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Examination of Race Disparities in Physical Inactivity among Adults of Similar Social Context

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Abstract

Objective—The objective of the study was to determine whether race disparities in physical inactivity are present among urban low-income Blacks and Whites living in similar social context.

Design—This analysis included Black and White respondents (≥18 years) from the Exploring Health Disparities in Integrated Communities-Southwest Baltimore (EHDIC-SWB; *N*=1350) Study and the National Health Interview Survey (NHIS; *N*=67790). Respondents who reported no levels of moderate or vigorous physical activity, during leisure time, over a usual week were considered physically inactive.

Results—After controlling for confounders, Blacks had higher adjusted odds of physical inactivity compared to Whites in the national sample (odds ratio [OR] =1.40; 95% confidence interval [CI] =1.30–1.51). In EHDIC-SWB, Blacks and Whites had a similar odds of physical inactivity (OR=1.09; 95% CI .86–1.40).

Conclusion—Social context contributes to our understanding of racial disparities in physical inactivity.

Keywords

Integrated Community; Physical Activity; Race Disparities; Residential Segregation; Social Environment

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Introduction

Physical inactivity has been considered as “the biggest public health problem of the 21st century”[1] and one of the most prevalent chronic disease risk factors. Based on considerable evidence surmised from national surveillance systems, racial and ethnic minorities in the United States are less likely to meet federal guidelines for physical activity.[2–4] Despite national public health initiatives to reduce sedentary behavior, race disparities in physical activity persist after accounting for various individual-level factors, such as income and education, among Blacks, Hispanics, women, older persons and residents of urban communities.[5–7] However, focusing on these factors may lessen the importance of how social context – the social and environmental conditions where people live – may explain the low prevalence of physical activity among racial and ethnic minorities. To better understand the extent by which social context influences race differences in physical inactivity, a growing body of literature has focused on the contribution of residential segregation.[8,9]

Residential segregation is an important determinant of health that negatively impacts physical activity. The United States remains a highly racially-segregated society with Blacks and Whites living in distinct communities, experiencing different health risk exposures.[10] Powell et al found that communities of lower socioeconomic status (SES) with higher proportions of Blacks possessed fewer environmental factors that promote physical activity.[11] Blacks are more likely to live in lower SES communities with fewer health-promoting characteristics such as healthy food options and quality recreational facilities than White counterparts living in communities of higher SES.[10,12,13] The adverse effects of racial residential segregation has resulted in communities with fewer physical characteristics conducive to maintaining a physically active lifestyle.[13] Previous work has found that the association between residential segregation and low levels of physical activity were similar for Blacks and Whites.[8,9] These studies used national data sources that included a small sample of Blacks living in large metropolitan statistical areas to measure residential segregation with the dissimilarity and isolation indices.[8,9] Understanding residential segregation in smaller geographical areas may improve our knowledge of the root causes that contribute to racial disparities in physical inactivity.[14]

By examining Black-White disparities in physical inactivity among adults with similar income, living in the same social context, we can account for the tightly intertwined relationship between race, SES and residential segregation.[15–17] Efforts to disentangle these factors continue to pose challenges in studies examining racial disparities in health, especially using data from national surveys.[18] While race disparities in levels of physical activity have been associated with differences in social and environmental exposures, most studies have merely adjusted for individual-level factors such as education or household income to account for the confounding of race and SES.[5,6,19–24] However, applying these analytical techniques with national data may not produce truly comparable samples across race groups.[10,25,26] These results could potentially lead to false conclusions that the observed race disparity is due to a direct race effect rather than differences in social context.[18] To overcome this challenge, recent studies that account for social context among Blacks and Whites living in the same community have shown a reduction or absence of race

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differences in health outcomes. Thorpe et al demonstrated that Black-White disparities in hypertension were attenuated in a racially integrated community despite national evidence suggesting race differences in hypertension.[27] Another report found that Black-White disparities in obesity among women, which are significant in a national sample, were eliminated among residents living under similar conditions.[28] These findings suggest that social context is an important determinant of health that is often not accounted for when using national data sources.[18,29–31]

The purpose of our study was to examine race disparities in physical activity among residents of an urban racially-integrated community with no differences in income. We hypothesized that racial disparities in physical activity among Blacks would be eliminated when accounting for social context. We compare these findings to national data that does not account for social context.

