Longer residence in the United States is associated with more Physical Function Limitations in African Immigrant Older Adults

Manka Nkimbeng, PhD, MPH, RN[1], **Yvonne Commodore-Mensah, PhD, MHS, RN**[1], **Jacqueline L. Angel, PhD**[2], **Karen Bandeen-Roche, PhD**[3], **Roland J. Thorpe Jr, PhD**[3], **Hae-Ra Han, PhD, RN, FAAN**[1], **Peter J. Winch, MD**[3], **Sarah L. Szanton, PhD, ANP, FAAN**[1,3]

[1]Johns Hopkins School of Nursing, 525 N. Wolfe Street, Baltimore, MD 21205

[2]The University of Texas at Austin, 2300 Red River St, Austin, TX 78712

[3]Johns Hopkins Bloomberg School of Public Health, 615 N Wolfe St, Baltimore, MD 21205

Abstract

Acculturation and racial discrimination have been independently associated with physical function limitations in immigrant and United States (U.S.)-born populations. This study examined the relationships between acculturation, racial discrimination, and physical function limitations in N=165 African immigrant older adults using multiple linear regression. The mean (±SD) age was 62 (8) years and 61% were female. Older adults who resided in the U.S. for 10 years or more had more physical function limitations compared to those who resided here for less than 10 years (b −2.62, 95% CI: −5.01, −0.23). Compared to lower discrimination, those with high discrimination had more physical function limitations (b −2.51 95% CI: −4.91, −0.17), but this was no longer significant after controlling for length of residence and acculturation strategy. Residing in the U.S. for over 10 years is associated with poorer physical function. Longitudinal studies with large, diverse samples of African immigrants are needed to confirm these associations.

Keywords

Acculturation; Discrimination; African Immigrants; Black Immigrants; Older Adults; Physical function

Introduction

With aging, older adults often develop physical function limitations (poor physical function) and disabilities, including an inability to walk, cook, or bathe (Verbrugge & Jette, 1994; World Health Organization & U.S National Institute of Aging, 2011). The loss of the ability to participate in daily activities for older adults is typically a consequence of chronic

diseases such as diabetes and hypertension, psychosocial factors, and a variety of other causes (Howrey et al., 2015; Stuck et al., 1999). Acculturation and racial discrimination —two psychosocial factors associated with immigration and minority status—are known risk factors for poor physical function in immigrant older adults and U.S.-born minorities, respectively (Gubernskaya et al., 2013; Walker et al., 2016). Physical function limitations have significant implications for poor health outcomes, including poor quality of life and mortality (Barile et al., 2012; Bentley et al., 2013; Koroukian et al., 2016). Poor physical function is associated with preventable healthcare expenses related to nursing home admissions, increased hospitalizations, and the use of long-term care services (Alecxih, 2010). Current studies provide very limited information on the burden of physical function limitations in African and Black immigrant older adults.

By 2060, 45% of U.S. older adults will belong to a racial/ethnic minority group (Mather et al., 2015; Mather et al., 2019). The growth of the African immigrant population serves as an important contributor to this trend. In 2015, there were 2.1 million African immigrants in the U.S. with Africans having the fastest growth rate from 2000 to 2013 among immigrants (Anderson, 2017). Currently, 19% of African immigrants are older than 55 years (U.S. Census Bureau & American Community Survey, 2014), and the number of older adults granted permanent residency in the U.S. is rising (Baugh & Witsman, 2017). Although it is essential to plan for the long-term care needs of this growing population, the prevalence of physical function limitations in older African immigrants in the U.S. is unknown, as reported rates in Black older adults range from 38.5% to 79% (Dallo et al., 2015; Melvin et al., 2014; Nkimbeng et al., 2019). In a study that disaggregated Black immigrants, the prevalence of physical function limitations in African immigrants was 3.6% (Elo et al., 2008). However, this sample was much younger (mean age of 39 years) than the older adult population with a high prevalence of physical limitations.

Migration and post migration processes—especially acculturation—present unique challenges for poor physical function in older adults. Acculturation is the process of cultural and psychological changes that occur when an individual migrates to a new environment (Berry, 1992; Berry, 2005; Gubernskaya et al., 2013; Lum & Vanderaa, 2010). It can impact changes in health behaviors such as diet and physical activity (Allen et al., 2014). Higher fat intake, lower consumption of fruits and vegetables, and increased intake of fast foods are some of the dietary changes that immigrants may engage (Allen et al., 2014; Okafor et al., 2014; Tseng et al., 2015), which can impact chronic diseases. Proxy measures of acculturation (e.g. length of residence, age of migration, and naturalization status) indicate that greater acculturation is associated with physical function limitations (Gubernskaya et al., 2013; Ro & Gee, 2012; Wakabayashi, 2010). While proxy measures are often measured in national surveys to decrease participant burden (Alegria, 2009), they may not fully capture the nuances of the acculturation process. Multidimensional theories and measures such as Berry's acculturation theory (Berry, 1992; Berry, 2005) may offer in-depth understanding of this process in immigrants.

Racial discrimination is associated with poor physical function and poor health in Blacks and other racial/ethnic minorities. Racial discrimination is differential treatment based on race or other inadequately justified factors that disadvantages a racial group (Blank et al.,

2004; U.S Equal Employment Opportunity Commission, n.d.). Studies link it to medical conditions and such as diabetes, and hypertension and emotional health outcomes such as diabetic distress (Pascoe & Richman, 2009; Williams, I. C. et al., 2020). Research shows perceived discrimination is associated with poor cognitive and physical function in older adults in Europe (Shankar & Hinds, 2017). In the U.S., racial discrimination correlates with physical function limitations in older African American women (Walker et al., 2016). Longer length of residence in the U.S. (acculturation) is associated with increased perception of racial discrimination in immigrants (Brondolo et al., 2015). Discrimination, especially in the context of acculturation, remains yet to be explored in the African immigrant population.

The growing burden of chronic diseases in adult African immigrants may impact future physical function in this population. According to a breadth of studies, hypertension prevalence ranges from 8.3%–40% (Commodore-Mensah et al., 2018; Njeru et al., 2016; Sewali et al., 2015), diabetes prevalence from 34.6%–65.5% (Commodore-Mensah et al., 2018; Njeru et al., 2016; Obisesan et al., 2016), and obesity prevalence from 5.4% –55% (Commodore-Mensah et al., 2017; Njeru et al., 2016; O'Connor et al., 2014; Sewali et al., 2015). These are all risk factors for physical function limitations in older adults (Stuck et al., 1999).

