Physical Functioning in Older Blacks: An Exploratory Study Identifying Psychosocial and Clinical Predictors

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Objectives: The primary objective of this investigation was to examine the relationship between physical functioning and various clinical (pain intensity, pain locations, medications, comorbidities) and psychosocial (depression, locus of control) variables in a sample of older blacks.

Methods: Data were collected from community-dwelling black adults (N=247), with a mean age of 69.4 ± 9.4 years. Participants were recruited from several senior high-rise facilities located in an urban community in Baltimore, MD. A multivariate regression model was tested to determine the relationship between selected clinical, psychosocial and demographic characteristics, and physical functioning; and to assess the amount of unique variance in functional status accounted for by specific psychosocial, clinical and demographic indicators (independently and collectively).

Results: It was established that reporting more depressive symptoms (ß=0.18, p<0.05), multiple pain locations (ß=0.25, p<0.01) and pain intensity (ß=0.30, p<0.01) was a significant indicator of physical impairment and accounted for 36% of its variation.

Conclusion: Identifying indicators of physical impairment is critical in providing baseline information on the functional well-being in older blacks. This emphasizes the need for further studies to rigorously examine the relationship between physical functioning, and clinical and psychosocial indicators within defined race and ethnic groups in order to develop data that provide meaningful comparisons between different race and ethnic groups.

Key words: physical functioning ■ elderly ■ pain ■ race/ethnicity ■ African Americans

INTRODUCTION

Functional status has important implications for policy, advocacy, health and long-term care needs for many aged adults.[1] Operationally defined as the difficulty, inability or limitation in performing basic functional activities, an estimated 49 million noninstitutionalized persons report some degree of physical impairment or disability due to a chronic illness(es) or the aging process.[2-4] While the changes in functional status across the life span contribute to lost work productivity, it also increases nursing home and healthcare use, and healthcare expenditures.[5] This is an important observation considering the impact physical impairments will have on the abilities of older adults to function within their environmental and social contexts.

An estimated 40–88% of adults ≥65 years are afflicted with ≥1 pain-related chronic illness that affects their ability to perform basic functional tasks (e.g., bathing, dressing, feeding self).[6] Arthritis, for example, affects approximately 58% of adults ≥65 years, and is considered one of the leading causes of physical disability that results in a decline in personal care and the inability to perform certain household tasks and work-related activities.[7-11] Data from the National Health Interview Survey concur that older adults with arthritis or other musculoskeletal disorders are more likely to report functional limitations and difficulty in performing such activities as walking and shopping compared to younger adults.[12] Baker also found a significant association between specific arthritis-related symptoms, pain and functional status in older community-dwelling blacks.[13]

While older adults from special populations (e.g., women, diverse race and ethnic groups) experience a disproportionate burden of disease and death, they are also at an increased risk for experiencing more disability and functional limitations.[14-17] Data show that females ≥65 years are more physically disabled than males. Similarly, older black females and males are more likely to report greater physical impairment than older white and Hispanic males and females.[1]

Consistent with these findings, disturbing racial disparities have been found. Seeman and colleagues found

that whites and males reported better physical performance than blacks.[18] Manton and Gu further established that older blacks demonstrated diminished functional capacities compared to younger blacks and other race groups.[19] Other investigations report similar findings, with persons from diverse race backgrounds performing at a less-than-optimal level than whites.[20] These results may have broad implications considering that many blacks self-rate their physical and mental health based on their ability to perform certain physical tasks.[21]

Despite these findings, it remains unclear if there are specific clinical and psychosocial indicators within the black population that explain the excess presentation of functional limitations compared to other race groups. This suggests a need to thoroughly identify and acknowledge the importance of establishing baseline data on a given race group before making comparisons between groups.[22]

To identify the factors that impact functional impairment in older blacks, we considered the degree to which certain demographic characteristics (age, sex, education, income), psychosocial indicators (depression, health locus of control) and clinical variables (pain intensity, pain locations, medication use, comorbidities) were associated with physical functioning in a sample of older community-dwelling blacks. More specifically, we aimed to assess the amount of unique variance in functional status accounted for by selected psychosocial, clinical and demographic indicators (independently and collectively).