Methods

Study Population

Exploring Health Disparities in Integrated Communities (EHDIC) is an ongoing multisite study of race disparities within communities where Blacks and Whites live together and where there are no race differences in socioeconomic status (as measured by median income). The first EHDIC study site was in Southwest Baltimore, Maryland (EHDIC-SWB) in a low-income urban area.

EHDIC-SWB is a cross-sectional face-to-face survey of the adult population (aged ≥18 years) of two contiguous census tracts collected between June and September 2003. In addition to being economically homogenous, the study site was also racially balanced and well integrated. The two census tracts included almost equal proportions of Black (51%) and White (44%) residents, and a median income of $24,002, without race difference. The census tracts were block listed to identify every occupied dwelling in the study area. Because our survey had similar coverage across each census block group in the study area, the bias to geographic locale and its relationship with socioeconomic status should be minimal.[15]

Comparisons to the 2000 Census for the study area indicated that the EHDIC-SWB sample included a higher proportion of Blacks and women, but was otherwise similar with respect to other demographic and socioeconomic indicators.[15] For instance, our sample was 59.3% Black and 44.4% male, whereas the 2000 Census data showed the population was 51% Black and 49.7% male. Age distributions in our sample and 2000 Census data were similar with the median age for both samples – 35–44 years. The lack of race difference in median income in the census, $23,500 (Black) vs $24,100 (Whites) was replicated in EHDIC $23,400 (Black) vs $24,900 (Whites).

The survey was administered in person by a trained interviewer and consisted of a structured questionnaire, which included demographic and socioeconomic information as well as self-reported health behaviors (smoking status, alcohol consumption, physical inactivity, and comorbid conditions). The EHDIC study has been described in greater detail elsewhere.[15]

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The study was approved by the Committee on Human Research at the Johns Hopkins Bloomberg School of Public Health. Of the 1489 participants in EHDIC-SWB we excluded participants whose race was not Black or White (*n*=81), and who were missing data on demographic characteristics and data on health behaviors (*n*=58), resulting in 1350 EHDIC-SWB participants for this analysis.

The National Health Interview Survey (NHIS) is an annual, multi-purpose health survey of civilian, non-institutionalized, households of the United States conducted by the National Center for Health Statistics (NCHS) which uses a multistage sample design to report estimates on the US population.[32] The survey is administered by US Census Bureau interviewers in the respondents' home. Our analyses were restricted to data from the Sample Adult Core section of the 2000–2003 NHIS because of similarity to data collected and corresponding age categories in the EHDIC-SWB survey. The study population for the Sample Adult Core consisted of 127,596 individuals aged ≥18 years who responded to questions regarding their demographic characteristics, health status and behaviors, functional limitations, AIDS, cancer screening and health care access and utilization. Detailed information regarding this sample can be found elsewhere.[32] Our analyses only included adults who responded to questions related to physical activity and related health behaviors.

Of the 127,596 NHIS eligible adults, we excluded participants whose race was not Black or White (*n*=27,098) and those who were missing data on demographic characteristics (age, sex, education, marital status, and employment; *n*=1,601), lifestyle factors (smoking status and alcohol consumption; *n*=1,914), health-related indicators (self-rated health, comorbid conditions, and BMI; *n*=372) and physical activity (*n*=28,930) resulting in 67,681 NHIS participants for this analysis.

Measures

Each measure included in these analyses was coded similarly in both EHDIC-SWB and the NHIS datasets. Physical inactivity is our primary outcome. Participants who reported no levels of moderate or vigorous physical activity, during leisure time, over a usual week were considered physically inactive. Race, the primary independent variable, was based on participant self-identification, White or Black. Demographic variables included sex, age, income category, educational attainment, marital status, and employment status. Sex was based on self report. Age was reported as a continuous variable. Five categories were used to classify income: <$10000, $10000–$19999, $20000–$34999, $35000–$54999, and ≥ $55000. In the NHIS a missing category for income was created to keep these observations in the analysis. Education was classified as: less than high school, or high school completion or greater. Marital status consisted of three categories: single, divorced/ widowed or separated, or married/ living as married. Employment status was dichotomized as unemployed or employed.

