Allostatic Load in Foreign-Born and US-Born Blacks: Evidence From the 2001–2010 National Health and Nutrition Examination Survey

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There is growing interest in improving population health because Healthy People 2020 and the Patient Protection and Affordable Care Act include important provisions to reduce health disparities.[1,2] Recent research suggests that certain racial/ethnic groups in the United States, particularly non-Hispanic Blacks, have higher rates of morbidity and all-cause mortality than do Whites. However, non-Hispanic Blacks are a heterogeneous group that includes a growing population of immigrants from a variety of countries and cultural backgrounds. Recent estimates suggest the foreign-born segment of the Black population has almost tripled over the past 3 decades—with the majority migrating from the Caribbean and Africa—and represents roughly 8% of the Black population.[3,4] Despite this marked increase, little is known about the health of foreign-born Blacks.

Previous research suggests that Caribbean and African immigrants differ from their US-born counterparts in various physical[5–8] and mental health indicators.[9] Some research suggests that foreign-born Blacks have better health outcomes than do US-born Blacks because of the healthy immigrant effect.[10,11] The healthy immigrant effect posits that immigrants have healthier lifestyles in their home countries, are among the healthiest from their home country, and are the group most willing and able to endure the stressors associated with immigration, therefore placing them at a health advantage. However, the health advantage declines with increased time spent in the United States, as immigrants adapt to the US sociocultural environment.[10] Research suggests Caribbean and African immigrants have worse health over time because they have higher levels of psychological stress related to immigration and adjusting to new sociocultural environments.[9] Additionally, the impact of exposure to racism in the United States may be particularly stressful for

Objectives. We tested whether the immigrant health advantage applies to non-Hispanic Black immigrants and examined whether nativity-based differences in allostatic load exist among non-Hispanic Blacks.

Methods. We used pooled data from the 2001–2010 National Health and Nutrition Examination Survey to compare allostatic load scores for US-born (n = 2745) and foreign-born (n = 152) Black adults. We used multivariate logistic regression techniques to assess the association between nativity and high allostatic load scores, controlling for gender, age, health behaviors, and socioeconomic status.

Results. For foreign-born Blacks, length of stay and age were powerful predictors of allostatic load scores. For older US-born Blacks and those who were widowed, divorced, or separated, the risk of high allostatic load was greater.

Conclusions. Foreign-born Blacks have a health advantage in allostatic load. Further research is needed that underscores a deeper understanding of the mechanisms driving this health differential to create programs that target these populations differently. (*Am J Public Health*. Published online ahead of print January 20, 2015: e1–e7. doi:10.2105/AJPH.2014.302285)

immigrants from regions of the world where they were a demographic majority.[8,9]

To measure the deleterious effects of stress on the body, the concept of allostatic load has been introduced as a unique approach to understanding the underlying biological processes that might explain health vulnerability. Allostatic load accounts for the cumulative impact of physiological responses to acute, chronic, or long-term psychosocial stressors generated by social conditions that continuously activate hormonal responses to stressful conditions. Prolonged activation of these physiological systems is thought to place persons at risk for the development for both physical and mental disorders.[12,13] The literature on allostatic load suggests that overexposure to adverse conditions while adapting to US culture can create a buildup of stressors endemic to the immigrant experience, particularly for immigrants of color.

Some studies document the deleterious effects for foreign-born populations of psychosocial stress on the body and dysregulation of physiological systems known to protect the individual from disease.[14] Much of this research

has focused on Hispanics, partly because they are one of the largest immigrant ethnic groups, there is available survey data, and there is scientific interest in the Hispanic health paradox.[15,16] This paradox—that Hispanics exhibit better health outcomes than do non-Hispanic Whites despite their lower than expected socioeconomic status—has been challenged in various studies in which time in the United States has been shown to be the predictor that is most associated with health declines.[17] Kaestner et al.[18] found that with increased time in the United States, the probability of having a high allostatic load score increased for foreign-born Mexicans. Peek et al.[19] reported that among foreign-born Mexicans, those who had lived in the United States for more than 10 years were more likely to have high allostatic load scores. In this way, allostatic load offers a viable reason for the health decline among immigrants but has not been extensively studied in foreign-born Black populations.