In this study, we examined the relationship among acculturation, discrimination, and physical function in African immigrant older adults. Using a multidimensional measure of acculturation, we examined acculturation strategies of older African immigrants and how these strategies impact physical function. We hypothesized that those who are more acculturated and have greater experiences of discrimination also have more physical function limitations. Although, there are some studies of physical function in African Americans and other U.S. born older adults, ethnic and cultural differences between U.S. born older adults and African immigrants can impact health behaviors and subsequently differential health outcomes. An understanding of these unique risk factors of poor physical function can inform tailored health interventions for African immigrant older adults in the U.S.

Methods

Study Design and Sample

To leverage recruitment efforts in a difficult to reach population, this study drew on data from two concurrent studies in the Baltimore-Washington Metropolitan area. Inclusion criteria were: 1)   50 years, 2) born in Africa, 3) ability to communicate in English, 4) lived in the U.S. for   6 months, 5) Black race, 6) cognitively intact from the six-item screener (Callahan et al., 2002), and 7) have   1 mobility limitation based on National Health Interview Survey Mobility questions (National Center for Health Statistics, 2016). The first study, which began in 2017 and is currently ongoing, is an epidemiological study to examine the overall health of African immigrant adults. Seventy-six participants from this study are included in this analysis. The second study examined physical function in older African immigrants. Researchers enrolled eighty-nine participants from February 2018 to March 2019. Researchers employed the same instruments to measure all study variables in

both studies and data collectors were shared across both studies. An academic institutional review board approved the study protocols (IRB).

The convenience sampling approach and community recruitment methods were the same for both studies (Commodore-Mensah et al., 2019). Researchers recruited participants through community-based organizations, word of mouth, and social media. Data collection events at community-based organizations occurred after leadership approval and IRB approval of that recruitment site. In study one, some potential participants with the study link completed the survey on a computer or smart mobile device, and consent information was included at the start of the online survey. Survey completion was considered consent for these participants. Participants who were screened by phone for study two had the choice to have the survey mailed to them with a prepaid return envelope or participate via home data collection. Home data collection was scheduled at a convenient time for the participant. Trained research assistants obtained oral informed consent from in-person, and phone participants using an IRB-approved consent script. All participants completed a survey with items from the measures discussed below. About 80% of study research assistants were African immigrants.

Measures

Physical function—The study outcome was physical function, which we measured with the Patient-Reported Outcomes Measurement Information System Physical Function short form (PROMIS PF 10a). This scale assessed the degree of difficulty in doing daily functional activities such as bending, climbing stairs, carrying groceries, and bathing (Rose et al., 2014). Data were collected on the paper version of the PROMIS PF 10a scale, and scores were transformed to T-scores using the short form conversion tables (Rose et al., 2014). The U.S. population mean T-score is 50, with a standard deviation of 10. Higher PROMIS-PF10a T-scores represent better function.

Risk factors

Acculturation.: Acculturation was measured with length of residence in the U.S. and the modified Psychological Acculturation Scale (Tropp et al., 1999). Length of residence is a continuous self-reported number of years each participant resided in the U.S. This variable was dichotomized as; <10 years or 10 years, as is the norm in many immigrant studies (Commodore-Mensah et al., 2016; Gubernskaya et al., 2013). The Psychological Acculturation Scale (PAS) measures changes that may occur during the acculturation process with questions such as "which group(s) of people do you feel the most comfortable?" and "In what culture do you feel confident you know how to act?" Responses are Likert scale from 1–5 as "totally disagree" to "totally agree". This scale has strong psychometric properties (Tropp et al., 1999), and has been used with African immigrants. Internal consistency in this sample was 0.81. The PAS questions were divided into two dimensions; one for U.S., and the other for country of origin and mean scores are calculated for each dimension. Scores were later categorized to form four acculturation strategies according to Berry's theory. Berry's theory of acculturation delineates four strategies to describe the uptake of new country culture and characteristics in comparison to the loss of country of origin culture (Berry, 1992; Berry, 2005). Individuals can adapt by adopting one of four acculturation strategies. They can become 1) assimilationist (abandoning the

old cultural identity and adopting the new culture completely), 2) integrationist (maintaining both cultures), 3) separationist (not engaging in the new culture), or 4) marginalist (neither engaging in the old or new cultures). The separationist strategy in this study is called traditionalist (Commodore-Mensah et al., 2017). Means scores for each dimension were the basis of categorizing study participants according to one of the four acculturation strategies. Specifically, high scores on both dimensions (≥3) were categorized as Integrationist, while high scores for the U.S (≥3) and low scores for country of origin (<3) were Assimilationists. High scores on the country of origin (≥3) and low scores for the U.S. (<3) were Traditionalists and low scores for both dimensions (<3) were categorized as Marginalist. In this sample, only two participants were categorized into the Assimilationist and Marginalist categories, respectively. Therefore, our analysis presents a comparison of only the Integrationist and Traditionalist strategies and excludes these 4 participants because inferential analyses cannot be conducted with these.

Discrimination.: Discrimination was measured with the Everyday Discrimination Scale (EDS) (Williams, D. R. et al., 1997; Williams, D. R., 2012). This scale has nine items that assess experiences of discrimination during everyday activities. Questions include: "You are treated with less courtesy than other people are," "You are treated with less respect than other people are," or "You are threatened or harassed." Responses are rated categorically as Never (0), Rarely (1), Sometimes (2), and Often (3). Total scores for the nine discrimination items were highly skewed. Therefore, responses were dichotomized into high discrimination —as described by Mays & Cochran (2001) and Pérez et al. (2008)—if participants reported "sometimes or often" on one or more of the scale items, and low discrimination otherwise. The internal consistency of this scale in this sample was α=0.86.

Covariates.: Covariates in this study included sociodemographic characteristics and health conditions. Sociodemographic characteristics included age, sex, level of education, marital status, income, employment status, health insurance, and migration reason. Age was continuous years of life, while sex was binary (male or female), and health insurance was binary (yes or no). Education level was measured in categories of the highest level of education and technical training completed, while marital status was categorized by participant's reported marital status. Household income was measured with categories ranging from $0 to $120,000 in $10,000 increments, but were later collapsed to $40,000 increments for analyses. Employment status and migration reasons were categorized as reported by participants. We also reported where data was collected for each participant with categories of the recruitment source. Health conditions assessed in this study include diabetes, hypertension, and depressive symptoms. Responses were obtained for whether participants have ever been diagnosed with diabetes or hypertension. Depressive symptoms were measured with the Patient Health Questionnaire (PHQ-8)(Kroenke et al., 2009). All data were self-reported.