Health characteristics included: self-rated health, comorbid conditions, body mass index (BMI), smoking status, and alcohol consumption. Self-rated health was coded as: excellent/ very good/good, or fair/poor. Self-reported physician diagnoses for asthma, hypertension, diabetes, heart disease, and/or stroke were dichotomized as 0 = no and 1 = yes and then

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summed to create a score of 0–5. Three categories were created to classify comorbid conditions: none, 1–2, or ≥3 conditions. Body mass index (BMI) was reported as a continuous variable. Smoking status was coded as a categorical variable: never, former smoker, or current smoker. Alcohol consumption consisted of three categories: never, former, or current.

Statistical Analysis

We used the chi-square tests and t-tests to assess differences in demographic characteristics and health-related factors between Black and White participants by study sample. Multivariate logistic regression was used to examine the association between race and physical inactivity controlling for age, sex, income, education, marital status, employment, smoking status, alcohol consumption, self-rated health, comorbid conditions, and BMI. The analyses using NHIS 2000–2003 were adjusted by Taylor-linearization procedures to account for the multi-stage sampling design.[32] Significance testing was performed at $P<.05$. Statistical analysis was performed using STATA 12 (Stata Corp, College Station, Texas, USA).

Results

Table 1 displays the demographic and health characteristics of Black and White adults by study sample. In the NHIS, on average, Blacks were younger than Whites. A lower proportion of Blacks were male, earned higher incomes, reported high school completion or greater and were married compared to Whites. There were no race differences in the proportion of employed Blacks and Whites in the NHIS. In terms of lifestyle factors, Blacks were less likely to smoke or consume alcohol compared to Whites. However, Blacks had a worse health profile, as demonstrated by higher rates of self-reported fair/poor health, greater comorbid conditions, higher mean BMI and higher rates of physical inactivity compared to Whites in the NHIS.

In EHDIC-SWB, on average, Blacks were younger than Whites. A higher proportion of Blacks reported high school completion or greater, not being married or employed compared to Whites. No race difference was observed in the proportion of males or those employed in EHDIC-SWB. In terms of lifestyle factors, Blacks were less likely to smoke or consume alcohol compared to Whites. Although Blacks reported lower rates of self-reported fair/poor health and fewer comorbid conditions, on average, they had a higher BMI compared to Whites. However, in EHDIC-SWB, no race difference was observed in physical activity.

Table 2 shows the odds ratio for race by sample, after controlling for age, sex, income, education, marital status, employment, smoking status, alcohol consumption, self-rated health, comorbid conditions, and BMI. In NHIS, Blacks had a higher odds (OR=1.40; 95% CI 1.30–1.51) of physical inactivity relative to Whites. However in EHDIC-SWB, Blacks had similar odds of physical inactivity as Whites (OR=1.09; 95% CI .86–1.40).

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Discussion

We examined race disparities in physical inactivity among Black and White residents of a low-income urban racially integrated community. We found that race differences in physical inactivity were eliminated within a sample of Blacks and Whites living in similar social context. When using national data, which does not account for social context, Blacks tend to have poorer health status and greater physical inactivity compared to Whites. Our results underscore the importance of understanding how social context contributes to racial differences in physical activity. These findings can inform the development of health promoting interventions aimed at increasing physical activity levels among adults who live in low-income urban racially integrated communities.

