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Physical Activity in Minority Populations: Overcoming a Public Health Challenge

I. Introduction

In this review, health disparities are described as they relate to physical inactivity among racial and ethnic minorities in the United States. Physical inactivity is a well-established independent coronary heart disease risk factor. Physical inactivity also plays a major role in other chronic diseases or conditions such as colorectal cancer, breast cancer, stroke, type 2 diabetes, hypertension, dyslipidemia, obesity, and depression. The above conditions also disproportionately affect minority populations in the U.S. Given the excess burden of disease among underserved populations, the potential benefit of an active lifestyle among racial and ethnic minorities cannot be ignored.

Definitions

The definition of race for U.S. federal government purposes is based on self-reported categorization from participants, and is not necessarily based on biological factors. The four major designations for race are: Whites, Blacks, Asian or Pacific Islanders, and American Indian or Alaskan Native. Ethnicity, on the other hand, is divided into Hispanic or non-Hispanic, and is the only ethnicity defined for government purposes. Because Hispanics can be of any race, data are often presented for non-Hispanic Whites, non-Hispanic Blacks, and Hispanics. Within Hispanics there are major subgroups such as Mexican Americans (the largest subgroup of Hispanics at approximately 66%), Puerto Ricans (island and continental), Cuban Americans, and Central and South Americans.

As with other major ethnic groups, there are wide diversities of ethnic subgroups within Asian-Pacific Islanders, Blacks, American Indians, and Alaskan Natives. Moreover, data from the 2000 census suggest that about 2% of respondents report having mixed ethnic heritage. Whenever possible, we present physical activity estimates for subgroups that are collected in national representative studies. These racial and ethnic definitions are important because they may indicate differences in educational attainment, income, geographic location, language preferences, and cultural practices that can help us to better understand health disparities.

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The National Center for Health Statistics (NCHS), part of the Centers for Disease Control and Prevention (CDC), monitors the health of the nation through a variety of surveys and surveillance systems. NCHS has tracked health indicators of the U.S. population to produce updates on the status of the National Health Objectives (e.g., Healthy People 2000 and 2010). Some of the surveillance systems used to monitor physical activity patterns presented here are the National Health Interview Survey (NHIS), a yearly survey with an in-person interview, and the National Health and Nutrition Examination Survey (NHANES), an in-person interview and a health examination conducted since 1960. In addition, the National Center for Chronic Disease Prevention and Health Promotion, also from the CDC, provides physical activity estimates on a state-by-state basis using data collected via the Behavioral Risk Factor Surveillance System (BRFSS), which is a telephone interview.

The Healthy People 2010 objectives have identified 10 leading health indicators, and physical activity is one of these leading health indicators. This categorization shows that physical activity remains at the top of the public health agenda and underscores the need to allocate valuable resources to ***eliminate the gap*** between those who are active and those who are not. Recent recommendations from the DHHS and the U.S. Department of Agriculture (USDA) have incorporated a physical activity recommendation for general health, disease prevention, and weight management, further underscoring the federal government's interest in promoting physical activity (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2005).

An increasingly alarming problem is that America is becoming a sedentary society. Technological advancements have engineered physical activity out of daily routines with great gains in productivity, automation and transportation. Since the workplace and transportation are no longer places for society to engage in physical activity, increased

participation in physical activity during leisure time is emphasized most often. Therefore, "leisure-time physical activity" (LTPA) has become the most widely studied form of physical activity. National surveillance systems have not used a standardized physical activity assessment over the years, which sometimes make comparability of findings difficult. What is clear, however, is that racial and ethnic minorities consistently have higher levels of no leisure time physical activity regardless of survey or year of assessment.

The term "no leisure-time physical activity" is meaningful, because while there may be limits to validly quantifying amounts and patterns of physical activity, assessing lack of participation in leisure-time physical activity is less complicated. Physical inactivity, defined as lack of participation in any type of leisure-time physical activity, is easier to measure, and is easier to track and compare across multiple population-based surveys.

The findings presented in this review primarily address lack of participation in physical activity for children, adolescents, and adults, both males and females, according to race and ethnic origin. Because of the lack of a national representative sample in all race/ethnic groups, most of the results presented compare physical inactivity prevalence estimates among Whites, Blacks, Hispanics, and if available, for Asian/Pacific Islanders.