METHODS

Participants

Data for this study were collected as part of the Baltimore Study on Black Aging (BSBA), which contains self-report information on psychosocial and behavioral indicators from older community-dwelling blacks. Participants were recruited from several senior high-rise facilities located in an urban community in Baltimore, MD. Respondents ≥50 years who experienced pain ≥3 months were included in this sample. The current investigation was approved by the Pennsylvania State University's institutional review board.

Measures

Physical functioning and clinical variables. Physical functioning was assessed using the Arthritis Impact Measurement Scale 2 (AIMS2).[23] The 25-item subscale score includes items on mobility, walking and bending, hand and finger function, arm function, self-care and household tasks. The subscale yields a composite score ranging from 0–10, with higher scores indicating greater functional impairment ($\alpha=0.90$).

Pain intensity was evaluated using the McGill Pain Questionnaire (MPQ).[24] The Pain Rating Index (PRI) scale of the MPQ consists of 78 pain descriptors (ranked by degree of intensity) that provides an overall index of

pain. A mean score value was obtained by summing the ranked intensities of all the words chosen by the respondent and then averaging them to obtain a single score. A high score indicates greater pain intensity ($\alpha=0.72$). The total number of pain locations was assessed by asking participants if they experienced pain in one of the following locations: knees, ankles, hips, shoulders, lower back, wrists, elbows and hands. A total pain location score was derived by a count of the total number of body locations identified by each participant.

The Medication Use Inventory scale was used to assess the total number of medications (categories of medications) (e.g., high blood pressure, diabetes) taken by each participant. A medication score was obtained by the total number of categories of medications reported ($\alpha=0.69$). A subscale of the Self-Evaluation of Life Function (SELF) scale (a comprehensive assessment of physical, emotional and social function) was used to determine the count of chronic diseases.[25] This subscale comprises of a list of chronic diseases assessing if the participant had been doctor diagnosed with a specific medical illness (e.g., arthritis, bronchitis, diabetes). A comorbidity score was obtained by a count of the total number of chronic diseases.

Psychosocial measures. The Center for Epidemiological Studies–Depression (CES–D) scale was used to assess depressive affect, positive affect, somatic activity and interpersonal distress. The measure yields a composite score ranging from 0–60; higher scores indicating more depressive symptoms ($\alpha=0.89$).[26]

Table 1. Demographic, clinical and psychosocial characteristics (N=247)	
Variable	**M ± SD**
Age	69.4 ± 9.4
Gender (Female)	73%
Education	10.4 ± 2.9
Marital Status (% Widowed)	45%
Income[a]	78%
Physical Functioning	2.53 ± 1.6
Pain	28.7 ± 14.2
Pain Locations	2.8 ± 1.4
Medications	5.4 ± 3.3
Comorbidities	2.9 ± 1.7
Depression	8.6 ± 7.9
Locus of Control	
Powerful	25.7 ± 5.6
Chance	19.9 ± 6.9
Internal	25.1 ± 5.7
Physical Impairment	
Mobility	2.9 ± 2.1
Walking and Bending	4.6 ± 2.9
Hand and Finger Function	2.3 ± 2.4
Arm function	2.5 ± 2.3
Self-Care Tasks	0.71 ± 1.5
Household Chores	1.9 ± 2.6
a: Income: percent earning <$1,000/month	

Health locus of control was evaluated via the Multi-dimensional Health Locus of Control (MHLC) questionnaire. This 18-item scale yielded composite sub-scale scores in three areas: internal (individual's belief they have control over their life), powerful others (life is controlled by others) and chance (life is determined by fate or chance).[27-29] Each subscale was measured on a six point-Likert scale (1=strongly disagree, 6=strongly agree). High scores indicate agreement with the locus of control factor represented by each subscale (α=0.77).

