

Factors Influencing the Accumulation of Recommended Physical Activity among Latinos in the Deep South of the United States

Factores que Influyen en la Acumulación de Actividad Física Recomendada entre Latinos en el Extremo Sur de los Estados Unidos

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Abstract. Less than 40% of the U.S. population achieves the recommended amount of leisure-time physical activity (LTPA) recommended by the American College of Sports Medicine [ACSM (>150 minutes/week of moderate-intensity or equivalent vigorous-intensity LTPA)]. The number of Hispanic/Latino men and women who report being physically inactive is disproportionately higher than non-Hispanic/Latinos. The purpose of this investigation is to evaluate factors which influence the achievement of meeting ACSM recommendations for LTPA among adults with Hispanic/Latino ethnicity and whites (non-Hispanic/Latino) in the southern United States. Self-reported data collected as part of the Behavioral Risk Factor Surveillance System (BRFSS) was analyzed in male and female Hispanic/Latinos and non-Hispanic/Latino whites using the Andersen Model and Chi Square Analysis to examine the association between variables. Hispanic/Latino men/women were significantly less likely to meet the ACSM recommendations (> 150 minutes/week) compared to non-Hispanic/Latinos. Lower amounts of income, education, and access to health care were all significant factors of origin étnico hispano o latino y en caucásicos (que no son hispanos o latinos) en la región Sur de los Estados Unidos. Se recolectaron datos de cuestionarios autoadministrados que son parte del Sistema de Vigilancia de Factores de Riesgo del Comportamiento (Behavioral Risk Factor Surveillance System, BRFSS), los cuales se analizaron en hombres y mujeres hispanos o latinos y en caucásicos que no lo eran, por medio del Modelo de Andersen y pruebas de Chi cuadrado para examinar la asociación entre variables. Se encontró que los hombres y las mujeres latinos tenían una menor probabilidad de cumplir con las recomendaciones del ACSM (> 150 minutos/semana) en comparación con quienes no eran hispanos o latinos. Menores ingresos económicos, educación y acceso a los servicios de salud fueron factores significativos que condicionaban si los hispanos o latinos en el extremo Sur lograban las recomendaciones del ACSM para AFTL. Aunque el porcentaje de hispanos o latinos con sobrepeso fue considerablemente mayor que los caucásicos (no hispanos o latinos), la obesidad reportada fue mayor entre los caucásicos (no hispanos o latinos). La AFTL entre los dos grupos fue estadísticamente diferente, lo cual sugiere que no alcanzar las recomendaciones de actividad física se asocia con tener sobrepeso; sin embargo, otros factores también pueden contribuir en tener sobrepeso y obesidad.

Key words. physical activity, Hispanics, leisure, obesity, overweight, disease

Resumen. Menos del 40% de la población de los Estados Unidos cumple con la cantidad de actividad física de tiempo libre (AFTL) recomendada por el Colegio Americano de Medicina Deportiva [ACSM (> 150 minutos/semana de AFTL de intensidad moderada o su equivalente de intensidad vigorosa)]. La cantidad de hombres y mujeres hispanos o latinos que reportan ser físicamente inactivos es desproporcionadamente mayor que quienes no lo son. El propósito de esta investigación es evaluar los factores que pueden influir en alcanzar las recomendaciones del ACSM para AFTL en adultos de origen étnico hispano o latino y en caucásicos (que no son hispanos o latinos) en la región Sur de los Estados Unidos. Se recolectaron datos de cuestionarios autoadministrados que son parte del Sistema de Vigilancia de Factores de Riesgo del Comportamiento (Behavioral Risk Factor Surveillance System, BRFSS), los cuales se analizaron en hombres y mujeres hispanos o latinos y en caucásicos que no lo eran, por medio del Modelo de Andersen y pruebas de Chi cuadrado para examinar la asociación entre variables. Se encontró que los hombres y las mujeres latinos tenían una menor probabilidad de cumplir con las recomendaciones del ACSM (> 150 minutos/semana) en comparación con quienes no eran hispanos o latinos. Menores ingresos económicos, educación y acceso a los servicios de salud fueron factores significativos que condicionaban si los hispanos o latinos en el extremo Sur lograban las recomendaciones del ACSM para AFTL. Aunque el porcentaje de hispanos o latinos con sobrepeso fue considerablemente mayor que los caucásicos (no hispanos o latinos), la obesidad reportada fue mayor entre los caucásicos (no hispanos o latinos). La AFTL entre los dos grupos fue estadísticamente diferente, lo cual sugiere que no alcanzar las recomendaciones de actividad física se asocia con tener sobrepeso; sin embargo, otros factores también pueden contribuir en tener sobrepeso y obesidad.