The only study to investigate the association between allostatic load and chronic health conditions for a population of Latinos that can identify themselves as Black or of African

descent[20] found that increasing allostatic load scores were significantly associated with abdominal obesity, hypertension, diabetes, self-reported cardiovascular disease, and arthritis for Puerto Ricans.[21] However, to our knowledge, no study has examined the relationship between nativity and allostatic load among US- and foreign-born Blacks. Testing this hypothesis will provide knowledge about whether allostatic load operates in a similar way for this understudied population as evidenced in the Latino immigrant literature. We used the 2001–2010 National Health and Nutrition Examination Survey (NHANES)—one of the largest surveys designed to assess the health and nutritional status of adults residing in the United States—to examine nativity-based differentials in allostatic load. On the basis of previous research on immigrant health, we expected to observe a health advantage in allostatic load for foreign-born over US-born Blacks similar to what has been documented in studies focused on Mexican-born individuals.

METHODS

We used pooled data from the 2001–2010 NHANES to examine the association between nativity and allostatic load among foreign- and US-born Blacks. NHANES uses a stratified, multistage probability sample to provide national estimates of the nutritional status and health for the civilian, noninstitutionalized population of the United States.[22] Our sample included respondents who were medically examined and had laboratory tests. We excluded pregnant women and respondents younger than aged 20 years from the analysis. NHANES denotes the variable for race/ethnicity by combining individuals' responses to questions on Hispanic origin and race. The full analytical sample included 2745 US-born Blacks and 152 foreign-born Blacks. We analyzed data using SAS 9.2.[23] We weighted descriptive statistics and logistic regressions using the mobile examination centers survey weight provided by NHANES to account for the complex sampling design of pooled data.

Measures

Independent variables. We measured nativity as a dichotomous variable indicating whether an individual was born in or outside the United

States (1 = foreign born; 0 = US born). NHANES defines length of time in the United States in years as a variable with 9 categories. Grounded in theoretical guidance from studies on immigration and health,[16,24] we recoded this variable into 3 levels (1 = < 5 years; 2 = 5–19 years; 3 = ≥20 years). Age was a continuous variable that we defined as participants' age in years at the time of the screening interview for the multivariate analyses. We defined gender on the basis of self-reported information on whether a respondent was a man or a woman (1 = woman; 0 = man). We measured education as a 4-level categorical variable (1 = < high school; 2 = high school diploma or general equivalency diploma; 3 = > high school diploma, some college, or an associate's degree; 4 = ≥college degree).

NHANES defines the poverty-income ratio (PIR) as a ratio of family income to the federal poverty level on the basis of family size in a calendar year with values ranging from 0 to 5. We coded values of 4 and above as 5 to protect individuals' anonymity. If the family income value was reported as a range, we used the midpoint of the range. If the family income data were missing, we did not compute the PIR values. According to the 2006 Department of Health and Human Services' poverty guidelines, for a family of 4, the federal poverty level was $20 000. Therefore, a PIR value of 1 is 100% of the federal poverty level, a value of 2 is 200% of the federal poverty level, and so forth. We recoded this variable into 2 categories: between 0.00 and 2.99, and 3.00 and greater to reflect individuals who were at or below $59 800 and those who were at or above $59 801. In preliminary analyses, we found that compared with the high-income group (i.e., > $59,801), none of the other PIR categories were statistically significant with high allostatic load. As high income is generally associated with a lower risk of high allostatic load, we decided to recode the variable to assess the relationship between individuals who are not in a high-income group to individuals who are in a high-income group and have high allostatic load in this sample. We recoded marital status into a 3-level categorical variable (1 = never married; 2 = married or living with partner; 3 = widowed, divorced, or separated). We used a question asking about the average number of cigarettes smoked per day in the past 30 days to determine current smokers and current nonsmokers. We defined current

nonsmokers as those who had never smoked at least 100 cigarettes in their lifetime and did not smoke at the time of the interview. We designated individuals who smoked at least 100 cigarettes in their lifetime and currently smoked as current smokers (1 = smoker; 0 = nonsmoker).

Dependent variable. We constructed the dependent variable from 8 biomarkers (i.e., systolic blood pressure, diastolic blood pressure, 60-second pulse, c-reactive protein, high-density lipoprotein, total cholesterol, creatinine clearance, and serum albumin) that represent dysregulation of physiological systems known to protect the individual from disease risk. These biomarkers are heavily weighted toward the metabolic and cardiovascular regulatory systems but are grounded on the theoretical guidance of previous allostatic load studies that used these parameters because of data availability.[13,25–27] We determined a high threshold for each biomarker on the basis of clinical recommendations of health risk. We used the 75th and 25th percentile to categorize respondents at greater risk of developing disease relative to the rest of the sample. We defined a high threshold as below the 25th percentile for albumin and high-density lipoprotein and above the 75th percentile for the other biomarkers. Systolic and diastolic blood pressures were an average of 2 readings conducted by trained medical personnel.