Data Analysis

We used means (SD) and proportions to summarize continuous and categorical variables, respectively. To examine the unadjusted and adjusted relationships between acculturation, discrimination, and physical function, we fitted univariable and multivariable linear

regression analyses. Three unique models were examined, which include: physical function and 1) acculturation strategy, 2) length of residence and 3) discrimination. Additionally, we examined the relationships between discrimination and physical function after controlling for acculturation strategy and length of residence. Covariates included in each model were chosen based on literature review of their association with function limitations and stepwise model building. Diagnostic plotting of residuals versus continuous covariates and residuals versus fitted values was employed to evaluate violations of linearity and homoscedascity assumptions; the assumptions appeared well met. Sensitivity analyses were conducted to address outlier influence and evaluate the robustness of findings to different definitions of independent and outcome variables (e.g. creating categories for continuous variables, using higher/lower cut-off scores), and imputation of missing data for key variables. More sensitivity analyses were conducted for complete data only (n=127) and controlling for the study that recruited each participant (see Appendix). These analyses showed similar direction for the relationship between length of residence, acculturation strategy, discrimination, and physical function. Analyses were conducted in Stata 15 I/C (StataCorp, 2015).

Results

Demographic characteristics of the sample

The mean (±SD) age was 62 (±8), years and 61% were female (Table 1). Sixty percent of the data was collected at community-based organizations that serve African immigrants. Fifty-eight percent migrated to join other family members, 61% had lived here for 10 years or more, and 50% migrated before the age of 50. Twenty-nine percent of participants had a bachelor's degree or higher. The majority (54%) of the sample had hypertension, and 29% had diabetes. The average functional limitation T-score was 45, indicating that the physical function of this sample was five points lower than the general adult population T-score. The majority of participants in both studies had lived in the U.S. for 10 years and acculturated through the Integrationist strategy. There was no difference in the level of discrimination (see Appendix), but participants in study 1 were older and had lower physical function scores.

Comparison of sample characteristics by acculturation strategy

Almost two-thirds of this sample used the Integrationist acculturation strategy. In unadjusted analyses, there were significant differences in sample characteristics by acculturation strategy. These included sex, marital status, level of education, migration reason, age at migration, and physical function score (p<0.05 for all). Specifically, more people categorized as Traditionalist had less than high school, or no formal education. The majority of participants who were classified as Traditionalist migrated to the U.S. after the age of 50 years.

Acculturation and physical function

Older adults who had resided in the U.S. for over 10 years had more physical function limitations than their counterparts who had immigrated more recently. After adjusting for covariates, older adults who had resided in the U.S. for over 10 years had a 2.6-point lower

physical function-score compared to those who had resided in the U.S. under 10 years (b −2.62, 95% CI: (−5.01, −0.23)), indicating that individuals who had resided in the U.S. for over 10 years had poorer function (Table 2a). Participants categorized as Traditionalist had significantly poorer physical function (T-Score 42 (SD:8.4)) compared to Integrationist (T-score 45.4 (SD:8.2)). After controlling for covariates, Integrationist had a 0.02 higher T-score (b 0.02, 95% CI (−2.76, 2.80)) compared to traditionalist, but this was not statistically significant (Table 2b).

Discrimination and physical function

Discrimination was not statistically significantly associated with poor physical function in univariable analyses. However, after adjusting for age, sex, marital status, education, health insurance, and employment status, participants with high levels of discrimination had significantly poorer physical function (2.5-point lower T-score) compared to those with low discrimination (b −2.51 95% CI (−4.84, −0.17)) (Table 3). When length of residence and acculturation strategies were controlled for, discrimination coefficients became non-significant.

Discussion

The purpose of this study was to examine the relationship among acculturation, discrimination, and physical function in African immigrant older adults. In this sample, participants primarily adopted the Integrationist acculturation strategy (identified equally with the African and American cultures) and in univariable analyses it was linked to better function compared to the Traditionalist strategy (only identifying with country of origin culture). From the adjusted analyses, the Integrationist strategy was not related to poorer physical function (better function). Therefore, our acculturation strategy hypothesis was not supported but length of residence as a proxy for acculturation was supported; as those who had resided in the country over 10 years had more physical function limitations.

Although limited, studies of acculturation strategies in African and older immigrants reveal similar patterns noted in this study. A recent study also found that the majority of younger African immigrants (mean age=49.5 years) were Integrationists (Commodore-Mensah et al., 2017). Similar to our sample, Jang and colleagues (2007) found that Korean immigrant older adults classified as Traditionalist had poorer functional and mental health outcomes compared to their Integrationist counterparts (Jang, Kim, Chiriboga, & King-Kallimanis, 2007). However, cluster analyses of a different sample of Korean immigrants older adults revealed that the majority were moderately bicultural (greater orientation to Korean culture than American culture) was the predominant acculturation strategy (Rhee, 2019). Although it was not significant in our adjusted models, in the univariable comparison, Traditionalist had significantly poorer physical function compared to Integrationist. In a multistate sample of Korean older adults, greater American acculturation was associated with improved function, however this finding became non-significant after adjusting for gender (Choi et al., 2020). Larger studies with diverse samples are needed to fully understand how different acculturation strategies impact functional health outcomes in immigrant older adults.

Length of residence as a proxy measure of acculturation was related to more physical function limitations in this sample. Greater adoption of U.S. culture is considered higher acculturation (Schwartz et al., 2010), and it is assumed that with longer residence, there are more opportunities to adopt more aspects of U.S. culture. Limited research in African immigrants show that longer residence in the U.S. is linked with poor health outcomes. Analyses of data from the National Health Interview Survey (1997–2005) reveal that longer length of U.S. residency for African immigrants was related to greater odds of being overweight (Oza-Frank & Venkat Narayan, 2010). In a study of Ghanaian and Nigerian immigrants, longer residence in the U.S. was associated with greater odds of cardiovascular disease risk factors(Commodore-Mensah et al., 2017). However, analyses of five years of the National Health Interview Surveys showed that recently-immigrated (lived in the country for <12months) foreign-born Black older adults had the highest proportion of poor physical function (Nkimbeng et al., 2019).

Discrimination experiences were significantly associated with poorer physical function in analyses with 150 participants but became non-significant in reduced samples. In a study with 120 middle-age older adult women in the U.S., greater experiences of racial discrimination were related to poorer function (Walker et al., 2016). Research on the relationship between racial discrimination and physical function in older adults is limited, but prior studies have examined the relationship between perceived racial discrimination and a number of chronic diseases. Racial discrimination was associated with diabetes, hypertension, and depression, which are current risk factors for poor physical function (Lewis et al., 2015; Pascoe & Richman, 2009; Williams, D. R. & Mohammed, 2009).

There is some evidence to suggests that acculturation may impact the perception of discrimination in immigrants. Greater length of residence (proxy measure of acculturation) in the U.S. is associated with greater cultural racism (racial discrimination)(Case & Hunter, 2014). In Norway, skin-tone discrimination was associated with acculturation in African immigrants; where discrimination from Whites was associated with lower uptake of Norwegian culture and discrimination from Africans was associated with decrease upkeep of African culture (Kunst & Phillibert, 2018). In this study, the relationship between discrimination and physical function was attenuated after adjusting for the length of residence and acculturation strategies, but the point estimate remained large, which is suggestive of precision loss. Post-hoc analyses did not reveal any significant interaction effects. Further research with larger and more representative samples can provide a clear understanding of these interactive relationships.

