99–1.04)	1.01 (0.99–1.04)
Education		1.10 (0.69–1.75)	1.30 (0.81–2.09)
Income		0.94 (0.90–0.98)	0.94 (0.90–0.99)
Married		1.52 (0.71–3.26)	1.56 (0.71–3.46)
Two or more prevalent comorbid conditions			3.95 (2.09–7.47)
<b>Men</b>			
Bodily Pain	7.06 (3.29–15.14)	7.01 (3.21–15.32)	6.44 (2.84–14.57)
Age	1.05 (1.01–1.10)	1.05 (0.99–1.09)	1.05 (0.99–1.09)
Education		0.74 (0.34–1.60)	0.73 (0.34–1.60)
Income		0.99 (0.93–1.06)	0.99 (0.93–1.06)
Married		0.88 (0.28–2.79)	0.84 (0.26–2.69)
Two or more prevalent comorbid conditions			1.34 (0.57–3.15)