II. Physical Activity Levels in Children

Assessment of physical activity in children is inherently difficult because cognitive recall is required in terms of amounts, intensity, and types of physical activity. Another approach for assessing physical inactivity in children is to measure time spent in front of televisions or computers, as a surrogate measure of physical inactivity. Time spent watching TV, however, does not necessarily mean that a child is inactive. It does reveal, however, time spent in activities in which a child is generally presumed to be sedentary.

Physical activity participation. The NHANES monitored participation in vigorous physical activity that causes sweating and hard breathing, along with hours of television watched a day. Andersen et al. showed that, in general, non-Hispanic Black and Mexican American children were less likely to participate in vigorous physical activity than non-Hispanic Whites. Girls consistently tended to participate less in vigorous activities than boys. More troublesome is the fact that as girls get older there is a steady decline in physical activity; however, as boys get older the percent who participate in vigorous active pursuits increases (Andersen et al., 1998).

Sedentary behaviors prevalence. Using NHANES data, the prevalence of television viewing of non-Hispanic White, non-Hispanic Black and Mexican American children aged 8-16 years was assessed. Marked differences were noted between the percent of White and African American children who reported watching 4 or more hours of TV a day. Almost 40 percent of African American children watched 4 or more hours a day of television for both boys and girls, compared with 16 percent and 12 percent of White boys and girls respectively (Crespo, Smit, Troiano, Bartlett, Macera, & Andersen, 2001; Andersen et al., 1998).

Patterns of physical activity and physical inactivity. Researchers at the University at Buffalo examined physical and sedentary activity in schoolchildren (Epstein, Coleman, & Myers, 1996). During this study a physical activity checklist was used to monitor sedentary and physical activity behaviors during the previous 24 hours among White and Black children. Other information included physical education classes, recess time, and any other outside of school activities. This study is important because it not only investigated the amount of physical activity and sedentary behaviors in a biracial group of children and adolescents, but it also reported the type of activity and temporal structuring of the activity. Children spent an average of 168 minutes of physical activity per day. As expected, boys were more physically active than girls, regardless of race. White children were more likely to report outdoor play than Black children, as well as football and gymnastics, and they performed these activities for longer periods. On the other hand, more Black children participated in basketball, dance, and jump rope, and they spent more time in these activities than White children. Black children also spent more time in selected sedentary activities than White children, both in total minutes and in percent of total reported activity. Interestingly, the study found a positive and significant relationship between reported minutes of physical activity and minutes of sedentary activity in both White and Black children. Thus, the more active children were more likely to engage in sedentary activities. Both physical and sedentary activities were more likely to occur outside of school hours. Not surprisingly, children who did not attend physical education classes accumulated less total physical activity than those who did. Additionally, children did not compensate for lack of physical education classes by being more active outside of school hours (Epstein, Paluch, Coleman, Vito, & Anderson, 1996; Epstein, Roemmich, Saad, & Handley, 2004; Roemmich, Gurgol, & Epstein, 2004).

Reducing sedentary behaviors. The majority of the research aimed at reducing sedentary behaviors and increasing healthful eating and physical activity has been conducted in White children (Robinson, 1999). However, Ford and colleagues (Ford, McDonald, Owens, & Robinson, 2002), conducted a randomized controlled pilot study among 28 families with African American children between the ages of 7 to 12 years who received primary care at an urban community clinic. The primary aim of the study was to reduce hours of children's television, videotape, and video game use in African American children. All families (intervention and control groups) received brief counseling. The behavioral intervention group received an additional discussion about setting television budgets, and parents received a brochure about parental guidance in lowering children's TV viewing. An electronic television time manager controlled power to the television, videotape and video games. This device locked the power plug to these appliances and allowed for monitoring and budgeting viewing time for each member of the household through the use of a four-digit personal identification number. The intervention group reported reduced time watching television, videotapes or video games compared with the control group. More importantly, they found a significant increase in weekly hours of organized physical activity in the behavioral intervention group compared to the control group.

Physical activity determinants. Determinants of physical activity among African American children have been studied with regard to the psychological, environmental and sociocultural influences (Trost, Pate, Ward, Saunders, & Riner, 1999; Lindquist, Beilin, & Knuiman, 1997; Pate et al., 2002).