We assigned individuals with a reading beyond the threshold for each biomarker 1 point for that particular biomarker. We defined individuals who reported taking medication for hypertension or high cholesterol as high risk when designating points for blood pressure and total cholesterol. We summed allostatic load scores for individuals with a score for at least 7 of the 8 biomarkers for a maximum score of 8. A higher allostatic load score is an indication of poorer health. We defined high allostatic load score as a total allostatic load score of 4 or above because previous research suggests that group differences in morbidity and mortality are observed when allostatic load scores reach above 3 or 4.[28,29] We dichotomized the variable (high allostatic load score = 1; low allostatic load score = 0).

Data Analysis

We stratified the data by nativity and allostatic load and conducted a χ^2 test and t test to

examine the distribution of each variable. As recommended by NHANES, we have reported the P value corresponding to the Rao-Scott χ^2 statistic. We employed multivariate logistic regression models to assess the best predictive association between nativity and high allostatic load. We tested separate models for foreign- and US-born Blacks to compare the factors associated with high allostatic load scores for the 2 populations. For the foreign-born analysis, model 1 included time spent in the United States; model 2 added age, gender, and marital status; and model 3 included PIR and education. The full model, model 4, introduced cigarette smoking. For the US-born analysis, model 1 included age, gender, and marital status; model 2 introduced PIR and education; and the final model, model 3, included cigarette smoking. We were also interested in examining whether high allostatic load scores differed between foreign- and US-born Blacks depending on age group. Therefore we conducted predicted probabilities of high allostatic load scores over age by nativity. We tested interactions between nativity and education and between PIR and smoking status but did not find them to be significant; we have not reported them in the tables.

RESULTS

Tables 1 and 2 show the bivariate stratified statistics for the independent and dependent variables by nativity and allostatic load. Table 1 indicates that the sample was advantaged by women for both foreign- and US-born Blacks. The mean age was 40 years for foreign-born Blacks and 41 years for US-born Blacks. Among those who were foreign born, a quarter had lived in the United States for less than 5 years, 37% had lived in the United States between 5 and 19 years, and 37% had lived in the United States for more than 20 years. The majority (85%) of foreign-born Blacks and 67% of US-born Blacks were nonsmokers. More than half of the foreign-born Blacks and 44% of the US-born Blacks were married or living with a partner. More US-born Blacks were unmarried (31%) than were foreign-born Blacks (28%). A larger proportion of foreign-born Blacks lived below 299% of the federal poverty than did US-born Blacks. Close to a third of the foreign-born Blacks and 14% of

TABLE 1—Weighted Descriptive Statistics for US- and Foreign-Born Blacks, by Nativity: National Health and Nutrition Examination Survey, United States, 2001–2010

Characteristic	Foreign-Born (n = 152), %	US-Born (n = 2745), %	P
Gender			.63
Men	49.25	47.41	
Women	50.75	52.59	
Mean age, y	40.00	41.00	.44
Length of US residence[a]			
< 5 y	25.23	NA	
5–19 y	37.45	NA	
≥ 20 y	37.32	NA	
Cigarette smoking status			≤ .001
Current nonsmoker	85.57	66.84	
Current smoker	14.43	33.16	
Marital status			.08
Unmarried	29.23	33.35	
Married or living with partner	53.54	44.57	
Divorced, separated, or widowed	17.24	22.08	
Poverty–income ratio			.31
≤299% federal poverty level[b]	72.15	67.77	
≥300% federal poverty level	27.85	32.23	
Education			≤ .001
< high school or no diploma	19.91	26.47	
High school diploma	16.02	26.46	
> high school, some college, or associate's degree	30.29	32.97	
≥college degree	33.78	14.10	
Allostatic load,[c] mean	2.14	2.42	

Note. NA = not applicable.
[a]Question was asked to foreign-born participants only.
[b]As determined by the Department of Health and Human Services in 2006.
[c]Total of 8 biomarkers (systolic blood pressure, diastolic blood pressure, 60-second pulse, c-reactive protein, high-density lipoprotein, total cholesterol, creatinine clearance, and serum albumin) that represent dysregulation of physiological systems known to protect the individual from disease risk. We assigned individuals with a reading beyond the threshold for each biomarker 1 point for that particular biomarker. We defined individuals who reported taking medication for hypertension or high cholesterol as high risk when designating points for blood pressure and total cholesterol.

the US-born Blacks had a college degree or more. Among foreign-born Blacks 18.97% and among the US-born Blacks 26.84% had a high allostatic load score.