Examining Black-White health disparities among persons residing within the same social context allowed us to account for the complex interplay between race, SES, and residential segregation, which remains a persistent challenge in health disparities research.[15–17] Using national data to examine race disparities by simply adjusting for SES in multivariate models may not create truly comparable samples across race groups.[10,25,26] Rather, observed race differences may be the result of different social and environmental exposures that are erroneously ascribed to a direct race effect.[10]

Using a national telephone survey, Marshall et al reported higher levels of physical inactivity among Blacks and Hispanics of lower social class compared to White counterparts, who live in different risk environments.[6] While social class is considered an independent determinant of health,[33] failure to account for social context may have contributed to the observed race difference on physical inactivity. Our findings suggest that accounting for social context is extremely important when examining race disparities in physical inactivity, particularly, in low-income urban racially integrated communities. Previous research has shown that residents of low-income urban communities are more likely to experience personal and environmental barriers such as limited access to recreational amenities, parks, and designated space for exercise.[34] These characteristics may lessen the desirability of maintaining a physically active lifestyle compared to residents of more affluent communities.[34] Thus, examining social context may, in part, contribute to reducing barriers to physical activity in the built environment as well as motivate change in individual behavior.[35] By sampling a community of residents who live in similar risk environments, the EHDIC-SWB study is able to reduce the impact of unmeasured aspects of the social environment and better characterize disparities in physical activity.

These findings must be considered in the following context. Physical inactivity was based on participant self-report, however, previous research suggests that self-report is a valid method to ascertain levels of physical activity.[36,37] Moreover self-reported physical activity is obtained using the NHIS to evaluate progress towards meeting *Healthy People* 2020 objectives. Therefore, the present analysis applies measures that are similarly used in setting national health priorities and public health campaigns. Lastly, EHDIC-SWB was conducted in a low-income urban community and our analysis only included Black and Whites. This may limit the generalizability of our results in higher income, other minority groups, or non-urban communities.

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Despite these limitations, our study contributes to our understanding of race disparities in physical activity using a study design that significantly minimizes the confounding of race and SES with residential segregation. The EHDIC-SWB study represents a new direction in health disparities research that accounts for unmeasured heterogeneity by taking into account the effects of residential segregation and assesses race differences in physical inactivity in an integrated community. However, national studies fail to account for the extreme differences in the historical and social contexts of various race groups in the United States.[18] As a result some race disparities research using national studies may overestimate race differences and underestimate the effect of residential segregation.[31]

Future research should continue to explore how social context contributes to physical inactivity. Limited studies have focused on the determinants of physical activity and sedentary behavior in the context of work and daily living.[38,39] Research is needed to identify strategies to implement interventions to reduce sedentary behavior and increase physical activity.[40] Longitudinal studies will enable researchers to identify which social, environmental and behavioral factors influence patterns of physical activity over the life course and to infer causal relationships between these hypothesized determinants of health and physical activity.

Conclusion

Race differences in physical inactivity were eliminated among Blacks and Whites living in the same social context. These findings demonstrate the importance of considering social and environmental exposures when examining race disparities in physical activity, particularly, in low-income urban racially integrated communities. Applying this research approach may illuminate strategies to promote physical activity among urban low-income populations. For instance, federal programs such as the *Let's Move Campaign and Healthy People 2020* have been implemented, in part, to increase physical activity. These national initiatives will provide empirical data on important social, environmental and behavioral determinants of physical activity. Such information will enable public health researchers to assess specific determinants of health and to tailor interventions aimed at reducing disparities in physical activity among minorities.

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The purpose of our study was to examine race disparities in physical activity among residents of an urban racially-integrated community with no differences in income.

We found that race differences in physical inactivity were eliminated within a sample of Blacks and Whites living in similar social context.

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Table 1

Distribution of demographic and health characteristics of NHIS (2000–2003) and EHDIC-SWB participants, by race