Trost and colleagues assessed psychosocial and environmental variables and their impact in influencing physical activity in African American sixth graders from four public middle schools in South Carolina. Psychosocial variables measured included self-efficacy, social influences, and belief outcomes. Environmental variables included perceived physical activity behaviors of parents and peers, access to sporting and/or fitness equipment at home, involvement in community physical activity organizations, participation in community sports teams over the preceding six months, and self-reported hours spent watching television or playing video games. Results showed that active African American boys exhibited higher levels of self-efficacy toward physical activity and reported greater involvement in community-based, physical activity organizations than low-active boys. Active African American girls were more likely to have higher levels of self-efficacy and higher scores on beliefs regarding physical activity outcomes (e.g., keep me in shape, make me more attractive, be fun) than less active African American girls. Self-efficacy—the belief that a person possesses the ability to perform a particular behavior—is consistently an important predictor of physical activity in children and adults regardless of race.

III. Physical Activity Levels in Minority Adolescents

Physical activity participation. The Youth Behavioral Risk Surveillance System (YRBSS) is a survey of youth activities. The YRBSS found that only 28.4% of our nation's youth in grades 9 to 12 participated in physical education (PE) classes 5 days per week. Participation in daily PE classes was higher among Hispanic students (36.7%) than White students (24.9%). Black male (37.1%) and Hispanic male (39.5%) students were more likely to attend daily PE classes than their White male counterparts (26.8%). Disturbingly, PE class attendance declined steadily from 9th grade (37.7%) to 12th grade (18.2%)—these steady declines were observed for all race/ethnic groups. (Grunbaum et al., 2004).

Nationwide, 33.4% of students in grades 9 through 12 did not participate in sufficient physical activity. Insufficient participation in physical activity was higher among Black female (50.4%), Hispanic female (42.6%), and White female (37.5%) students compared with Black male (31.8%), Hispanic male (30.3%), and White male (24.8%) students. Similar patterns were observed for participation in both vigorous and moderate physical activity. Outside of PE classes, minority students were less likely to be active than their White counterparts. For example, participation in moderate intensity physical activity for 30 minutes 5 or more days a week was highest among White males (29%) and lowest among Black females (17.5%). Participation in vigorous physical activity for 20 minutes 3 or more days a week followed the same trend. Results from the National Longitudinal Study of Adolescent Health, a nationally representative study with more than 14,000 adolescents, including 3,135 non-Hispanic Blacks, 2,446 Hispanics, and 976 Asians, also reported similar results. With the exception of Asian females, minority adolescents were more inactive than their White counterparts.

Sedentary behaviors prevalence. NHANES data indicated that watching television for more than 3 hours a day was higher among Black (67%) than among Hispanic (46%) or White (29%) adolescents (Grunbaum et al., 2004).

Decline in physical activity. Kimm and colleagues showed a significantly higher decline in Black girls' physical activity into adolescence than White girls (Kimm, Glynn, Kriska, Barton, et al., 2002; Kimm, Glynn, Kriska, Fitzgerald, et al., 2000). Another study also documented the decline in physical activity with age, in which the decline in grades 10-12 was appreciably higher among girls than among boys (Trost et al., 2002).

Predictors of physical activity. In a study of urban and rural White and Black girls, enjoyment of physical education and family involvement in physical activity were greater among Black girls than White girls. A positive attitude toward physical activity was higher among rural White girls and urban Black girls compared with their rural and urban counterparts. White girls had greater access to sports equipment, higher perceived safety of neighborhoods, and higher physical activity self-efficacy than Black girls (Felton et al., 2002).

In summary, physical inactivity is consistently higher among minority children and adolescents than among their White counterparts. Inactive children become inactive adolescents, and more importantly, the percent of physically active African American and Hispanic girls who become less active as they grow into adolescence is of clinical and public health significance given the diseases associated with physical inactivity (e.g., high blood pressure, type 2 diabetes, and obesity). Strategies to increase participation in physical activity among minority children should take advantage of well-developed interventions among White children such as budgeting of TV time, negotiating sedentary time, providing safe environments for play and games, and improving curriculums that teach lifetime skills to engage in exercise programs and physical activity pursuits (Bungum & Vincent, 1997). Another important factor is the need for culturally specific interventions that are ethnic specific rather than just interventions developed for non-Hispanic White children.

