

## Research Article

# Factors Associated with Black & Latina Women Meeting the US Federal Physical Activity Guidelines: Secondary Analysis of NHIS Data

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## Abstract

**Background:** Not meeting physical activity guidelines is a major public health concern. Studies show that Black and Latina women have general lower levels of physical activity (PA) than White women and are therefore at higher risk for chronic diseases including cardiovascular disease, diabetes, and obesity. The purpose of this study is to analyze National Health Interview Survey (NHIS) data to determine what factors, if any may contribute to Black and Latina women between the ages of 18 and 47, adhering to the federal PA guidelines. Identifying these factors will help in the development of PA promotion programs aimed at increasing adherence to the federal PA guidelines among minority women.

**Method:** Secondary analysis of data from the National Health Interview Survey 2008–2014 was analyzed to determine factors which may be associated with PA adherence among Black (N = 23,162) and Latina (N = 37,103) women.

**Results:** Logit modeling examined mean differences between groups and related variables. Blacks are more likely to meet muscle-strength guidelines with increased education and increased income. Latinas are more likely to meet muscle-strength as education and US acculturation increases.

**Conclusion:** These findings highlight the importance of understanding and considering racial/ethnic differences when developing strategies for promotion of PA among minority women. Identifying strategies and factors for increasing PA is a major step toward reducing risk factors associated with inadequate PA. Practitioners should be aware of these results and trends when discussing PA recommendations with their patients.

## Introduction

Not engaging in adequate physical activity is a major public health problem associated with increased morbidity and mortality, accounting for 3.2 million deaths each year [1]. The numbers of individuals not meeting recommended physical activity levels have risen significantly over the last decade, contributing to increased prevalence of heart disease, diabetes, colon cancer, and high blood pressure [2]. Engaging in regular physical activity as per physical activity guidelines has shown to be essential and beneficial in reducing risk factors for many of these diseases (cardiovascular diseases, type 2 diabetes, breast & colon cancers) thereby reducing premature all-cause mortality [3]. Minority women, such as Black and Latino, are more likely to be less physically active in comparison to White women [4].

In 2008, the federal government adopted physical activity guidelines for all Americans [5]; the second edition of these guidelines was recently released in the fall of 2018 [6]. These guidelines serves as the primary, authoritative voice of the federal government for evidence-based guidance on physical activity, fitness, and health for Americans that describe the amount, types, and intensity of physical activity needed to achieve many health benefits for Americans across

the life span [6]. These guidelines are further broken down into aerobic and Muscle Strengthening (MS) activities aimed at improving one's health. The minimal recommendations for adults living in the United States are:

- a. 2 hours and 30 minutes (150 minutes) of aerobic activity of moderate intensity, such as, brisk walking every week, along with 2 or more days a week of muscle-strengthening activity that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders, and arms (p.56, 2018).

Unfortunately, the overwhelming majority of Black and Latina women in the United States are not consistently meeting these guidelines. The prevalence of meeting aerobic physical activity guidelines for Black women in the US is 35% and 41% for Latina women, in comparison to White women at 51% [4]. The lower level of physical activity noted in minority women may account for the significant health disparities noted between White women and Black. (Table 1) shows the significant differences noted between White and Black women regarding diseases and risk factors.

Physical activity is defined as bodily movement that increases energy expenditure above the basal level [7]. *Leisure-time physical*

activity is defined as physical activities performed during free time, other than work or school, such as recreation and/or exercise [8]. Healthy People 2020 have defined *health disparity* as “a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage that adversely affects specific population groups [9].” Common themes noted in the literature that may help to explain these differences are cultural attitudes (body image, hair maintenance, society norms) and family responsibilities. Therefore, the purpose of this study is to analyze National Health Interview Survey (NHIS) data to determine what factors, if any may contribute to Black and Latina women between the ages of 18 and 47 adhering to the federal physical activity guidelines. Identifying these factors will help in the development of physical activity programs aimed at promoting adherence to the federal physical activity guidelines among minority women. Improving adherence to physical activity guidelines can lead to health promotion and disease prevent of various chronic diseases (hypertension, heart disease, obesity, diabetes, and some form of cancers) among minority women.