Demographic characteristics. Age was scored in a continuous format. Sex was treated as a dichotomous variable. Education was assessed as a continuous variable reflecting the total number of years of completed formal schooling. Income was coded dichotomously (0=earning <$1,000/month, 1=earning ≥$1,000/month).

Statistical Analysis

Data analysis was conducted in several stages. First, descriptive statistics were calculated to provide a profile of the sample's demographic characteristics and measure performance. Next, a series of Pearson Product-Moment correlation coefficients were examined to assess the strength of the bivariate associations between the physical functioning index and each demographic, psychosocial and clinical variable. Correlation coefficients were calculated using the pairwise deletion procedure.[30] A hierarchical multiple regression model was used to determine the amount of unique variance in physical functioning accounted for by specific clinical variables while controlling for the demographic and psychosocial indicators. The regression procedure entered the predictor variables in three models. Demographic variables (age, sex, education, income) were entered first (Model I), followed by depressive symptoms and health locus of control indicators (psychosocial variables, Model II). The clinical variables (pain intensity, pain locations, medications, comorbidities)

Table 2. Association between physical functioning and clinical and psychosocial variables

Variable	r
Age	0.00
Gender	0.09
Education	-0.19[†]
Income	-0.23[†]
Pain	0.39[†]
Pain locations	0.33[†]
Medications	0.41[†]
Comorbidities	0.45[†]
Depression	0.28[†]
Locus of Control	
Powerful	0.18
Chance	0.13*
Internal	-0.07

* p<0.05; † p<0.01; ‡ p<0.001

were entered as the final set of predictor variables (Model III). Standardized beta coefficients were reported to describe the relative importance of the predictor variables within the regression model. All statistical analyses were conducted using SPSS version 13.0 (SPSS Inc., Chicago, IL).

RESULTS

Descriptive Characteristics

Data were derived from an independent sample of 247 blacks, with a mean age of 69.4 ± 9.4. The average level of education was 10.4 ± 2.9 years. Seventy-three percent of the sample were female. Nine percent of the respondents were married, 26% were divorced and 45% reported as being widowed. Seventy-eight percent of the respondents reported a monthly income of <$1,000. Respondents reported an average of 2.9 ± 1.7 chronic diseases, 5.4 ± 3.3 medications and 2.8 ± 1.4 pain locations. Walking and bending-related activities were most affected (4.6 ± 2.9) by functional limitations. However, requiring assistance with self-care tasks (0.71 ± 1.5) was least affected by limited functional status. Other demographic, clinical and psychosocial variables are provided in Table 1.

Correlations were calculated to determine the association between physical functioning and measures of pain, pain locations, depression, comorbidities, medications and demographic characteristics. Table 2 shows that limited functional capacity was associated with less education (r=-0.19, p<0.01) and lower income (r=-0.23, p<0.01). Physical impairment was also associated with experiencing more depressive symptoms (r=0.28, p<0.01) and health locus of control–chance (r=0.13, p<0.05). Reporting more pain locations (r=0.33, p<0.01), comorbidities (r=0.45, p<0.01) and medications (r=0.41, p<0.01), and greater pain intensity (r=0.39, p<0.01) were also significantly correlated with reporting more functional impairment.

Multivariate Analysis

A hierarchical multiple regression model was calculated to determine the amount of unique variance in physical functioning accounted for by the demographic, psychosocial and clinical variables. The first step in model development involved entering the demographic variables (age, sex, education and income; Model I). These variables accounted for 9% of the total physical functioning variance. Education (ß=-0.23, p<0.05) was the only significant demographic predictor of limited physical functioning in the first model. The psychosocial indicators (depression, locus of control variables; Model II) were entered in the second model. Depression (ß=0.28, p<0.01) was significant and accounted for 10% of the total variance. Education was not retained when the psychosocial variables were entered. Table 3 shows that after controlling for age, sex, education, income and the psychosocial indi-

cators, the clinical variables (pain intensity, pain locations, medications, comorbidities; Model III) accounted for another 18% of the functioning variance. The effect of depression remained significant when the clinical indicators were included in the analyses.