This study has a few limitations. First, the African immigrant older adults in this sample were primarily from five countries, and the majority were currently living in the Baltimore-Washington Metropolitan area. These results might not reflect the health of all African immigrants in the U.S. Second, this study presents results from cross-sectional analyses. This makes it impossible to establish temporality and causality. Also, acculturation strategies were assessed at one time point; participants may transition between acculturation strategies with time in the U.S. or interaction with other factors, such as living in an ethnic enclave. Third, study data were collected through self-report, which may be influenced by social desirability bias during interviews and/or recall bias in self-administered surveys.

Fourth, due to financial constraints, this study only included English speaking participants; therefore, the results might not reflect the experiences of non-English speaking older African immigrants.

Conclusion

To the best of our knowledge, this was the first study to examine physical function in African immigrant older adults in the U.S. African immigrant older adults who had resided in the U.S. for 10 years had worse physical function compared to newer immigrants. More studies with large diverse samples of African (individuals from more African countries and different regions of the U.S.) using longitudinal designs are needed to explore how various acculturation strategies may impact experiences of discrimination and physical function with time in the U.S. Additionally, qualitative studies can help provide in-depth understanding of the acculturation process, and may inform identification and description of which cultural practices and health behaviors are changing in immigrants. Greater understanding of this process can facilitate targeting of health interventions to enhance uptake and maintenance of health promoting behaviors. Poor physical function is prevalent in older adults and is costly, but it is also modifiable. Healthcare providers should assess and refer participants for treatment during routine appointments. In addition to physical and occupational therapy assessment and treatment, innovative interventions such as the Community Aging in Place Advancing Better Living for Elders (CAPABLE) that are also cost-saving are potential treatment approaches (Ruiz et al., 2017; Szanton et al., 2019). Finally, all participants in this sample have at least one mobility limitation; a precursor to poor physical function (Verbrugge & Jette, 1994), health policies are needed to ensure timely assessment and treatment of poor physical function in older adults.

Acknowledgements

Appendices

Table 1.

Comparison of Sample Characteristics by Baseline Studies

			Study 1 (N=76)	Study 2 (N=89)	P-value
Age (mean, SD)			58.6 (6.7)	64.8 (7.9)	**<0.001**
Data Collection Site		*Home*	0 (0%)	38 (43%)	**<0.001**
		CBO	62 (82%)	37 (42%)	
		Mail/Online	14 (18%)	14 (16%)	
Sex		*Female*	33 (43%)	68 (76%)	**<0.001**
		Male	43 (57%)	21 (24%)	

		Study 1 (N=76)	Study 2 (N=89)	P-value
Marital Status	*Married/cohabitating*	14 (19%)	45 (51%)	**<0.001**
	Single (Never married/widowed)	12 (16%)	38 (43%)	
	Separated/Divorced	49 (65%)	6 (7%)	
Level of Education	*No formal Ed/<HS*	7 (10%)	42 (48%)	**<0.001**
	HS/GED equivalent	10 (14%)	12 (14%)	
	Associate/Technical training	24 (33%)	18 (20%)	
	Bachelors/Masters/Doctorate	31 (43%)	16 (18%)	
Health insurance		50 (57%)	45 (63%)	0.40
Income	*$0– 39,999*	24 (37%)	33 (37%)	**<0.001**
	$40,000–$79,999	17 (26%)	8 (9%)	
	$80,000	12 (18%)	4 (4%)	
	Prefer not to answer/Unknown	12 (18%)	44 (49%)	
Employment status	*Currently Employed*	51 (69%)	38 (43%)	**<0.001**
	Not Employed	23 (31%)	51 (57%)	
Migration Reason	*Better opportunity*	30 (48%)	18 (21%)	**0.002**
	Join family	29 (46%)	57 (66%)	
	Asylum/Refugee	4 (6%)	11 (13%)	
Age at Migration	*50years*	51 (72%)	29 (33%)	**<0.001**
	>50years	20 (28%)	59 (67%)	
Length of U.S. residency	*<10years*	21 (30%)	41 (47%)	**0.025**
	10years	50 (70%)	46 (53%)	
Diabetes		20 (27%)	27 (30%)	0.60
Hypertension		40 (55%)	47 (53%)	0.80
Depressive symptoms (mean, SD) (range 0–24)		4.2 (4.4)	2.4 (3.2)	**0.004**
Acculturation strategy	*Traditionalist*	7 (12%)	31 (37%)	**<0.001**
	Integrationist	52 (88%)	53 (63%)	
Discrimination	*Low*	22 (31%)	35 (40%)	0.25
	High	48 (69%)	52 (60%)	
Physical function (mean, SD) (range 22.1–61.9)		48.5 (6.1)	41.6 (8.3)	**<0.001**

Table 2a.

Relationship between Length of U.S. Residence and Physical function (n=127)

Characteristic		b(95%CI)
Length of U.S residency	*<10years*	*Reference*
	10 years	**−4.33** [**] **(−6.9, −1.76)**
Age		**−0.32** [***] **(−0.48, −0.16)**
Sex	*Female*	*Reference*
	Male	1.69 (−1.16, 4.56)

Characteristic		b(95%CI)
Marital Status	*Married/Cohabitating*	*Reference*
	Never married/widowed	−1.70 (−4.68, 1.274)
	Separated/Divorced	0.93 (−2.93, 4.78)
Education	*None/< HS*	*Reference*
	HS/GED equivalent	**4.79** * **(0.66, 8.92)**
	Associate/Technical training	**5.11** ** **(1.65, 8.56)**
	Bachelors or higher	**3.90** * **(0.28, 7.52)**
Data source	*study one*	*Reference*
	study two	−3.23 (−6.85, 0.39)
_cons		65.56 *** (54.77, 76.35)
R²		0.44

*
p < 0.05,
**
p < 0.01,
***
p < 0.001

Table 2b:

Relationship between Acculturation strategies and Physical function (n=127)

Characteristic		b(95%CI)
Acculturation Strategy	*Traditionalist*	*Reference*
	Integrationist	0.36 (−2.55, 3.27)
Age		**−0.34** *** **(−0.51, −0.18)**
Sex	*Female*	*Reference*
	Male	1.43 (−1.58, 4.43)
Marital Status	*Married/Cohabitating*	*Reference*
	Never Married/Widowed	−1.76 (−4.89, 1.36)
	Separated/Divorced	0.13 (−3.88, 4.13)
Education	*None/< HS*	*Reference*
	HS/GED equivalent	**4.79** * **(0.45, 9.13)**
	Associate/Tech. training	**3.61** * **(0.05, 7.17)**
	Bachelors or higher	2.59 (−1.16, 6.34)
Data source	*study one*	*Reference*
	study two	−3.01 (−6.81, 0.79)
_cons		65.17 *** (53.69,76.64)
R²		0.38