**Table 1.** Prevalence of Diseases & Risk Factors in Women by Race/Ethnicity (%)

Diseases & Risk Factors	White	Black	Hispanic or Latina
Physician-diagnosed DM	7.4	13.6	12.7
High Blood Pressure	32.3	46.3	30.7
Overweight (BMI ≥ 25kg/m <sup>2</sup> )	63.7	82.2	77.1

\*Met Federal Physical Activity guidelines for Adults (2015); DM = Diabetes mellitus.  
**Source:** Table created by W. Williams from data from Heart Disease and Stroke Statistics – Prevalence 2011–2014 (Benjamin et al., 2018)

## The Literature Regarding Racial/Ethical Differences

### Black Women

A person’s experiences and perceptions play a major role in determining her participation in regular physical activity. A person’s attitude is shaped by her experiences, beliefs, and cultural influences [10, 11]. Evidence suggests that racial/ethnic differences exist regarding Black women’s attitudes toward physical activity.[11, 12] These attitudes toward physical activity may help explain the significant decline noted in Black women in comparison to White women. In the Black community, women are less concerned with body size and are more accepting of fuller, curvaceous figures [12–16]. Therefore, Black women who are satisfied with their body size may perceive being physically active as a waste of time since they have no desire to lose weight. Also, Black women are more accepting of individuality and tend not to conform to society’s views of beauty. [17] Although having a positive image of one’s self is a generally a good thing, such an attitude may help contribute to some Black women being less interested in engaging in adequate physical activity.

One aim of a systematic review of qualitative studies conducted by Siddiqi, Tiro, and Shuval [18] was directed at understanding barriers to physical activity among Black adults. This review indicated that among Black women, hair maintenance, family responsibilities, and

environmental condition were some of the barriers the women gave for not being physically active. Hair maintenance is a major concern among Black women due to the cost and time-consuming process involved. Hair maintenance among Black women tends to be a major deterrent for engaging in PA [19–22].

Another barrier is family responsibilities [20, 23]. In 2011, 67.8% of Black births in the United States were to single Black or African American women, which is a significant rise in the last decade [24]. Being a single mother juggling multiple responsibilities related to work and caring for children does not leave sufficient time to be physically active for many women. Research shows that women with children are more likely to have decreased physical activity [25, 26]. Such a significant rise in single Black mothers may be one explanation why physical activity levels are significant lower in Black women than in White women [19, 24].

### Latina Women

Similar to Black women, Latinas regard fuller figures as more desirable [27]. Latinas and Blacks have reported more of a positive body self-image at higher BMIs than White women, suggesting that they have higher thresholds for what is considered healthy [27]. Personal hygiene issues such as desire not to sweat are also barriers to Latinas engaging in physical activity similar to the desire not to redo their hair for Black women [12, 17].

Latinas’ cultural emphasis on family and familial unity or *familismo* highlights their sense of family duties and responsibilities [28]. Latinas also tend to be the homemaker and caregiver, which might influence how they engage in physical activity because their energy and time is put into household duties instead of Leisure Time Physical Activity (LTPA) [29]. *Marianismo* and acculturation are also influencing factors on Latinas participation in PA [28]. *Marianismo*, or prioritization of family responsibilities over self-care, has been shown to affect physical activity among Latina women. D’Alonzo (2012) found that Latina women who immigrated to the United States were less likely to participate in LTPA due to family priorities and working outside the home. Many Latina women feel that family is a priority and taking time to go to the gym or engage in physical activity takes away time that could be spent with children, spouses, or other family members [28].

Immigration to the United States and subsequent acculturation also plays a role in leisure time physical activity among Latina women. D’Alonzo (2012) showed that decrease leisured time physical activity among Latina women who had recently immigrated to the United States due to “role overload” was associated with lifestyle changes and acculturation (p. 138). These changes include working outside the home, increased number of hours worked in a day, socioeconomic pressures, decreased social support, learning English, and transitioning from a collective culture to an individualistic one [28].

Latinas also have a higher fertility rate than White women, and which several researchers [29–31] have found the increasing number of children to be negatively associated with reported physical activity levels. Having more children would presumably increase the duties and therefore hours associated with childcare and household tasks,

thus reducing the number of hours available to engage in physical activity participation for Latinas as their family commitments would be more time consuming [32].