As shown in Table 2, a larger proportion of US-born Blacks had a high allostatic load score. Among foreign-born Blacks, a larger percentage (25.84%) with high allostatic load scores were those who had lived in the United States for more than 20 years. Of the foreign-born Blacks, those who had lived in the United States for less than 5 years were the largest proportion of those with low allostatic load scores (Table 2). A larger proportion of those who

were married, widowed, divorced, separated, or living with a partner had high allostatic load scores than did those who were never married. We also observed education differences in allostatic load. We found larger proportions of high allostatic load among those with lower levels of education.

Multivariate logistic regression models (not shown) indicated that foreign-born Blacks were less likely to have a high allostatic load score than were US-born Blacks (odds ratio [OR] = 0.62; 95% confidence interval [CI] = 0.45, 0.86) after controlling for age, gender, PIR, marital status, education, and smoking.

TABLE 2—Weighted Sociodemographic and Behavior Characteristics Among US- and Foreign-Born Blacks, by Allostatic Load Score: National Health and Nutrition Examination Survey, United States, 2001–2010

Characteristic	Allostatic Load Score ≥ 4 (n = 897), %	Allostatic Load Score < 4 (n = 2000), %	P
Location of birth			≤.001
Foreign-born	18.97	81.03	
US-born	26.84	73.16	
Gender			.83
Men	26.61	73.39	
Women	26.22	73.78	
Length of US residence (n = 152)[a]			≤.001
< 5 y	8.56	91.44	
5–19 y	20.79	79.21	
≥ 20 y	25.84	74.16	
Cigarette smoking status			.11
Current nonsmoker	27.15	72.85	
Current smoker	24.83	75.17	
Marital status			≤ .001
Never married	15.65	84.35	
Married or living with partner	26.07	73.93	
Widowed, divorced, or separated	43.43	56.57	
Poverty-income ratio			.39
≤299% federal poverty level[b]	25.93	74.07	
≥300% federal poverty level	27.42	72.58	
Education			.05
< high school or no diploma	30.42	69.58	
High school diploma	24.66	75.34	
> high school, some college, or associate's degree	25.39	74.61	
≥college degree	24.69	75.31	

Note. Allostatic load was calculated from a total of 8 biomarkers (systolic blood pressure, diastolic blood pressure, 60-second pulse, c-reactive protein, high-density lipoprotein, total cholesterol, creatinine clearance, and serum albumin) that represent dysregulation of physiological systems known to protect the individual from disease risk. We assigned individuals with a reading beyond the threshold for each biomarker 1 point for that particular biomarker. We defined individuals who reported taking medication for hypertension or high cholesterol as high risk when designating points for blood pressure and total cholesterol.
[a]Question was asked to foreign-born participants only.
[b]As determined by the Department of Health and Human Services in 2006.

However when we ran separate logistic regression models for the foreign- and US-born Blacks (Table 3) and compared ORs, we were able to discern how various predictors were associated with allostatic load that varied by nativity.

For foreign-born Blacks, time in the United States proved to be a powerful predictor of allostatic load scores. Individuals who lived in the United States for less than 5 years had a 73% lower odds of having a high allostatic load score than did individuals who had lived in the United States for 20 or more years (OR = 0.27; 95% CI = 0.18, 0.40; model 1). This effect persisted when age, gender, and marital status were entered into the model (OR = 0.54; 95% CI = 0.34, 0.86; model 2). Moreover, older immigrants were more likely to have high allostatic load scores (OR = 1.05; 95% CI = 1.02, 1.08). However, the effect of time in the United States on the odds of high allostatic load disappeared when education and PIR were entered into the model. Lower educational attainment proved to be protective of high allostatic load for foreign-born Blacks. The predicted odds of high allostatic load was 83% lower (OR = 0.17; 95% CI = 0.09, 0.35) for those with a high school diploma and 54% lower (OR = 0.46; 95% CI = 0.22, 0.92) for respondents with less than high school than for immigrants with a college degree or above. In model 4, age and education remained significant predictors of high allostatic load for foreign-born Blacks.

For our analysis with US-born Blacks, the predictors of high allostatic load were different (Table 3). Older US-born Blacks were more likely to have higher allostatic load scores and those widowed, divorced, or separated had higher allostatic load scores than did those who were married (OR = 1.21; 95% CI = 1.01, 1.45; model 1). Although cigarette smoking is detrimental to health, results indicate that the predicted odds of high allostatic load was 21% lower for US-born current smokers (model 3).

