

Residential Segregation, Health Behavior, and Health Status among Blacks: A Multi-level Analysis

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Introduction

- Prevalence of fruit/vegetable consumption (FVC), physical activity (PA) are significantly lower, and overweight/obesity prevalence is significantly higher among Blacks than among Whites ¹.
- Demographic and cultural variables contribute to these differences, but do not fully account for them ¹.
- One neglected factor that may explain these disparities is residential segregation.

1. Centers for Disease Control (2006). *Summary health statistics for US adults: National Health Interview Survey, 2006*. US Department of Health and Human Services, National Center for Health Statistics: Vital and Health Statistics Series 10, No. 25, www.cdc.gov/nchs.

Residential segregation: Refers to the uneven distribution of Blacks and Whites in residential areas.

Neighborhood disparity: Segregated Black neighborhoods may have **2-4 time more** fast-food restaurants, **3 times fewer** supermarkets, and are **3 times more** likely to have **no** recreational facilities than White neighborhoods with matching SES ²⁻⁴.

2. Morland K, Wing S, Diez-Roux A, Poole C. (2002). Neighborhood characteristics associated with the location of food stores and food service places. *American Journal of Preventive Medicine*, 22:: 23-29.

3. Powell LM, Chaloupka FJ, Bao Y. (2007). The availability of fast food and full-service restaurants in the United States: Associations with neighborhood characteristics. *American Journal of Preventive Medicine*, 33 (4 Suppl.): S240-S245

4. Moore LV, Diez Roux AV, Evenson KR, McGinn AP, Brines SJ. (2008). Availability of recreational resources in minority and low socioeconomic status areas. *American Journal of Preventive Medicine*, 34: 16-22.

Methods

Data source: BRFSS 2000. N = 11,142 Black (age \geq 18).
Linked to census 2000 data to obtain isolation index and poverty index at MSA (metropolitan statistical area) level.

Isolation index: measures the extent to which Blacks encounter only other Blacks in their residential area. It ranges from 0 to 100 with 100 meaning complete segregation/isolation. ≥ 50 = High; < 50 = Low.

Poverty Index: the percentage of people below the poverty line, $\leq 9.5\%$ = low, $> 9.5 - \leq 12\%$ = moderate, and $> 12\%$ = high poverty.

Methods (cont.)

Multi-level logistic regression (SAS PROC GLIMMIX) was used to examine associations between the health outcomes and individual-level, MSA-level predictors.

Outcome variables: any physical activities in the past month, 5+ FVC , and overweight/obese prevalence (BMI ≥ 25).

Individual-level predictors: sex, age, and education.

MSA-level predictors: Poverty and Segregation Index.

Results

Table 1. Prevalence of 5+ FVC, PA and Overweight/Obese

Variables	5+ FVC	PA	Overweight/Obese
Total	22.6	65.7	67.8
Sex			
Male	19.6	72.9	69.6
Female	24.2	62.0	66.9
Poverty(% below)			
> 12%	20.9	62.7	69.2
> 9.5% - ≤ 12%	22.0	66.1	67.5
≤ 9.5%	25.2	68.8	66.7
Segregation			
Isolation Index ≥ 50	23.1	65.7	68.7
Isolation Index < 50	21.8	65.9	66.3

Results

Table 2. Multi-level Logistic Regression for Blacks

Variables	5+ FVC		PA		Overwt/Obese	
	OR,	95% CI	OR,	95% CI	OR,	95% CI
Individual-Level						
Sex						
Male	0.77,	0.69-0.84**	1.69,	1.55-1.85**	1.14,	1.04-1.24**
Female	(Ref)					
Age						
≥ 18 - ≤ 35	0.67,	0.59-0.76**	1.42,	1.27-1.59**	0.51,	0.45-0.57**
> 35 - ≤ 45	0.71,	0.62-0.81**	1.14,	1.01-1.29*	0.90,	0.79-1.03
> 45 - ≤ 55	0.75,	0.65-0.87**	1.03,	0.90-1.18	1.12,	0.97-1.30
> 55	(Ref)					
Education						
LS high school	0.58,	0.49-0.69**	0.35,	0.30-0.40**	1.21,	1.05-1.40*
High school grad	0.73,	0.65-0.83**	0.47,	0.42-0.53**	1.26,	1.12-1.41**
Some college	0.91,	0.80-1.03	0.74,	0.65-0.83**	1.20,	1.07-1.35**
College grad	(Ref)					

*: p<0.05 **: p<0.01

Results (cont.)

Table 2. Multi-level Logistic Regression for Blacks (cont.)

Variables	5+ FVC		PA		Overwt/Obese	
	OR,	95% CI	OR,	95% CI	OR,	95% CI
MSA-Level						
Poverty (% below)						
> 12%	0.90,	0.76-1.07	0.91,	0.79-1.04	1.07,	0.95-1.21
>9.5% - ≤ 12%	0.94,	0.79-1.12	1.00,	0.88,1.15	0.99,	0.88-1.12
≤ 9.5%	(Ref)					
Segregation						
Iso Index ≥ 50	1.00,	0.88-1.14	0.95,	0.86-1.06	1.13,	1.03-1.24*
Iso Index < 50	(Ref)					
Measure of clustering						
MSA var. (S.E)	0.046	(0.016)	0.017	(0.009)	0.007	(0.006)
Median O.R	1.23		1.134		1.085	
Intra-class corr.	0.014		0.005		0.002	

*: p<0.05 **: p<0.01

Conclusion

- Each individual-level variable contributed significantly to all three outcomes.
- Multi-level logistic regression revealed that MSA-level poverty did not contribute to any outcome, although there were prevalence differences in all three outcomes across high, medium and low poverty MSAs.
- MSA segregation contributed only to overweight /obese.

Study Limitations

Measures of segregation and poverty at the MSA-level may not be sensitive to neighborhood-disparities because MSAs are so large. Measures at the census tract level probably would yield significant area effects ⁵⁻⁷.

⁵ Krieger, N., Chen, J. T., Waterman, P. D., et al. (2005). Painting a truer picture of US socioeconomic and racial/ethnic health inequalities: The Public Health Disparities Geocoding Project. *AJPH*, 95 (2), 312-323.

⁶ Krieger, N., Chen, J. T., Waterman, P. D., et al. (2003). Race/ethnicity, gender, and monitoring socioeconomic gradients in health: A comparison of area-based socioeconomic measures – – The Public Health Disparities Geocoding Project. *AJPH*, 93, 1655-1671.

⁷ Krieger, N., Chen, J. T., Waterman, P. D., et al. (2002). Geocoding and monitoring US socioeconomic inequalities in mortality and cancer incidence: Does choice of area-based measure and geographic level matter? The Public Health Disparities Geocoding Project. *Am J Epidemiol*, 156, 471-482.

Future Study

Conduct analyses with segregation and poverty measured at the census tract level; this level is more sensitive to area-effects, and is a better predictor of health outcomes⁷, e.g. NHIS and NHANES data from the CDC research data center.

⁷ Krieger, N, Chen, J. T., Waterman, P. D., et al. (2002). Geocoding and monitoring US socioeconomic inequalities in mortality and cancer incidence: Does choice of area-based measure and geographic level matter? The Public Health Disparities Geocoding Project. *Am J Epidemiol*, 156, 471-482.

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