## Methods and Materials

### Design

Secondary analysis of data from the National Health Interview Survey (NHIS) 2008–2014 was analyzed to explore factors which may be associated with physical activity adherence among Black and Latina women. The NHIS is an annual in-person household survey conducted by the Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS) and administered by the US Census Bureau [33]. The data is publicly accessible with no identifiable information of the participants. Adults aged 18 years or older are randomly selected through a complex stratified clustered process that oversamples Hispanics and non-Hispanic Blacks from the noninstitutionalized civilian population [33]. Oversampling of minorities allows for more precise estimation of health characteristics in these segments of the populations. The conditional response rate for this time frame was approximately 80% [33].

To be included in this study, NHIS responders for the years 2008–2014 had to be female, between the ages of 18 and 47, and identify race as Black or Latino. Sample size consisted of  $N=23,162$  Blacks and  $N=37,103$  Latinas women aged 18 to 47 years. This is 4.1% of the total population of respondents regardless of sex, age, or race.

### Measures

*Co-habitation* status (partner present vs. no partner), *education* [less than high school (LHS); High School/General Education Diploma (HS/GED); some college, Associates Degree (AD), Bachelor's, greater than Bachelor's)] and *family income* which was categorized as multiples of the federal poverty level (FPL) [not poverty, below poverty limit, 150% above FPL, 200% above FPL, 250% above FPL, 300% above FPL, 400% FPL and above] were the primary variables that were explored to identify association to physical activity adherence related to the federal physical activity guidelines. Also, an acculturation measure was created, combining language spoken most often (Spanish or English) and place of birth (US born or foreign born). These categories are (a) English/US born, (b) English/ foreign born, (c) English and Spanish/ US born, (d) English and Spanish/ foreign born, (e) Spanish/ US born, and (f) Spanish/foreign born. Based on the federal physical activity guidelines recommendations and the available data, 2008–2014 IHIS participants were grouped as follows: one variable capturing adherence to only moderate aerobic activity recommendations was dichotomized into “meets recommendations” or “does not meet recommendations;” a second variable capturing adherence to only vigorous aerobic activity recommendations was dichotomized into “meets recommendations” or “does not meet recommendations;” and a third variable capturing adherence to muscle-strengthening activities was dichotomized into “meets recommendations” or “does not meet recommendations.”

### Data Analysis

The analysis was conducted with the Statistical Package for the Social Sciences (SPSS) [34]. The primary outcome for this analysis

was identification of factors associated with adherence to meeting the federal physical activity guidelines among Black and Latina women.

Bivariate analysis of the independent variables partner presence, educational level and income were performed to determine impact on meeting moderate aerobic, vigorous aerobic, and muscle-strengthening activities as outlined above. Logistic regression models were used to identify a relationship with the variables associated with higher odds of engaging in moderate or vigorous aerobic activity and adherence to muscle-strengthening recommendations. Results are reported using odds ratios adjusted for all listed associated variables, significant effects (SEs), and  $p$  values.

## Results

Due to the difference between Black and Latina women, the results will be reported based on race. Results are reported using adjusted odds ratios for all listed variables, significant effects (SEs), and  $p$  values. For Black women, none of the associated variables were significant for meeting moderate or vigorous aerobic activity guidelines. However, bivariate analysis revealed partner presence, educational level and income significantly impacted adherence to muscle-strengthening (MS) guidelines ( $p<0.05$ ) and engaging in MS are a significant part of the federal physical activity guidelines. Multivariable logistic regression was then performed to ascertain the effects the independent variables of partner presence, educational level and income had on the likelihood that Black women age 18 to 47 met the recommended muscle-strengthening guidelines. These independent variables were chosen based on their  $p$  value ( $p < 0.05$ ) from the bivariate analysis. For Black females, the logistic regression model including combined effects of partner status (cohabitating or non-cohabitating), education and income level was statistically significant,  $\chi^2(30) = 77.70, p < .05$ . Results are reported using adjusted odds ratios for all listed variables, significant effects (SEs), and  $p$  values.

The multivariable logistic regression showed income and education to significantly impact the likelihood of meeting recommended muscle-strengthening guidelines for cohabitating Black women aged 18 to 47. Results were not significant for women who were non-cohabitating. Income significantly impacted those with a high school diploma or General Education Degree (GED), while education significantly impacted women who identified as having an income below the federal poverty level (FPL). The comparison group was Black women age 18 to 47 with less than a high school diploma, no partner present, and identified as “not poverty”.