TABLE 3—Multivariate Logistic Regression Models Predicting High Allostatic Load Scores Among US- and Foreign-Born Blacks: National Health and Nutrition Examination Survey, United States, 2001–2010

Characteristic	Foreign-Born Blacks (n = 152)				US-Born Blacks (n = 2745)		
	Model 1, OR (95% CI)	Model 2, OR (95% CI)	Model 3, OR (95% CI)	Model 4, OR (95% CI)	Model 1, OR (95% CI)	Model 2, OR (95% CI)	Model 3, OR (95% CI)
Length of US residence[a]							
≥ 20 y (Ref)	1.00	1.00	1.00	1.00			
5–19 y	0.75 (0.42, 1.36)	1.52 (0.86, 2.71)	1.72 (0.89, 3.33)	1.71 (0.89, 3.31)			
< 5 y	0.27* (0.18, 0.40)	0.54* (0.34, 0.86)	0.78 (0.41, 1.48)	0.78 (0.41, 1.48)			
Age, y		1.05 (1.02, 1.08)*	1.06* (1.04, 1.09)	1.06* (1.04, 1.09)	1.06* (1.06, 1.07)	1.06* (1.06, 1.07)	1.06* (1.06, 1.07)
Gender							
Women (Ref)		1.00	1.00	1.00	1.00	1.00	1.00
Men		1.12 (0.56, 2.25)	1.02 (0.54, 1.92)	1.03 (0.50, 2.12)	1.17 (0.95, 1.44)	1.20 (0.95, 1.43)	1.2 (0.99, 1.50)
Marital status							
Married or living with partner (Ref)		1.00	1.00	1.00	1.00	1.00	1.00
Never married		1.20 (0.63, 2.34)	1.40 (0.74, 2.64)	1.41 (0.74, 2.67)	0.93 (0.72, 1.21)	0.93 (0.72, 1.21)	0.94 (0.73, 1.22)
Widowed, divorced, or separated		2.38 (1.00, 5.66)	2.08 (0.80, 5.41)	2.09 (0.8, 5.44)	1.21* (1.01, 1.45)	1.21* (1.01, 1.45)	1.21* (1.01, 1.46)
Poverty-income ratio							
≥ 300% federal poverty level[b] (Ref)			1.00	1.00		1.00	1.00
≤ 299% federal poverty level			0.65 (0.29, 1.50)	0.65 (0.29, 1.50)		1.13 (0.92, 1.38)	1.16 (0.95, 1.43)
Education							
≥College degree (Ref)			1.00	1.00		1.00	
> high school, some college, or associate's degree			1.02 (0.48, 2.17)	1.02 (0.49, 2.13)		1.11 (0.79, 1.54)	1.14 (0.82, 1.59)
High school diploma			0.17* (0.09, 0.35)	0.17* (0.09, 0.35)		0.96 (0.68, 1.36)	1.00 (0.71, 1.41)
< high school or no diploma			0.46* (0.22, 0.92)	0.46* (0.22, 0.95)		0.88 (0.60, 1.28)	0.93 (0.64, 1.36)
Cigarette smoking							
Current nonsmoker (Ref)				1.00			1.00
Current smoker				0.94 (0.54, 1.63)			0.79* (0.67, 0.94)

Note. CI = confidence interval; OR = odds ratio.
[a]Question was asked to foreign-born participants only.
[b]As determined by the Department of Health and Human Services in 2006.
*P < .05.

However, we found age and marital disruption to be significant predictors of high allostatic load for this population.

Figure 1 shows predicted probabilities of high allostatic load scores over age by nativity. Foreign- and US-born Blacks experienced an increase in high allostatic load as age increased. However, the increase was much steeper for US- than for foreign-born Blacks. Most interesting is that at early ages, foreign- and US-born Blacks have similar allostatic load scores but differences in allostatic load begin to widen starting in middle age. However, the interaction between nativity and age in predicting allostatic load (not shown) was statistically significant for the youngest age group but not for the other age groups.