*
p < 0.05,
**
p < 0.01,
***
p < 0.001

Table 3:

Relationship between Discrimination and Physical function (n=127)

	Characteristic	b(95%CI)	b(95%CI)	b(95%CI)
		Model 1	**Model 2**	**Model 3**
Discrimination	*Low*	*Reference*	*Reference*	*Reference*
	High	−1.98 (−4.46, 0.50)	−1.74 (−4.21 0.72)	−1.95 (−4.45, 0.55)
Age		**−0.31**[***] **(−0.47, −0.15)**	**−0.29**[***] **(−0.45, −0.13)**	**−0.31**[***] **(−0.47, −0.15)**
Sex	*Female*	*Reference*	*Reference*	*Reference*
	Male	1.98 (−0.85, 4.81)	2.09 (−0.70 4.89)	1.93 (−0.93, 4.78)
Education	*None/< HS*	*Reference*	*Reference*	*Reference*
	HS/GED equivalent	**4.87**[*] **(0.74, 9.01)**	**4.73**[*] **(0.65, 8.81)**	**4.78**[*] **(0.61, 8.96)**
	Associate/Tech. training	**3.65**[*] **(0.22, 7.08)**	**4.24**[*] **(0.80, 7.68)**	3.51 (0−.01, 7.03)
	Bachelors or higher	3.07 (−0.59, 6.74)	3.44 (−0.19, 7.08)	2.95 (−0.79, 6.69)
Marital Status	*Married/ Cohabitating*	*Reference*	*Reference*	*Reference*
	Never Married/Widowed	−1.73 (−4.65, 1.20)	−1.54 (−4.43,1.34)	−1.67 (−4.62, 1.28)
	Separated/Divorced	0.92 (−2.83, 4.68)	1.36 (−2.37, 5.08)	0.91 (−2.86, 4.67)
Health Insurance	*Insured*	*Reference*	*Reference*	*Reference*
	Not Ensured	**5.37**[***]**(2.88, 7.87)**	**4.09**[**]**(1.33, 6.85)**	**5.39**[***]**(2.89, 7.89)**
Employment status	*Employed*	*Reference*	*Reference*	*Reference*
	Not Employed	**−3.08**[*]**(−5.92 −0.23)**	**−3.46**[*]**(−6.29, −0.62)**	**−3.13**[*]**(−6.0, −0.26)**
Data Source	*study one*	*Reference*	*Reference*	*Reference*
	study two	−2.28 (−5.85, 1.29)	−2.37 (−5.9, 1.15)	−2.22 (−5.82, 1.37)
Length of U.S residency	*< 10 years*		*Reference*	
	10 years		**−2.96**[*]**(−5.83, −.09)**	
Acculturation Strategy	Traditionalist			*Reference*
	Integrationist			0.53 (−2.22, 3.27)
_cons		62.64[***] (51.60, 73.67)	63.52[***] (52.60, 74.44)	62.21[***] (50.9, 73.51)
	R²	0.47	0.49	0.47

[*]
p < 0.05,

[**]
p < 0.01,

[***]
p < 0.001

References

Alecxih LMB (2010). Individuals living in the community with chronic conditions and Functional Limitations: a closer look. Office of the Assistant Secretary for Planning & Evaluation, United

States Department of Health and Human Services. https://aspe.hhs.gov/system/files/pdf/75961/closerlook.pdf

Alegria M (2009). The Challenge of Acculturation Measures: What are we missing? A commentary on Thomson & Hoffman-Goetz. Social Science & Medicine, 69(7), 996–998. 10.1016/j.socscimed.2009.07.006 [PubMed: 19664868]

Allen JD, Caspi C, Yangyr M, Leyva B, Stoddard AM, Tamers S, Tucker-Seeley RD, & Sorensen GC (2014). Pathways between acculturation and health behaviors among residents of low-income housing: The mediating role of social and contextual factors Social Science & Medicine 123, 26–36. 10.1016/j.socscimed.2014.10.034 [PubMed: 25462602]

Anderson M (2017). African Immigrant Population in U.S. Steadily Climbs Pew Research Center. https://www.pewresearch.org/fact-tank/2017/02/14/african-immigrant-population-in-u-s-steadily-climbs/

Barile JP, Thompson WW, Zack MM, Krahn GL, Horner-Johnson W, & Haffer SC (2012). Activities of daily living, chronic medical conditions, and health-related quality of life in older adults. The Journal of Ambulatory Care Management, 35(4), 292–303. 10.1097/JAC.0b013e31826746f5 [doi] [PubMed: 22955089]

Baugh R, & Witsman K (2017). US lawful permanent residents: 2015. Washington, DC: US Department of Homeland Security, Office of Immigration Statistics, 4 https://www.dhs.gov/sites/default/files/publications/Lawful_Permanent_Residents_2015.pdf

Bentley JP, Brown CJ, McGwin G Jr, Sawyer P, Allman RM, & Roth DL (2013). Functional status, life-space mobility, and quality of life: a longitudinal mediation analysis. Quality of Life Research, 22(7), 1621–1632. [PubMed: 23161329]

Berry JW (1992). Acculturation and adaptation in a new society. International Migration, 30(s1), 69–85.

Berry JW (2005). Acculturation: Living successfully in two cultures. International Journal of Intercultural Relations, 29, 697-698-712.

Blank RM, Dabady M, & Citro CF (Eds.). (2004). Measuring Racial Discrimination. The National Academies Press.

Brondolo E, Rahim R, Grimaldi SJ, Ashraf A, Bui N, & Schwartz JC (2015). Place of birth effects on self-reported discrimination: Variations by type of discrimination. International Journal of Intercultural Relations, 49, 212–222. [PubMed: 27647943]

Callahan CM, Unverzagt FW, Hui SL, Perkins AJ, & Hendrie HC (2002). Six-item screener to identify cognitive impairment among potential subjects for clinical research. Medical Care, 40(9), 771–781. 10.1097/01.MLR.0000024610.33213.C8 [doi] [PubMed: 12218768]

Case AD, & Hunter CD (2014). Cultural Racism-Related Stress in Black Caribbean Immigrants Examining the Predictive Roles of Length of Residence and Racial Identity. Journal of Black Psychology, 40(5), 410–423.