Barriers and Opportunities to Promote Physical Activity in Children

The Robert Wood Johnson Foundation commissioned a study to assess barriers and opportunities to participation in physical activity among minorities and they identified the following barriers: (1) Minority children attend school districts where allocation of funds for the teaching of lifetime physical activity is not a priority; (2) There is an emphasis on encouraging skill acquisition for competitive sports that appear to have the potential to improve economic well-being. This overemphasis on physical skill acquisition has the potential to detract from academic achievement; (3) No parks. This is a major environmental deterrent to participation, and it goes beyond having a park, but a park that is safe and well-maintained; (4) No programs; "if you build them they will come" is not necessarily applicable. A program that includes quality programming for all members of the community is essential and builds long-term sustainability; (5) No role models; (6) No family engagement. These last two items address the social influence that other human beings have on children, especially the long-term implications of adopting an active lifestyle.

From the above description of the problems, and the identification of barriers to increase participation and eliminate disparities in physical activity, a recommendation to incorporate more physical activity within the physical education system is warranted. Also, it is important to have safe neighborhoods

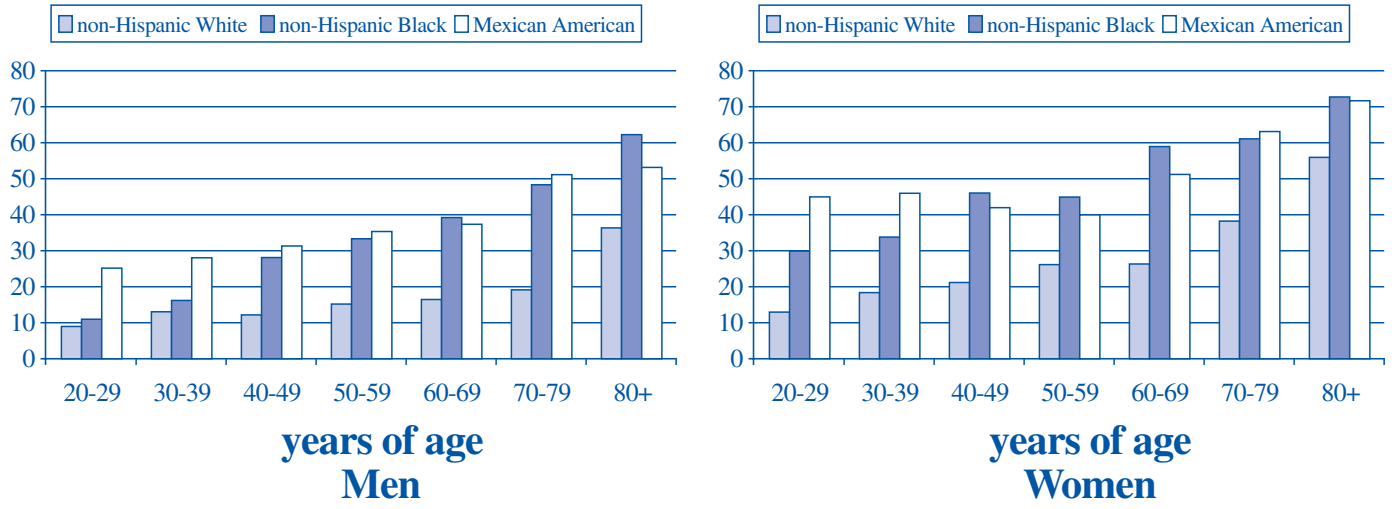

Figure 1
Age-specific prevalence of no leisure-time physical activity by race/ethnicity in men and women.
Source: Third National Health and Nutrition Examination Survey, 1988-1994 Adapted from Crespo et al., *Am J Prev Med* 2000:18:46-53

where both boys and girls can participate in lifetime affordable physical activities in an environment that is safe.