DISCUSSION

In a nationally representative sample of US- and foreign-born Blacks, we found that time in the United States was a significant predictor of high allostatic load scores for foreign-born Blacks residing in the United States. However, when we controlled for the socioeconomic status variables, the effect of time in the United States on the odds of high allostatic load disappeared. Conversely, the US-born Blacks had higher allostatic load scores if they experienced marital disruption. However, for both populations, older respondents had higher allostatic load scores. This finding is consistent with research that found increased allostatic load was associated with increased age because cumulative adversity over the life-span is associated with multisystem dysregulation.[24]

Foreign- and US-born Blacks in our sample had fairly different sociodemographic profiles. A larger proportion of foreign- than US-born Blacks was below the 299% poverty line. By contrast, we found that more than twice as many foreign- than US-born Blacks had a college degree or more. The health advantages of educational attainment are well documented for the US population, showing education's protective effects, particularly at higher levels of attainment.[30,31] In our analysis, lower education was a confounder in the models for foreign-born Blacks. This finding contradicts
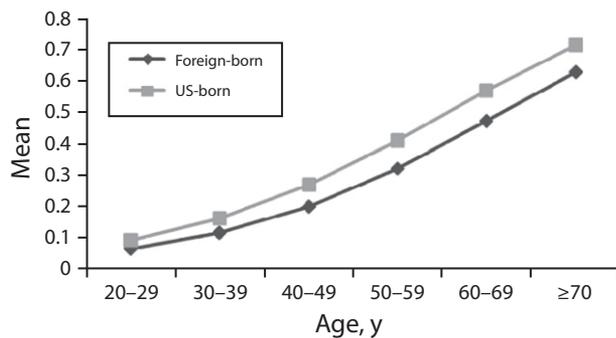
FIGURE 1—Predicted probabilities of high allostatic load by age for US- and foreign-born Blacks: National Health and Nutrition Examination Survey, United States, 2001–2010.

trends for the general population in which lower education is associated with higher risk for disease and research that suggests African immigrants' superior health may be related to the fact that they are on average more highly educated than are US-born Blacks and Whites.[32] In this case, despite their higher educational attainment, a health paradox is apparent for this population that is similar to the well-researched Hispanic health paradox.[16]

We also found that smoking had a protective effect on high allostatic load for US-born Blacks. Compared with nonsmokers, current smokers were at a 20% lower risk of high allostatic load. Several studies suggest that unhealthy behaviors such as heavy drinking and smoking play a stress-buffering role for non-Hispanic Blacks and protect against mental health vulnerability but may have deleterious consequences for physical health.[33,34] Our findings challenge previous studies[35] that suggest elevated rates of physical health among Blacks may be accounted for by unhealthy behaviors because smoking may not be a viable pathway that increases the incidence of high allostatic load.

Acculturation and Allostatic Load

We found that foreign-born Blacks who had been in the United States for less than 5 years had a decreased risk of high allostatic load. Although this finding was no longer significant after accounting for important sociodemographic variables, with the exception of age, this finding is consistent with the acculturation hypothesis. Drawn primarily from Hispanic samples, several key studies document the

negative effects that length of time in the United States has on the health of immigrants. These studies conclude that immigrant health deteriorates with increased US residence and an increase in engagement in unhealthy behaviors such as alcohol and tobacco use and an unhealthy diet.[36] To our knowledge, only 2 studies have examined the relationship between length of stay in the United States and allostatic load. Both studies report positive associations: more time spent in the United States is associated with high allostatic load scores.[18,19] We have made a significant contribution to the literature by highlighting that the healthy immigrant effect or health paradox does exist for Black immigrants but dissipates as they adapt to the US cultural context. This health deterioration may be explained by overexposure to race-related stress and racism, which are more powerful predictors of health declines than are diet and adverse health behaviors.[37,38]

Limitations

Several limitations of the data are worth mentioning. First, the data were cross-sectional, which limited our ability to make meaningful statements about causality. Second, the NHANES data are derived from self-reported information, which is subject to information bias. Third, because of the small number of foreign-born Blacks, we were not able to ascertain the home country of foreign-born Blacks in our sample. Because experiences with untoward stress are directly related to high allostatic load, our foreign-born sample might internalize stress differently depending on

country of origin.[39] Blacks who emigrate from countries where they are in the majority may experience and internalize race-related stress once they arrive and attempt to rebuild their lives in the United States. For example, for African Black immigrants, the stress of racism may be particularly virulent and pathogenic, whereas European-born Blacks may have been exposed to racism in their home countries and normally come to the United States well educated with social resources essential for buffering the deleterious effects of stress on health.[40] This also restricts our ability to address the socioeconomic variability among Black immigrants from various regions that may have a direct impact on health. More research is needed that disaggregates the foreign-born Black population and investigates implications for health advantages and disadvantages.