Commodore-Mensah Y, Ukonu N, Obisesan O, Aboagye JK, Agyemang C, Reilly CM, Dunbar SB, & Okosun IS (2016). Length of Residence in the United States is Associated with a Higher Prevalence of Cardiometabolic Risk Factors in Immigrants: A Contemporary Analysis of the National Health Interview Survey. Journal of the American Heart Association, 5(11), 10.1161/JAHA.116.004059. https://doi.org/e004059 [pii]

Commodore-Mensah Y, Matthie N, Wells J, Dunbar SB, Himmelfarb CD, Cooper LA, & Chandler RD (2017). African Americans, African Immigrants, and Afro-Caribbeans Differ in Social Determinants of Hypertension and Diabetes: Evidence from the National Health Interview Survey. Journal of Racial and Ethnic Health Disparities,1–8.

Commodore-Mensah Y, Selvin E, Aboagye J, Turkson-Ocran R, Li X, Himmelfarb CD, Ahima RS, & Cooper LA (2018). Hypertension, overweight/obesity, and diabetes among immigrants in the United States: an analysis of the 2010–2016 National Health Interview Survey. BMC Public Health, 18(1), 773. 10.1186/s12889-018-5683-3 [PubMed: 29925352]

Commodore-Mensah Y, Turkson-Ocran R, Nmezi NA, Nkimbeng M, Cudjoe J, Mensah DS, York S, Mossburg S, Patel N, & Adu E (2019). Commentary: Engaging African Immigrants in Research - Experiences and Lessons from the Field. Ethnicity & Disease, https://www.ethndis.org/edonline/index.php/ethndis/article/view/761

Commodore-Mensah Y, Ukonu N, Cooper LA, Agyemang C, & Himmelfarb CD (2017). The Association Between Acculturation and Cardiovascular Disease Risk in Ghanaian and Nigerian-born African Immigrants in the United States: The Afro-Cardiac Study. Journal of Immigrant and Minority Health 1–10. [PubMed: 26880029]

Dallo FJ, Booza J, & Nguyen ND (2015). Functional limitations and nativity status among older Arab, Asian, black, Hispanic, and white Americans. Journal of Immigrant and Minority Health / Center for Minority Public Health, 17(2), 535–542. 10.1007/s10903-013-9943-0 [doi]

Elo I, Mehta N, & Huang C (2008). Health of Native-born and Foreign-born Black Residents in the United States: Evidence from the 2000 Census of Population and the National Health Interview Survey. PARC Working Paper Series, https://repository.upenn.edu/parc_working_papers/17

Gubernskaya Z, Bean FD, & Van Hook J (2013). (Un)Healthy immigrant citizens: naturalization and activity limitations in older age. Journal of Health and Social Behavior, 54(4), 427–443. 10.1177/0022146513504760 [doi] [PubMed: 24311754]

Howrey BT, Al Snih S, Jana KK, Peek MK, & Ottenbacher KJ (2015). Stability and change in activities of daily living among older Mexican Americans. Journals of Gerontology Series A: Biomedical Sciences and Medical Sciences, 71(6), 780–786.

Koroukian SM, Schiltz N, Warner DF, Sun J, Bakaki PM, Smyth KA, Stange KC, & Given CW (2016). Combinations of chronic conditions, functional limitations, and geriatric syndromes that predict health outcomes. Journal of General Internal Medicine, 31(6), 630–637. [PubMed: 26902246]

Kroenke K, Strine TW, Spitzer RL, Williams JB, Berry JT, & Mokdad AH (2009). The PHQ-8 as a measure of current depression in the general population. Journal of Affective Disorders, 114(1–3), 163–173. 10.1016/j.jad.2008.06.026 [doi] [PubMed: 18752852]

Kunst JR, & Phillibert EN (2018). Skin-tone discrimination by Whites and Africans is associated with the acculturation of African immigrants in Norway. PloS One, 13(12), e0209084. [PubMed: 30543697]

Lewis TT, Cogburn CD, & Williams DR (2015). Self-reported experiences of discrimination and health: scientific advances, ongoing controversies, and emerging issues. Annual Review of Clinical Psychology, 11, 407–440.

Lum TY, & Vanderaa JP (2010). Health disparities among immigrant and non-immigrant elders: The association of acculturation and education. Journal of Immigrant and Minority Health, 12(5), 743–753. [PubMed: 19184599]

Mather M, Jacobsen L,A, & Pollard K,M (2015). Fact Sheet: Aging in the United States. Population Reference Bureau's Population Bulletin. https://www.prb.org/wp-content/uploads/2016/01/aging-us-population-bulletin-1.pdf

Mather M, Scommegna P, & Kilduff L (2019). Fact Sheet: Aging in the United States. Population Reference Bureau's Population Bulletin. https://www.prb.org/aging-unitedstates-fact-sheet/

Mays VM, & Cochran SD (2001). Mental health correlates of perceived discrimination among lesbian, gay, and bisexual adults in the United States. American Journal of Public Health, 91(11), 1869–1876. [PubMed: 11684618]

Melvin J, Hummer R, Elo I, & Mehta N (2014). Age patterns of racial/ethnic/nativity differences in disability and functional limitations in the United States. Demographic Research, 31, 497–510. 10.4054/DemRes.2014.31.17 [doi] [PubMed: 26893587]

National Center for Health Statistics. (2016). National Center for Health Statistics. National Health Interview Survey, 2010–2014. Public-use data file and documentation 2015. National Health Interview Survey, 2014.Public-use Data File and Documentation,

Njeru JW, Tan EM, Sauver JS, Jacobson DJ, Agunwamba AA, Wilson PM, Rutten LJ, Damodaran S, & Wieland ML (2016). High rates of diabetes mellitus, pre-diabetes and obesity among Somali immigrants and refugees in Minnesota: a retrospective chart review. Journal of Immigrant and Minority Health, 18(6), 1343–1349. [PubMed: 26416285]

Nkimbeng M, Turkson-Ocran R, Thorpe RJ Jr, Szanton SL, Cudjoe J, Taylor JL, & Commodore-Mensah Y (2019). Prevalence of functional limitations among foreign and US-born Black older adults: 2010–2016 National Health Interview Surveys. Ethnicity & Health, , 1–13.