IV. Physical Activity Levels of Adults

The National Health and Nutrition Examination Survey is designed to obtain a national representative sample of Blacks and Mexican Americans. During NHANES III, the highest prevalence of physical inactivity was observed among non-Hispanic Blacks and Mexican Americans (Figure 1) (Crespo, Smit, Andersen, Carter-Pokras, & Ainsworth, 2000). As people aged, prevalence of physical inactivity increased, but for Mexican Americans, participation in physical inactivity during leisure time was very high early in adult life (Figure 1).

The Centers for Disease Control and Prevention recently updated health status surveillance for minority communities and identified participation in physical activity as part of the Racial and Ethnic Approaches to Community Health (REACH). The survey focused on Blacks, Hispanics, Asian/Pacific Islanders, and American Indians. The median percentage of men who met physical activity recommendations ranged from 24.1% among Asian/Pacific Islanders to 42.9% among American Indian communities. The median among women ranged from 17.3% in Asian/Pacific Islander communities to 35.9% in American Indian communities. With the exception of two communities, minority communities were more likely to engage less in physical activity compared with data from the general population. Nationally, 49.6% of men and 42.9% of women met the recommended levels of physical activity (*Morbidity and Mortality Weekly Report,* 2000; Centers for Disease Control and Prevention, 2004).

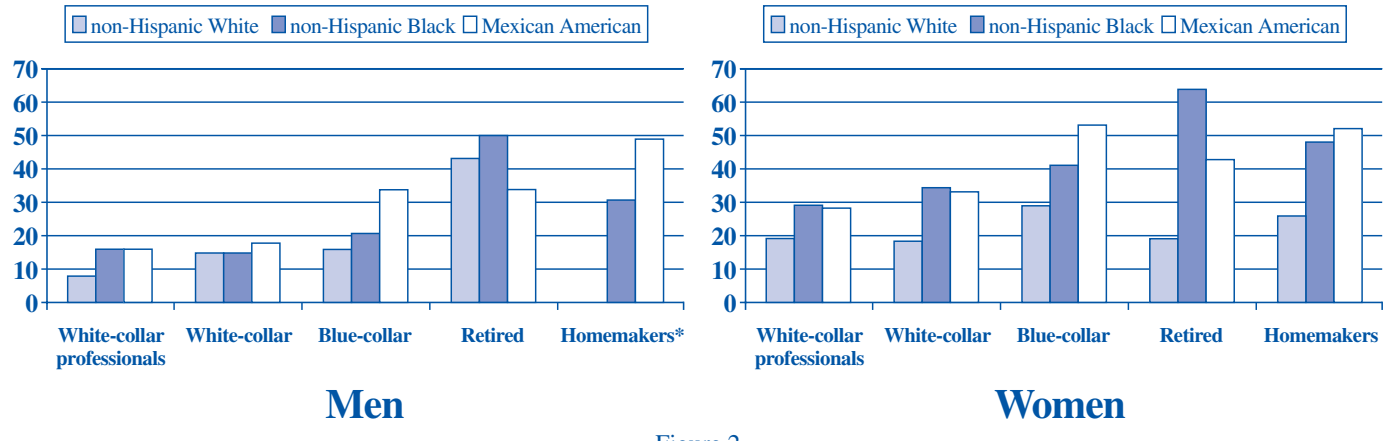

Figure 2
Occupation and prevalence of no leisure-time physical activity by race/ethnicity in men and women.
*Sample size too small to calculate prevalence estimates in non-Hispanic Whites.
Source: Third National Health and Nutrition Examination Survey, 1988-1994. Adapted from Crespo et al., *Am J Prev Med* 2000:18:46-53.

Table 1.
Age-adjusted prevalence of no leisure-time physical activity among non-Hispanic White, non-Hispanic Black and Mexican American men and women ages 20 years and older according to social class indicator, Third National Health and Nutrition Examination Survey, 1988-1994.