(Table 2) shows Black women age 18 to 47 with a high school diploma or GED are significantly less likely to meet muscle-strengthening guidelines as income increases from Federal Poverty Level (FPL) to above FPL. Specifically, women with a family income identified as below the Federal Poverty Level (FPL) were 0.51 times less likely to meet muscle-strengthening act ( $p<0.01$ ), while those with an income of 150% above the FPL were 0.67 times less likely to meet muscle-strengthening guidelines ( $p<0.01$ ). However, there was an increase in likelihood of meeting muscle-strengthening guidelines as income rose from 150% above FPL. While still less likely to meet muscle-strengthening guidelines than women with an income below

the FPL, those who made 200% and 300% above FPL were only 0.55 ( $p < 0.05$ ) and 0.59 ( $p < 0.05$ ) times less likely to meet muscle-strengthening guidelines.

**Table 2.** Effects of Income in Cohabiting Black Women Age 18–47 with a High School Diploma or General Education Degree on Meeting Muscle Strengthening Guidelines.

	Meets MS Guidelines			Confidence Interval (CI)	
	O.R.	S.E.	P value	Lower CI	Upper CI
	Reference Category: Not Poverty, less than high school diploma, non-cohabitating				
Below FPL	0.49	0.24	<b>0.004**</b>	0.31	0.79
150% above	0.33	0.38	<b>0.004**</b>	0.16	0.70
200% above	0.45	0.36	<b>0.026*</b>	0.22	0.91
250% above	0.60	0.29	0.072	0.34	1.05
300% above	0.416	0.36	<b>0.013*</b>	0.20	0.82
400% + above	0.74	0.33	0.360	0.39	1.41
*P < .05. ** P < .01 O. R = Adjusted Odd Ratio; S.E. = Significant effects; FPL = Federal Poverty Level; MS = muscle strengthening Source: Table created by MacLean.					

Among cohabiting Black women age 18 to 47 who identified a family income of below FPL, education appears to increase the likelihood of meeting muscle-strengthening guidelines (see Table 3). Women with a high school diploma or GED were 0.51 times less likely to meet muscle-strengthening guidelines ( $p < 0.01$ ), while those with some college were only 0.48 times less likely ( $p < 0.05$ ). However, women who had a partner present, identified family income of FPL, and had an associate degree were 0.74 times less likely to meet muscle-strengthening guidelines ( $p < 0.05$ ).

**Table 3.** Effects of Education in Cohabiting Black Women Age 18–47 with a Family Income of Below Federal Poverty Level on Meeting Muscle Strengthening.

	Meets MS Guidelines			Confidence Interval (CI)	
	O.R.	S.E.	P value	Lower CI	Upper CI
	Reference Category: Not Poverty, less than high school diploma, non-cohabitating				
HS/GED	0.49	0.24	<b>0.004**</b>	0.31	0.80
Some college	0.52	0.30	<b>0.029*</b>	0.29	0.94
AD	0.26	0.59	0.023*	0.08	0.83
Bachelor's	0.15	1.01	0.061	0.02	1.09
>Bachelor's	1.31	0.75	0.718	0.30	5.74
*P < .05. ** P < .01 All variables were included in the model to obtain the adjusted odds ratios. OR=Adjusted Odd Ratio; S.E.=Significant effects; HS=High School; GED=Graduate Equivalency Degree; AD=Associates Degree; > Bachelor's =greater than a Bachelor's degree; MS=muscle strengthening Source: Table created by MacLean					

For Latina women, none of the associated variables were significant for Latinas in meeting moderate aerobic activity guidelines. However, trends in the data showed that Latinas were more likely to meet moderate aerobic activity guidelines as education and acculturation increased. They were less likely to meet moderate aerobic activity guidelines with increasing income. These trends are displayed in (Table 4) None of the associated variables were significant for vigorous aerobic activity for Latinas, nor were any trends present in the data.