Obisesan O, Kuo WH, Brunet M, Obisesan A, Akinola O, & Commodore-Mensah Y (2016). Predictors of Obesity Among Nigerian Immigrants in the United States. Journal of Immigrant and Minority Health / Center for Minority Public Health, 10.1007/s10903-016-0404-4 [doi]

O'Connor MY, Thoreson CK, Ricks M, Courville AB, Thomas F, Yao J, Katzmarzyk PT, & Sumner AE (2014). Worse Cardiometabolic Health in African Immigrant Men than African American Men: Reconsideration of the Healthy Immigrant Effect. Metabolic Syndrome and Related Disorders, 12(6), 347–353. 10.1089/met.2014.0026 [PubMed: 24814168]

Okafor MC, Carter-Pokras OD, & Zhan M (2014). Greater Dietary Acculturation (Dietary Change) Is Associated With Poorer Current Self-Rated Health Among African Immigrant Adults. Journal of Nutrition Education and Behavior, 46(4), 226–235. 10.1016/j.jneb.2013.11.015 [PubMed: 24581812]

Oza-Frank R, & Venkat Narayan KM (2010). Effect of length of residence on overweight by region of birth and age at arrival among US immigrants. Public Health Nutrition, 13(6), 868–875. 10.1017/S1368980009992084 [PubMed: 19943997]

Pascoe E,A, & Richman L., Smart. (2009). Perceived discrimination and health: a meta-analytic review. Psychological Bulletin, 135(4), 531. [PubMed: 19586161]

Pérez DJ, Fortuna L, & Alegria M (2008). Prevalence and correlates of everyday discrimination among US Latinos. Journal of Community Psychology, 36(4), 421–433. [PubMed: 19960098]

Ro A, & Gee GC (2012). Disability status differentials among Asian immigrants in the United States: The added dimensions of duration and age. Race and Social Problems, 4(2), 83–92. 10.1007/s12552-012-9069-3

Rose M, Bjorner JB, Gandek B, Bruce B, Fries JF, & Ware JE Jr (2014). The PROMIS Physical Function item bank was calibrated to a standardized metric and shown to improve measurement efficiency. Journal of Clinical Epidemiology, 67(5), 516–526. [PubMed: 24698295]

Ruiz S, Snyder LP, Rotondo C, Cross-Barnet C, Colligan EM, & Giuriceo K (2017). Innovative home visit models associated with reductions in costs, hospitalizations, and emergency department use. Health Affairs, 36(3), 425–432. [PubMed: 28264943]

Schwartz SJ, Unger JB, Zamboanga BL, & Szapocznik J (2010). Rethinking the concept of acculturation: implications for theory and research. American Psychologist, 65(4), 237.

Sewali B, Okuyemi KS, Askhir A, Belinson J, Vogel RI, Joseph A, & Ghebre RG (2015). Cervical cancer screening with clinic-based Pap test versus home HPV test among Somali immigrant women in Minnesota: a pilot randomized controlled trial. Cancer Medicine, 4(4), 620–631. 10.1002/cam4.429 [doi] [PubMed: 25653188]

Shankar A, & Hinds P (2017). Perceived discrimination: Associations with physical and cognitive function in older adults. Health Psychology, 36(12), 1126. [PubMed: 28639821]

Stuck AE, Walthert JM, Nikolaus T, Büla CJ, Hohmann C, & Beck JC (1999). Risk factors for functional status decline in community-living elderly people: a systematic literature review. Social Science & Medicine, 48(4), 445–469. 10.1016/S0277-9536(98)00370-0 [PubMed: 10075171]

Szanton SL, Xue Q, Leff B, Guralnik J, Wolff JL, Tanner EK, Boyd C, Thorpe RJ, Bishai D, & Gitlin LN (2019). Effect of a Biobehavioral Environmental Approach on Disability Among Low-Income Older Adults: A Randomized Clinical Trial. JAMA Internal Medicine, 179(2), 204–211. [PubMed: 30615024]

Tropp LR, Erkut S, Coll CG, Alarcon O, & Vazquez Garcia HA (1999). Psychological Acculturation: Development of a New Measure for Puerto Ricans on the U.S. Mainland. Educational and Psychological Measurement, 59(2), 351–367. 10.1177/00131649921969794 [doi] [PubMed: 21415932]

Tseng M, Wright DJ, & Fang CY (2015). Acculturation and dietary change among Chinese immigrant women in the United States. Journal of Immigrant and Minority Health, 17(2), 400–407. 10.1007/s10903-014-0118-4 [doi] [PubMed: 25281323]

U.S Equal Employment Opportunity Commission. (n.d.). Race/Color Discrimination. https://www.eeoc.gov/laws/types/race_color.cfm

Verbrugge LM, & Jette AM (1994). The disablement process. Social Science & Medicine (1982), 38(1), 1–14. [PubMed: 8146699]

Wakabayashi C (2010). Effects of immigration and age on health of older people in the United States. Journal of Applied Gerontology, 29(6), 697–719.

Walker JL, Harrison TC, Brown A, Thorpe RJ Jr, & Szanton SL (2016). Factors associated with disability among middle-aged and older African American women with osteoarthritis. Disability and Health Journal, 9(3), 510–517. 10.1016/j.dhjo.2016.02.004 [doi] [PubMed: 27052590]

Williams DR (2012). Measuring Discrimination Resource. https://scholar.harvard.edu/files/davidrwilliams/files/measuring_discrimination_resource_feb_2012_0_0.pdf

Williams DR, & Mohammed SA (2009). Discrimination and racial disparities in health: evidence and needed research. Journal of Behavioral Medicine, 32(1), 20–47. [PubMed: 19030981]

Williams DR, Yu Y, Jackson JS, & Anderson NB (1997). Racial differences in physical and mental health: Socio-economic status, stress and discrimination. Journal of Health Psychology, 2(3), 335–351. [PubMed: 22013026]

Williams IC, Clay OJ, Ovalle F, Atkinson D, & Crowe M (2020). The role of perceived discrimination and other psychosocial factors in explaining diabetes distress among older African American and white adults. Journal of Applied Gerontology, 39(1), 99–104. [PubMed: 29291677]

World Health Organization, & U.S National Institute of Aging. (2011). Global Health and Ageing. http://www.who.int/ageing/publications/global_health.pdf?ua=1

Table 1.

Characteristics of African Immigrants Older Adults with Physical function Limitations