Social Class Indicator	Whites		African Americans		Mexican Americans	
Men	N	mean ± SE	N	mean ± SE	N	mean ± SE
Education•						
<12 y	1192	22 ± 2.1	913	33 ± 2.4[3]	1579	40 ± 1.6[4]
12 y	1062	15 ± 1.3	765	22 ± 2.3[1]	466	20 ± 3.8
13-15 y	624	13 ± 1.6	394	21 ± 3.2	267	13 ± 2.5
16+ y	821	7 ± 1.1	193	14 ± 2.7[2]	120	14 ± 4.0
Income†						
<$10,000	282	22 ± 4.5	423	40 ± 3.4[3]	379	43 ± 2.6[3]
$10,000-$19,999	887	21 ± 2.0	691	27 ± 2.3	850	42 ± 1.3[6]
$20,000-$34,999	906	15 ± 1.6	490	20 ± 2.6	530	23 ± 3.3[1]
$35,000-$49,999	594	10 ± 1.4	280	20 ± 2.7[1]	230	19 ± 3.8
$50,000+	1065	10 ± 1.1	416	20 ± 2.4[3]	478	31 ± 3.5[6]
Women						
Education•						
<12 y	1295	36 ± 3.1	990	51 ± 2.4[3]	1487	59 ± 1.5[5]
12 y	1559	25 ± 1.4	1018	45 ± 2.3[3]	557	34 ± 2.8[4]
13-15 y	804	15 ± 1.5	482	32 ± 3.1[3]	249	19 ± 3.2[3]
16+ y	709	14 ± 1.5	260	30 ± 3.2[3]	106	24 ± 6.0[3]
Income†						
<$10,000	566	30 ± 3.1	675	46 ± 3.9[3]	464	60 ± 2.6[6]
$10,000-$19,999	1025	27 ± 2.0	786	47 ± 2.2[3]	808	54 ± 2.0[6]
$20,000-$34,999	949	22 ± 2.0	531	38 ± 2.2[3]	478	43 ± 3.7[4]
$35,000-$49,999	622	16 ± 1.8	264	32 ± 3.2[3]	217	27 ± 3.6[3]
$50,000+	1250	20 ± 1.5	515	43 ± 2.8[3]	459	41 ± 2.6[3]

• based on years of school completed
† based on total annual household income
[1] p<0.05; [2] p<0.01; [3] p<0.001; different than non-Hispanic Whites
Adapted from Crespo CJ et al., *Am J Prev Med,* 2000; 18(1): 46-53

Social Class and Physical Inactivity in Racial/Ethnic Minorities

Difference in social class is hypothesized to be one of the main reasons why health disparities, including physical inactivity, exist in minority populations. Measurement of social class and its relation to health indicators is complex. Education is mostly related to health behavior, and income is mostly associated with the ability to purchase goods and services, such as health insurance, prescription medication, and access to health care (Liberatos, Link, & Kelsey, 1988). Table 1 shows that regardless of educational attainment or household earnings, both non-Hispanic Blacks and Mexican Americans were more physically inactive than non-Hispanic Whites.

A report using data from the National Health Interview Survey studied the percentage of employed adults reporting participation in leisure-time physical activity and who also reported hard occupational physical activity by race/ethnicity (*Morbidity and Mortality Weekly Report,* 2000). Non-Hispanic Whites had the lowest levels of physical inactivity and the highest percentages of adults meeting the recommended guidelines of moderate physical activity for 30 minutes 5 or more days a week. Non-Hispanic Whites also had the lowest percentages of employed adults who engaged in heavy work for 5 or more hours a day. Hispanics, on the other hand, reported engaging more frequently in highly physically active jobs for 5 or more hours a day than non-Hispanic Whites or Blacks, and had the highest levels of physical inactivity during leisure time. The results of this report are consistent with the thought that occupational activity may explain some racial/ethnic disparities.

To further examine these associations, the prevalence of no leisure-time physical activity by different categories of occupation using the U.S. Census Occupational Classification Codes was assessed (Crespo, Forde, Smit, & Andersen, 2000). NHANES III participants were divided into six occupational classifications: White-collar professionals; White-collar other, which includes those working in technical jobs and in offices; Blue-collar workers who engage in mostly manual labors, farming, and unskilled jobs; those who reported being retired; being homemakers; and other pursuits such as students or unemployed. Results indicate that regardless of occupational status, the prevalence of physical inactivity was highest among both non-Hispanic Black and Mexican American women. Among those who reported being in "white-collar professionals" occupations, non-Hispanic Black and Mexican American men had twice the age-adjusted rate of inactivity compared to observed rates among non-Hispanic Whites. Blue-collar workers' prevalence of physical inactivity was lowest among non-Hispanic White men, followed by non-Hispanic Black men, and highest among Mexican American men.