Variable	NHIS 2000–2003 (*N*=67,681)			EHDIC-SWB (*N*=1350)		
	Whites (*n*=55,093)	**Blacks (*n*=12,588)**	***P***	**Whites (*n*=551)**	**Blacks (*n*=799)**	***P***
Age[a] (mean ± SD)	47.1 ± 17.0	42.3 ± 18.3	<.001	43.7 ± 16.1	38.4 ± 13.3	<.001
Male (%)	49.5	44.9	<.001	43.4	46.4	.267
Income (%)						
≤$10000	5.2	11.3	<.001	21.8	25.0	.502
$10000–19999	8.0	13.4		33.0	34.0	
$20000–34999	14.3	17.7		23.1	20.2	
$35000–54999	16.2	15.0		11.8	11.6	
≥$55000 +	32.5	19.0		10.3	9.1	
Missing	23.8	23.8		–	–	
High school completion or greater (%)	85.6	75.2	<.001	52.6	64.3	<.001
Marital status (%)						
Single	16.7	33.1	<.001	36.8	62.3	<.001
Divorced/ widowed/ separated	17.7	23.0		37.2	22.8	
Married/ living as married	65.6	44.0		26.0	14.9	
Employed (%)	63.4	62.5	.191	37.6	50.0	<.001
Smoking status (%)						
Never	50.2	62.7	<.001	24.3	36.9	<.001
Former	24.5	14.4		59.4	54.2	
Current	25.3	22.9		16.3	8.9	
Drinking status (%)						
Never	20.4	36.0	<.001	42.7	48.4	<.001
Former	15.5	16.6		37.8	27.2	
Current	64.1	47.4		19.6	24.4	
Fair/poor health (%)	3.6	4.9	<.001	36.8	28.3	.001
Comorbid conditions[b] (%)						
None	63.7	59.3	<.001	47.4	57.8	<.001
1–2	33.8	37.6		44.5	37.4	
≥ 3	2.5	3.1		8.2	4.8	
BMI[c] (mean ± SD)	29.1 ± 13.3	30.4 ± 14.4	<.001	27.2 ± 6.8	28.0 ± 7.3	.045
Physical Inactivity (%)	71.2	79.4	<.001	44.3	41.8	.365

SD, standard deviation.

[a] Age shown in years.

[b] Comorbid conditions include physician diagnosis of asthma, hypertension, diabetes, heart disease, and/or stroke.

[c] BMI, kg/m^2.

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Table 2

The association between race and physical inactivity[a], by sample, OR (95% CI)

	NHIS 2000–2003 (*N*=67,681)		EHDIC-SWB (*N*=1350)	
	OR	**95% CI**	**OR**	**95% CI**
Black	1.40	1.30–1.51	1.09	.86–1.40
Male	.69	.66–.72	.71	.56–.90
Age	1.05	1.01–1.02	1.00	1.00–1.02
Income				
≤$10000	1.00		1.00	
$10000–19999	1.07	.96–1.20	1.18	.87–1.59
$20000–34999	.88	.79–.98	.76	.52–1.09
$35000–54999	.79	.71–.89	1.40	.91–2.17
≥$55000	.63	.57–.70	.80	.49–1.32
Missing	.93	.83–1.03	–	–
High school completion	.64	.59–.69	.91	.71–1.16
Marital status				
Single	1.00		1.00	
Divorced/ widowed/ separated	1.34	1.25–1.43	.95	.70–1.30
Married/ living as married	1.46	1.38–1.55	1.21	.87–1.68
Employed	1.30	1.23–1.38	.64	.49–.82
Fair/poor health	5.04	3.97–6.40	1.86	1.43–2.43
BMI	1.01	1.00–1.01	1.02	1.00–1.04
Comorbid conditions[b]				
None	1.00		1.00	
1–2	1.13	1.08–1.18	.83	.64–1.07
$ 3	1.81	1.52–2.14	1.08	.63–1.85
Smoking status				
Never	1.00		1.00	
Former	.88	.83–.93	.95	.73–1.25
Current	1.42	1.34–1.50	1.30	.86–1.95
Drinking status				
Never	1.00		1.00	
Former	.70	.64–.76	1.09	.83–1.42
Current	.47	.44–.51	.88	.66–1.19

[a]Defined as not reporting any levels of physical activity.

[b]Comorbid conditions include physician diagnosis of asthma, hypertension, diabetes, heart disease, and/or stroke.

Note: model was adjusted for sex, age, income, education, marital status, employment status, health status, BMI, comorbid conditions, smoking status, and drinking status.