**Table 4.** Latina Women Age 18–47 Moderate Aerobic Activity Guidelines.

	Meets Moderate Aerobic Guidelines				
	O.R.	S.E.	P value		
	Reference Category: Less than HS				
HS/GED	1.95	0.5	0.18		
Some college	1.10	0.61	0.87		
AD	2.36	0.59	0.15		
Bachelor's	2.87	0.62	0.09**		
Greater than Bachelor's	2.70	0.91	0.27		
	Reference Category: FPL				
Below FPL	6.57	1.04	0.07		
150% above	7.96	1.08	0.06		
200% above	3.28	1.24	0.34		
250% above	8.50	1.10	0.05		
300% above	4.00	1.15	0.23		
400% + above	2.86	1.20	0.38		
	Reference Category: English/US born				
English/FB	0.91	0.40	0.80		
S+E/US	0	5304.70	1.00		
S+E/FB	0.63	0.62	0.46		
S/US	0	6458.79	1.00		
S/FB	0.39	0.62	0.13		
*P < .05. ** P < .01 AD (Associates Degree); HS (High School)/GED (General Education Diploma); FPL (Federal Poverty Level); FB (Foreign Born); S+E (Spanish and English); US (United States Born); S (Spanish)					

However, just like with Black women, many of the associated variables for meeting muscle-strengthening guidelines were significant ( $p < .05$ ) for Latinas as evidenced in (Table 5) As education increased, odds of meeting muscle-strengthening guidelines also increased in Latinas who had a bachelor's degree; they were 87.9% [OR=1.88, CI=1.18–2.99,  $p = .008$ ] more likely to meet muscle-strengthening guidelines than were Latinas with no high school degree. Data also showed that as income increased, Latinas were more likely to meet muscle-strengthening guidelines. Latinas who earn 400% or more above FPL were 215% [OR=2.15, CI=1.26–3.65,  $p = .005$ ] more likely to

meet muscle-strengthening guidelines that Latinas who earned income equivalent to the FPL. Latinas were 89.3% [OR=.11, CI=0.03–0.44,  $p=.002$ ] less likely to meet muscle-strengthening guidelines if they were currently pregnant. Also, data showed that the odds of meeting muscle-strengthening guidelines increased as acculturation increased. Latinas born outside of the U.S. who predominantly spoke English were 22.5% more likely to meet muscle-strengthening guidelines than those who predominantly spoke Spanish [Eng/FB (OR=.68, CI=.50-.93,  $p=.014$ ); Sp/FB (OR=.46, CI=.3-.70,  $p=.000$ )]. Trends in the data also showed that as BMI increased, the likelihood of a Latina meeting muscle-strengthening guidelines decreased. Latinas in the Obese III category were 68.6% [OR=.31, CI=.17-.58,  $p=.000$ ] less likely to meet muscle-strengthening guidelines than a Latina of normal BMI.

**Table 5.** Latina Women Age 18–47 Muscle-Strengthening Guidelines.

		Meets MS Guidelines			
		O.R.	S.E.	P Value	
Reference Category: Less than HS					
HS/GED		0.97	0.13	0.80	
Some college		1.57	0.12	0**	
AD		1.45	0.14	0.01**	
Bachelor's		2.01	0.13	0**	
Greater than Bachelor's		1.92	0.15	0**	
Reference Category: FPL					
Below FPL		0.84	0.11	0.09	
150% above		1.17	0.13	0.25	
200% above		1.33	0.14	0.04*	
250% above		1.37	0.13	0.02*	
300% above		1.57	0.12	0**	
400% + above		1.88	0.12	0**	
Reference Category: Not pregnant					
Pregnant		0.48	0.18	0**	
Reference Category: English/US born					
English/FB		0.71	0.11	0.002**	
S+E/US		0.71	0.45	0.44	
S+E/FB		0.44	0.25	0.001**	
S/US		0.68	0.50	0.43	
S/FB		0.45	0.2	0.001**	
Reference Category: Normal BMI					
Underweight		0.72	0.15	0.03*	
Overweight		0.78	0.07	0**	
Obese I		0.48	0.1	0**	
Obese II		0.50	0.15	0**	
Obese III		0.32	0.14	0**	
*P < .05. ** P < .01					
AD (Associated Degree); HS (High School)/GED (General Education Diploma); FPL (Federal Poverty Level); FB (Foreign Born); S+E (Spanish and English); US (United States Born); S (Spanish); muscle-strengthening (MS)					