		All	Traditionalist	Integrationist	p value
Mean(±SD)/N (%)		165	38	105	
Age (mean, SD)		61.9 (±8.0)	64.2 (±9.3)	61.4 (±7.9)	0.070
Data collection location	*Home*	38 (23.0%)	15 (39.5%)	23 (21.9%)	0.095
	Community based organization	99 (60.0%)	16 (42.1%)	62 (59.0%)	
	Mailed-in/Online	28 (17.0%)	7 (18.4%)	20 (19.0%)	
Sex	*Female*	101(61.2%)	30 (78.9%)	63 (60.0%)	**0.036**
	Male	64 (38.8%)	8 (21.1%)	42 (40.0%)	
Marital Status	*Married/cohabitating*	59 (36.0%)	15 (39.5%)	34 (32.7%)	**0.009**
	Single (never married/widowed)	50 (30.5%)	18 (47.4%)	29 (27.9%)	
	Separated/Divorced	55 (33.5%)	5 (13.2%)	41 (39.4%)	
Level of Education	*No formal Ed/<HS*	49 (30.6%)	20 (52.6%)	23 (22.8%)	**0.006**
	HS graduate/GED equivalent	22 (13.8%)	5 (13.2%)	14 (13.9%)	
	Associate &Technical training	42 (26.3%)	7 (18.4%)	28 (27.7%)	
	Bachelors/Masters/Doctorate	47 (29.4%)	6 (15.8%)	36 (35.6%)	
Health Insurance	*Yes*	95 (59.7%)	21 (55.3%)	62 (62.0%)	0.47
	No	64 (40.3%)	17 (44.7%)	38 (38.0%)	
Income	*$0– 39,999*	57 (37.0%)	12 (32%)	35 (37%)	0.093
	$40,000– 80,000	25 (16.2%)	4 (11%)	17 (18%)	
	$80,000	16 (10.4%)	2 (5%)	13 (14%)	
	Prefer not to answer/Unknown	56 (36.4%)	20 (53%)	29 (31%)	
Employment status	*Currently Employed*	89 (54.6%)	18 (47.4%)	55 (53.4%)	0.52
	Not Employed	74 (45.4%)	20 (52.6%)	48 (46.6%)	
Migration Reason	*Better opportunity*	48 (32.2%)	8 (22%)	35 (37%)	**0.006**
	Join family	86 (57.7%)	28 (78%)	47 (49%)	
	Asylum/Refugee	15 (10.1%)	0 (0%)	13 (14%)	
Age at migration	*50years*	80 (50.3%)	12 (31.6%)	58 (56.9%)	**0.008**
	>50years	79 (49.7%)	26 (68.4%)	44 (43.1%)	
Length of U.S residency	*<10years*	62 (39.2%)	20 (52.6%)	35 (34.7%)	0.053
	10years	96 (60.8%)	18 (47.4%)	66 (65.3%)	
Diabetes		47 (28.7%)	12 (31.6%)	30 (28.8%)	0.75
Hypertension		87 (53.7%)	22 (57.9%)	54 (52.4%)	0.56
Depressive symptoms (range 0–24)		3.2 (±3.9)	2.4 (±3.3)	3.2 (±3.9)	0.26
Discrimination	*Low*	57 (36.3%)	14 (38.9%)	39 (38.6%)	0.98
	High	100 63.7%	22 (61.1%)	62 (61.4%)	
Physical function T-score (range 22.1–61.9)		44.8 (±8.1)	42.0 (±8.4)	45.4 (±8.2)	**0.029**

Table 2a.

Relationship between Length of U.S. Residence and Physical function (n=154)

Characteristic		b(95%CI)
Length of U.S residency	*<10years*	*Reference*
	10 years	**−2.62*(−5.01, −0.23)**
Age		**−0.30***(−0.45, −0.16)**
Sex	*Female*	*Reference*
	Male	1.06 (−1.33, 3.44)
Marital Status	*Married/Cohabitating*	*Reference*
	Never married/widowed	−1.81(−4.61, 0.98)
	Separated/Divorced	1.36(−1.39, 4.13)
Education	*None/< HS*	*Reference*
	HS/GED equivalent	**5.98**(2.17, 9.79)**
	Associate/Technical training	**6.08***(2.79, 9.36)**
	Bachelors or higher	**5.02**(1.60, 8.43)**
_cons		61.14***(51.12, 71.15)
R^2		0.34

Table 2b:

Relationship between Acculturation strategies and Physical function(N=139)

Characteristic		b(95%CI)
Acculturation Strategy		
	Traditionalist	*Reference*
	Integrationist	0.02(−2.76, 2.80)
Age, years		**−0.34***(−0.49, −0.19)**
Sex	*Female*	*Reference*
	Male	2.38(−0.25, 5.02)
Marital Status	*Married/Cohabitating*	*Reference*
	Never Married/Widowed	−1.35(−4.29, 1.59)
	Separated/Divorced	2.25(−0.82, 5.32)
Education	*None/< HS*	*Reference*
	HS/GED equivalent	**5.11*(1.06, 9.15)**
	Associate/Tech. training	**4.62**(1.26, 7.98)**
	Bachelors or higher	**3.73*(0.26, 7.19]**
_cons		61.51***(50.82, 71.19)
R^2		0.36

Table 3:

Relationship between Discrimination and Physical function

Characteristic		Model 1	Model 2	Model 3
	n	150	144	130
		b(95%CI)	b(95%CI)	b(95%CI)
Discrimination	*Low*	*Reference*	*Reference*	*Reference*
	High	**−2.51** *(−4.84, −0.17)*	−2.18 (−4.58, 0.22)	−2.34 (−4.81, 0.13)
Age		**−0.33** ***(−0.48, −0.18)*	**−0.30** ***(−0.46, −0.15)*	**−0.33** ***(−0.49, −0.18)*
Sex	*Female*	*Reference*	*Reference*	*Reference*
	Male	1.49 (−0.82, 3.81)	1.41 (−1.01, 3.84)	2.58 (.00, 5.16)
Education	*None/< HS*	*Reference*	*Reference*	*Reference*
	HS/GED equivalent	**5.70** **(1.96, 9.44)*	**5.79** **(1.86, 9.72)*	**5.22** *(1.14, 9.29)*
	Associate/Tech. training	**4.24** **(1.12, 7.37)*	**4.89** **(1.49, 8.31)*	**4.14** *(0.73, 7.55)*
	Bachelors or higher	**3.41** *(0.13, 6.69)*	**3.88** *(0.289, 7.48)*	**3.61** *(0.07, 7.14)*
Marital Status	*Married/Cohabitating*	*Reference*	*Reference*	*Reference*
	Never Married/Widowed	−1.99 (−4.70, 0.73)	−1.64 (−4.42, 1.15)	−1.49 (−4.29, 1.31)
	Separated/Divorced	1.08 (−1.63, 3.78)	1.47 (−1.37, 4.30)	2.18 (−0.82, 5.18)
Health Insurance	*Insured*	*Reference*	*Reference*	*Reference*
	Not Ensured	**4.18** **(1.86, 6.51)*	**3.39** *(0.68, 6.12)*	**5.59** ***(3.16, 8.03)*
Employment status	*Employed*	*Reference*	*Reference*	*Reference*
	Not Employed	**−3.60** **(−6.28, −0.92)*	**−3.51** *(−6.31, −0.71)*	**−3.42** *(−6.19, −0.64)*
Length of U.S residency	*< 10 years*		*Reference*	
	10 years		−1.68 (−4.51, 1.15)	
Acculturation Strategy	*Traditionalist*			*Reference*
	Integrationist			**0.32 (2.38, 3.03)**
_cons		63.29(52.83, 73.74)	62.32 (51.38, 73.26)	61.77(50.64, 72.91)
R^2		0.42	0.41	0.49

*
p < 0.05,

**
p < 0.01,

***
p < 0.001