The full regression model was significant (p<0.001) and accounted for 36% of the total variation in physical functioning. When the three models were included in the final analysis, depression (ß=0.18, p<0.05), total number of pain locations (ß=0.25, p<0.01) and pain intensity (ß=0.30, p<0.01) were the only significant indicators of functional impairment. When all the variables in the respective models were taken into account, older physically impaired blacks experienced more depressive symptoms and greater pain intensity, and reported more pain locations.

DISCUSSION

The aim of this study was to examine the relationship between physical functioning, and psychosocial and clinical indicators in a sample of older community-dwelling blacks. We established that reporting more depressive symptoms was a significant indicator of physical impairment. This is consistent with other studies showing an association between reports of depressive symptoms and physical impairment in older adults.[31-33] Previous research has shown that older blacks with positive supportive emotional and physical relationships have a lower prevalence of depression.[34] However, there are considerable inconsistencies in the literature on the prevalence of depressive symptoms in this population.

Husaini found that older blacks diagnosed with a medical condition reported more depressive symptoms than those who did not report a medical illness.[35] Baker and Green corroborate this finding, suggesting that having a medical illness is a significant predictor of depression in older black chronic pain patients.[36] Other investigations indicate that the highest rate of depressive symptoms is found in blacks aged <45 years and the lowest among blacks 45–64 years of age, with a slight increase after age 65.[37] Other work suggests that blacks ≥65 years have lower or similar rates of depression compared to that of other race groups.[38,39]

Despite these results, significant difficulty remains in interpreting, defining and diagnosing depressive syndromes and other mental and medical conditions in blacks. One explanation is that primary emphasis in defining these mental conditions has focused on comparisons involving blacks and whites.[40] The data lead to understanding differences; however, they do not provide answers as to why these differences exist or if the magnitude of these interrelationships differ in one race or ethnic group compared to others.

With the complexity of symptoms associated with certain chronic medical problems and depression, it is often difficult to disentangle somatic symptoms of

depression and those secondary to a medical illness.[41] This is particularly important for diagnosing depression in adults in general but particularly in older adults. Chronic conditions in some adults may cause the manifestation of somatic symptoms recognized as a medical illness rather than symptoms resulting from a psychological disorder.[42] This observation clearly underscores the importance of examining health among blacks in particular, since this population is disproportionately diagnosed with more severe and debilitating illnesses and is more incapacitated and functionally impaired than the whites population.[43-46]

There is a growing body of research illustrating the robust relationship between physical impairment and pain. This is consistent with our findings showing greater pain intensity as a significant indicator of functional impairment. Defined as an unpleasant emotional experience associated with a physiological response to disease and tissue damage, pain is often secondary to physically debilitating conditions such as fractures, arthritis, osteoporosis and falls.[47-49] The physiological changes that occur as a result of these conditions may lead to pain and functional impairment. For example,

Table 3. Multivariate regression model of physical functioning and clinical and psychosocial indicators

Variable	Models		
	Model I	Model II	Model III
Demographics			
Age	0.03	-0.03	1.25
Gender	0.04	0.03	-0.02
Education	-0.23*	-0.09	-0.04
Income	-0.10	-0.10	-0.45
R^2	0.09		
Adjusted R^2	0.05		
R^2 change	0.09		
P value	<0.05		
Psychosocial			
Depression	0.28†	0.18*	
Chance	0.19	0.13	
Powerful	-0.01	0.04	
Internal	-0.11	-0.15	
R^2	0.19		
Adjusted R^2	0.13		
R^2 change	0.10		
P value	<0.01		
Clinical			
Comorbidities	0.16		
Pain intensity	0.30†		
Pain locations	0.25†		
Medications	-0.08		
R^2	0.36		
Adjusted R^2	0.29		
R^2 change	0.18		
P value	<0.001		

* p<0.05; † p<0.01

certain chronic illnesses (e.g., arthritis and musculoskeletal disorders) have specific symptoms and physiological changes (e.g., tissue inflammation, swelling within the joint capsule, cartilage deterioration) that cause a considerable amount of pain.[50] These painful episodes may impact the capacity to perform activities essential to maintaining an independent lifestyle.