Conclusions

Our analyses reveal important findings by nativity and allostatic load. The results suggest that the health advantages of foreign-born Blacks are contingent on important factors that are similar to other immigrant groups such as Latinos but differ on the basis of particular demographics and socioeconomic status that are different from those of US-born Blacks. In any case, investigators should consider the larger picture when attempting to uncover which factors contribute to health deterioration for different immigrant populations. Future questions should challenge how multiple statuses interact with immigrant status (e.g., gender) to better understand the unique contexts and mechanisms that operate to compromise or promote health. Further, although allostatic load is widely used as a tool to examine the effects of chronic stress on the body, future research should test whether the individual biomarkers produce comparable results with the cumulative allostatic load score for different immigrant populations. ∎

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Contributors

L. A. Doamekpor designed the overall study, performed the statistical analysis, and interpreted the findings. G. Y. Dinwiddie contributed to the design of the study, the analysis plan, the literature review, and the interpretation of the findings. Both authors reviewed and revised all sections of the article for intellectual content.

Human Participant Protection

No protocol approval was required, as the data are secondary data and publicly available.

References

1. US Department of Health and Human Services. The health care law and you. 2011. Available at: http://www.healthcare.gov/law/introduction/index.html. Accessed June 12, 2013.

2. US Department of Health and Human Services. Healthy People 2020. Heart disease and stroke. Available at: http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicID=21. Accessed June 12, 2013.

3. Schmidley A, Gibson CUS. *Profile of the Foreign-Born Population in the United States: 1997*. Washington, DC: US Government Printing Office; 1999. Current Population Reports, Series P23–195.

4. Pew Hispanic Center. *Tabulations of 2010 American Community Survey (1% IPUMS)*. Washington, DC: Pew Research Center; 2011.

5. Williams DR. Race and health: basic questions, emerging directions. *Ann Epidemiol*. 1997;7(5):322–333.

6. Pallotto EK, Collins JW, Williams DR. Enigma of maternal race and infant birth weight: a population based study of US-born Black and Caribbean-born Black women. *Am J Epidemiol*. 2000;151(11):1080–1085.

7. Singh GK, Siahpush M. Ethnic-immigrant differentials in health behaviors, morbidity, and cause-specific mortality in the United States: an analysis of two national databases. *Hum Biol*. 2002;74(1):83–109.

8. Read JG, Emerson MO, Tarlov A. Implications of Black immigrant health for US racial disparities in health. *J Immigr Health*. 2005;7(3):205–212.

9. Williams DR, Haile R, Gonzalez HM, Neighbors H, Baser R, Jackson JS. The mental health of Black Caribbean immigrants: results from the National Survey of American Life. *Am J Public Health*. 2007;97(1):52–59.

10. Read JG, Emerson MO. Racial context, Black immigration and the U.S. Black/White health disparity. *Soc Forces*. 2005;84(1):181–199.

11. David RJ, Collins J. Differing birth weight among infants born of U.S.-born Blacks, African-born Blacks, and U.S.-born Whites. *N Engl J Med*. 1997;337(17):1209–1214.

12. Seeman TE, McEwen BS, Rowe JW, Singer BH. Allostatic load as a marker of cumulative biological risk: MacArthur studies of successful aging. *Proc Natl Acad Sci USA*. 2001;98(8):4770–4775.

13. Juster RP, McEwen BS, Lupien SJ. Allostatic load biomarkers of chronic stress and impact on health and cognition. *Neurosci Biobehav Rev*. 2009;35(1):2–16.

14. Crimmins EM, Johnston M, Hayward M, Seeman T. Age differences in allostatic load: an index of physiological dysregulation. *Exp Gerontol*. 2003;38(7):731–734.

15. Jasso G, Massey DS, Rosenzweig RS, Smith JP. Immigrant health, selectivity and acculturation. In: Anderson NB, Bulatao RA, Cohen B, eds. *Critical Perspectives on Racial and Ethnic Differences in Health in Late Life*. Washington, DC: National Academy Press; 2004:227–266.

16. Markides KS, Eschbach K. Aging, migration and mortality: current status of research on the Hispanic paradox. *J Gerontol B Psychol Sci Soc Sci*. 2005;60(spec no 2):S68–S75.

17. Dinwiddie GY, Zambrana RE, Garza MA. Exploring risk factors in Latino cardiovascular disease: the role of education, nativity and gender. *Am J Public Health*. 2014;104(9):1742–1750.

18. Kaestner R, Pearson JA, Keene D, Geronimus AT. Stress, allostatic load and health of Mexican immigrants. *Soc Sci Q*. 2009;90(5):1089–1111.