## Limitations

The data utilized in this study was obtained from secondary analysis of NHIS data, which should be considered a limitation due to the inability to consider other variables that may be associated with physical activity. NHIS represents a cross-sectional research design that obtained household interviews of a sample clusters of addresses from each state. Therefore, because participants were not randomized the sample may not be representative of the population, contributing to selection bias. In addition, cause and effect cannot be determined with a cross-sectional design and the data may only capture what is occurring at that particular time and moment, which may not be transferable to other times or situations. NHIS relies on self-reported data, therefore, recall bias is a major issue and can potentially increase the risk of participants' bias. Participants may also over or under report certain information to look good or to please the interviewer (socially acceptable bias). These findings may not be generalizable to other populations that are not women of Black or Latina descent.

## Discussion

The findings and trends presented here are significant to understanding and developing effective strategies that could improve physical activity among Black and Latina women. Strategies to address physical activity participation in minority women must occur at multiple levels that consider cultural differences.

Although, no variables were found to be significant for meeting moderate or vigorous aerobic activity guidelines in either Black or Latina women. Adherences to muscle-strengthening activities were found to be associated with a few variables in both groups. Although, muscle-strengthening activities are only a partial requirement of the federal physical activity guidelines, it still represents some level of activity in these women. And current studies support that some activities are better than none [6].

For Black women, partner presence was associated with Black women maintaining muscle-strengthening activities, which stands to reason that Black women with a partner present, that is supportive may show higher levels of commitment due to encouragement and interest in them being active. A qualitative study by Mama et al. (2015) revealed that Black women did view support of a spouse or friend as important factor in engaging in regular physical activity [35]. The support can be in the form of working-out together, prompting, to offering to pay for a gym membership.

Higher educational attainment was associated with muscle-strengthening activities in both groups, which is consistent with other studies indicating that higher educational attainment is associated with being more physically active [36]. A study by Ainsworth et al. (2003) that looked at African-American women in South Carolina showed that educational attainment had a strong relationship for Black women to be physically active, with college educated women revealing a two-times higher likelihood of being physically active over high school educated Black women [37].

Also, income was associated with muscle-strengthening activities; these findings of income are consistent with other studies that have shown that women from lower socioeconomic status tend to be less

physically active. [38, 39] In the Black community there is a higher prevalence of single family homes, headed by women, where they are the sole source of income for their families [24]. Therefore, being the head-of-the household may place financial burdens on single Black mothers that prevent them from being physically active (i.e., no money for gym fees, or a babysitter that would allow her to go out to a gym). Black women from a lower socioeconomic background may also have greater difficulty being physically active compared to their higher income counterparts due to environmental barriers as well (no local gym or nearby park, unsafe neighborhood and heavy traffic patterns) [40]. More research is needed that considers the economic context of physical activity among low-income Black women. A study by Harley et al. (2013) emphasizes the need for better understanding of how significant, if any, income is regarding being physically active. A recent study by Sun and colleagues (2016) revealed that higher socioeconomic status was positively associated with young Black women being physically active [36].

For Latina women, factors associated with lower levels of engagement in sufficient physical activity levels include lower income, lower education levels, and greater number of children [29–31]. This study found that Latinas were less likely to meet moderate aerobic activity guidelines with increasing income. The difference could be explained by different definition of physical activity or the use of leisure time physical activity versus total physical activity.

With the increase of reported education beyond high school and income, the odds of Latinas meeting muscle-strengthening guidelines increased. This study's findings were consistent with the literature regarding the negative association of pregnancy and likelihood of meeting muscle-strengthening guidelines with Latinas who reported being currently pregnant were less likely to meet muscle-strengthening guidelines [41]. Similarly, as acculturation to the US increases, odds of meeting muscle-strengthening guidelines increased for Latinas. This is consistent with literature reporting on total leisure time physical activity associated with meeting physical activity guidelines [41]. Our data demonstrated similar trends regarding the association with increasing BMI and decreasing likelihood of meeting muscle-strengthening guidelines [41]. This study found racial/ethnic differences among Black and Latina women as pertains to their level of physical activity; these differences must be taken into consideration if we hope to reduce the growing trend of insufficient physical activity among minority women. Working together, providers, patients, and policy makers can reduce health care disparities associated with diseases related to engaging in insufficient physical activity.

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