Several models of pain have been derived to explain the pain and functional impairment relationship. The Biobehavioral Model, for example, illustrates how pain resulting from a physiological pathology or injury is influenced by various social and cultural influences, which ultimately leads to avoidance and disability.[51] Taking an approach similar to the Biobehavioral Model, Dekker and colleagues provide a cogent description of the path from disease to impairment, suggesting that "muscle weakness leads to unstable joints, and the stress on the unstable joints result in pain and impairment."[52] Avoidance of certain pain-related activities promotes a self-reinforcing cycle of activity avoidance, pain and limited functional capacity.

Consistent with previous research, pain location was significantly associated with physical impairment. For this investigation, the physical disability variable consisted of items focusing primarily on mobility and joint movement (i.e., arm disability, hand and finger function, and walking and bending). These are significant determinants of how well an individual is able to move and perform certain physical tasks. In addition, factors such as the location of the restricted joint, the number of joints restricted, the magnitude of joint deformity, and the joints affected are known to significantly impact physical performance such as reaching, walking and bending.[53]

Although the number of comorbidities was not a significant indicator in our analyses, there are myriad data suggesting the significant relationship between chronic health conditions and disability. This recognizes that potential physiological changes resulting from these medical conditions can lead to pain, which may compromise one's ability to perform certain physical tasks. Numerous investigations corroborate this research, demonstrating a positive relationship between the presence of a chronic medical condition and functional impairment.[34, 47] Miller et al. established that diabetic patients are more likely to report functional disability than nondiabetic patients.[54] Similarly, Wang and colleagues showed that selected medical conditions (diabetes mellitus, hypertension, coronary heart disease, arthritis) are associated with increased rates of functional decline in adults ≥65 years.[55] We are not sure why our comorbidities variable was not significant in these analyses. Perhaps including specific chronic diseases (e.g., diabetes, arthritis, hypertension) rather than a composite disease variable would have elicited a significant relationship. Another possible explanation is that the instrument used in this investigation may not have

effectively captured the comorbidities variable in this sample of older blacks. Future studies are needed to explore the conceptual and measurement-related issues that may be specific to this population.

Although we showed important descriptive data on the psychosocial and clinical predictors of functional impairment in older community-dwelling blacks, there are several study limitations that should be acknowledged. First, all analyses were based on self-report data. Self-report, representativeness and nonresponses are inherent sources of potential biases, although questionnaires were completed confidentially.[56] Furthermore, self-report is subject to error and may be masked by depressive symptoms and clinical conditions. Second, the cross-sectional nature of the study made it difficult to test or assume the temporal sequence of physical impairment and other clinical (pain intensity) and psychosocial (depression) indicators. This is important given that self-reports of health among older blacks are largely grounded in their ability to perform certain physical tasks, which is often associated with depressive symptoms and clinically defined illnesses.[57]

Investigations involving other racial and ethnic groups are important because they may uncover similarities and/or differences in reporting behaviors and patterns of functional status, pain and depressive symptoms. Only a few studies have examined race differences (specifically between whites and blacks) in perceptions of physical impairment and painful stimuli. However, comparative investigations of this sort should be carefully planned and executed in order to avoid the mistakes of prior research. The potential benefits of such an approach are significant and could possibly address questions of how socialization patterns and other factors influence functional capacity and quality of life.

Our findings underscore the importance of continued research on disease processes as well as physical and mental health outcomes both within and between racially diverse adults. We established that there were indeed specific psychosocial and clinical variables that influence functional status. Specifically, we found that reporting more depressive symptoms and pain locations, and greater pain intensity were significant indicators of functional impairment in older blacks. Future research should be directed at developing models that assess how social, race and ethnicity, and environmental factors influence the degree of physical functioning among adults from diverse populations. These research efforts would provide a scientific basis for understanding the physical and psychological implications of functional status in blacks and other race groups as well.

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