19. Peek MK, Cutchin MP, Salinas JJ, et al. Allostatic load among non-Hispanic Whites, non-Hispanic Blacks, and people of Mexican origin: effects of ethnicity, nativity, and acculturation. *Am J Public Health*. 2010;100(5):940–946.

20. Denton NA, Massey DS. Racial identity among Caribbean Hispanics: the effect of double minority status on residential segregation. *Am Sociol Rev*. 1989;54(5):790–808.

21. Mattei J, Demissie S, Falcon LM, Ordovas JM, Tucker KL. Allostatic load is associated with chronic conditions in the Boston Puerto Rican Health Study. *Soc Sci Med*. 2010;70(12):1988–1996.

22. Centers for Disease Control and Prevention. 2012. National Health and Nutrition Examination Survey Data. 2012. Available at: www.cdc.gov/nchs/nhanes/nhanes_questionnaires.htm. Accessed June 20, 2010.

23. *SAS/STAT, Version 9.2.* [computer program]. Cary, NC: SAS Institute; 2008.

24. Antecol H, Bedard K. Unhealthy assimilation: why do immigrants converge to American health status levels? *Demography*. 2006;43(2):337–360.

25. Seeman TE, Singer B, Rowe J, Horwitz R, McEwen B. Price of adaptation—allostatic load and its health consequences. *Arch Intern Med*. 1997;157(19):2259–2268.

26. Kubzansky LD, Kawachi I, Sparrow D. Socioeconomic status, hostility, and risk factor clustering in the Normative Aging Study: any help from the concept of allostatic load? *Ann Behav Med*. 1999;21(4):330–338.

27. Seeman T, Glei D, Goldman N, Weinstein M, Singer B, Yu-Hsuan L. Social relationships and allostatic load in Taiwanese elderly and near elderly. *Soc Sci Med*. 2004;59(11):2245–2257.

28. Geronimus AT, Hicken M, Keene D, Bound J. Weathering and age patterns of allostatic load scores among Blacks and Whites in the United States. *Am J Public Health*. 2006;96(5):826–833.

29. Crimmins EM, Kim JK, Alley DE, Karlamangla A, Seeman T. Hispanic paradox in biological risk profiles. *Am J Public Health*. 2007;97(7):1305–1310.

30. Dinwiddie GY. The health advantages of educational attainment. In: Peterson P, Baker E, McGaw B, eds. *International Encyclopedia of Education*. Oxford, England: Elsevier; 2010:667–672.

31. Kim J. Intercohort trends in the relationship between education and health. Examining physical impairment and depressive symptomatology. *J Aging Health*. 2008;20(6):671–693.

32. Dodoo FN. Assimilation differences among Africans in America. *Soc Forces*. 1997;76(2):527–546.

33. Jackson JS, Knight KM, Rafferty JA. Race and unhealthy behaviors: chronic stress, the HPA axis, and physical and mental health disparities over the life course. *Am J Public Health*. 2010;100(5):933–939.

34. Mezuk B, Rafferty JA, Kershaw KN, Hudson D, Abdou CM, Lee H. Reconsidering the role of social disadvantage in physical and mental health: stressful life events, health behaviors, race, and depression. *Am J Epidemiol*. 2010;172(11):1238–1249.

35. King KE, Morenoff JD, House JS. Neighborhood context and social disparities in cumulative biological risk factors. *Psychosom Med*. 2011;73(7):572–580.

36. Kennedy S, McDonald JT, Biddle N. *The Healthy Immigrant Effect and Immigrant Selection: Evidence From Four Countries*. Hamilton, Canada: McMaster University; 2006. Social and Economic Dimensions of an Aging Population, Research Paper No. 164.

37. Williams DR. Race, stress and mental health: findings from the commonwealth minority health survey. In: Hogue C, Hargraves M, Scott-Collins K, eds. *Minority Health in America: Findings and Policy Implications From the Commonwealth Fund Minority Health Survey*. Baltimore, MD: Johns Hopkins University Press; 2000:209–243.

38. Yip T, Gee GC, Takeuchi DT. Racial discrimination and psychological distress: the impact of ethnic identity and age among immigrant and United States-born Asian adults. *Dev Psychol*. 2008;44(3):787–800.

39. Hamilton TG, Hummer RA. Immigration and the health of U.S. Black adults: does country of origin matter? *Soc Sci Med*. 2011;73(10):1551–1560.

40. Elo I, Mehta N, Huang C. 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. Population Aging Research Center Working Paper Series, WPS. Av08–04.