Other Socioeconomic Factors Influencing Minority Physical Activity

Older women may be more fearful of engaging in leisure-time physical activity if they perceive that the crime in their neighborhood is high (*Morbidity and Mortality Weekly Report,* 1999). This barrier was less significant among men. Since minorities tend to live in areas with high poverty, the interaction between poverty, area of residence and changes in physical activity in minority populations is of interest. Findings from the Alameda County Study suggest that these two are linked and deserve further validation in other communities.

Differences in Physical Activity Preferences Among Racial/Ethnic Minorities

The types of physical activities in which racial and ethnic minorities prefer to participate are different from those of non-Hispanic Whites. For example, social dancing consistently was one of the top five physical activities reported among non-Hispanic Black and Mexican American men and women as well as among non-Hispanic White women. Non-Hispanic White men reported golf as one of their top 10 activities, whereas Black men and Mexican American men reported basketball, baseball and soccer as popular activities. Walking and gardening consistently ranked in the "top 3" list for all groups. However, the advice to go for a walk cannot be generalized to all segments of society since certain neighborhoods may be perceived as less safe than others.

Acculturation may be a strong indicator influencing participation in physical activity, especially among Mexican Americans. Using a nationally representative sample of Mexican Americans, preferred language spoken at home was used as an indicator of acculturation. Mexican American men and women who spoke mainly English at home had a prevalence of physical inactivity that was similar to those of non-Hispanic Whites, whereas those who spoke mostly Spanish at home had higher levels of physical inactivity (Crespo, Smit, et al., 2000). Interestingly, among those who reported speaking both languages at home (English and Spanish), the prevalence of physical inactivity was in between those who spoke English and Spanish, suggesting a dose-response relationship between participation and leisure-time physical activity and acculturation. These findings are in agreement with those reported earlier by Ahmed et al., (2005) using a national representative sample of Hispanics. Other studies, however, have found that acculturation to the U.S. is a risk factor for obesity-related behaviors such as physical inactivity among Asian-American and Hispanic adolescents (Ahmed et al., 2005; Unger, Reynolds, Shakib, Spruijt-Metz, Sun, & Johnson, 2004). Thus, more research is needed to further understand which components of acculturation are strongly related to physical inactivity.

Barriers and Opportunities for Physical Activity

The Robert Wood Johnson Diversity Report on Physical Activity identified major barriers for participation in physical activity by asking community members, researchers and related personnel who work with African Americans, Latinos and American Indians (Robert Wood Johnson Foundation, 2004). The most salient barriers identified by this group in ascending order of relevance were: (1) Not enough time; (2) Not a priority; (3) Level of safety in neighborhood; (4) Not having the money; (5) No child care; (6) It's tiring or it's not fun; (7) Others would think I'm being selfish; (8) No parks; (9) No good programs; and (10) Not wanting to get sweaty.

The above barriers are not exclusive to minorities; for example, "not having enough time" has been recognized as a major barrier for not participating in physical activity by non-Hispanic Whites also. However, there are other barriers that disproportionately affect minorities such as level of safety in the neighborhood, no parks or lack of good programs.

V. Future Research

We need more research to understand the social and environmental barriers that interfere with racial and ethnic minorities exercising in their neighborhood. Other promising areas of research to increase participation in physical activity among women and minorities may include access to affordable fitness facilities, child care, crime prevention, and culturally appropriate social marketing.

VI. Conclusion

In summary, disparities in physical inactivity among minority populations and the need to understand specific barriers affecting racial and ethnic minorities have been identified. The prevalence of physical inactivity is higher in women than in men, but it is highest among minority women. Several correlates of physical inactivity in minority populations have been found, especially among children, such as television watching, neighborhood safety, and lack of adequate facilities. Other important determinants of physical inactivity include lack of culturally relevant forms of physical activity, participation in group activities, and the presence of co-morbidities associated with sedentary lifestyle and obesity.

There is a need to better understand how the built-environment influences participation in physical activity among minority populations. Research translation efforts that are linguistically and culturally appropriate are needed to facilitate the learning and adoption of lifetime active lifestyles among underserved populations. In an era where obesity and physical inactivity have been identified as major public health problems for the general public, we should not ignore the need of populations with the highest health disparities.

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