Palabras claves. actividad física, hispanos, ocio, obesidad, sobrepeso, enfermedad

Introduction

Following years of multiple and conflicting reports on the recommended amount of physical activity needed for healthy adults, the American College of Sports Medicine (ACSM) set forth a clear and concise recommendation to diminish public misperception. In its 2011 Position Stand, ACSM recommends that healthy individuals, 18-65 years, accumulate > 30 minutes of moderate-intensity physical activity > 5 days/week (> 150 min/week) or > 20 minutes of vigorous-intensity physical activity > 3 days a week (> 75 min/week) (Garber et al., 2011). The recommended volume of physical activity represents the minimum quantity and quality of leisure-time physical activity (LTPA) needed to maintain and improve good health, prevent disease, and reduce the risk of early mortality in adults.

Numerous studies provide evidence that LTPA offers benefits to those who transition from a sedentary lifestyle to one that meets or exceeds the minimum requirements set forth from ACSM (Plaisance, Grandjean, & Mahurin, 2009). Performing the recommended 150 minutes of moderate LTPA per week has been shown to reduce blood pressure, risk of coronary heart disease, stroke, type 2 diabetes, and breast cancer in women and colorectal cancer in men (Plaisance et al., 2009). In addition to the physiological benefits, there are specific psychological benefits that have also been observed in those who meet the ACSM guidelines for LTPA. Studies have shown that LTPA can

deter and possibly prevent the effects of mild and moderate depression and increase vigor (Bartholomew, Morrison, & Ciccolo, 2005; Puetz, 2006). In older adults, LTPA reduces the risk of falls and slows the deterioration of bone mass (Nelson et al., 2007) while increasing quality of life (QOL) (Conn, Hafdahl, & Brown, 2009).

While organizations, such as ACSM, have set forth a clear recommendation for weekly physical activity in healthy adults, recent studies have found that most Americans fail to achieve these guidelines. For example, approximately 33% of the American population in 2008 reported not engaging in any form of LTPA. Furthermore, significant disparities exist in the accumulation of LTPA among different race/ethnic groups, such as Hispanics (Latinos) and African Americans, compared to non-Hispanic whites. Indeed, 37% of the U.S. Latino population was considered physically inactive as compared to 33% of the African American population and 22% of the non-Hispanic white population (Ickes & Sharma, 2012). While Latinos and African Americans seem to accumulate lower levels of physical activity compared to non-Hispanic whites, research has also shown that Latino women are the most inactive (Larsen, Pekmezi, Marquez, Benitez, & Marcus, 2013). The authors reported that approximately 48% of Latino women do not participate in LTPA as compared to 29% of non-Hispanic white women. These results highlight the trend that a large majority of Americans are exposed to risks that accompany a sedentary lifestyle and that certain cultural or environmental factors are responsible for the physical activity related disparities that exist between ethnic groups.

The likelihood that an individual will meet the physical activity recommendations set forth by ACSM and pursue a healthy lifestyle may be determined by their health behaviors. Health behaviors include

actions such as smoking and utilization of available health care facilities which may be influenced by ethnicity and cultural background. Margerison-Zilko and Cubbin found that non-Hispanic Whites had higher smoking rates than Hispanic/Latinos, although Hispanic/Latinos tend to initiate the habit of smoking at a much earlier age (Margerison-Zilko & Cubbin, 2013). Others have shown disparities in healthcare coverage and routine healthcare among Hispanics compared to non-Hispanic Whites (Villa, Wallace, Bagdasaryan, & Aranda, 2012). Since Hispanics typically experience a greater incidence of obesity and diabetes compared to non-Hispanic whites («Health disparities experienced by Hispanics—United States,» 2004), the role of physical activity and factors which increase the adoption of physical activity as part of a healthy lifestyle are crucial to reduce the disparities in health in this population. Therefore, the purpose of this investigation was to explore factors associated with the accumulation of LTPA between Hispanic/Latinos and non-Hispanic whites in the Deep South of the United States (U.S.) through the 2011 administration of the Behavioral Risk Factor Surveillance System (BRFSS).

Methods and Materials

The BRFSS is a collaborative project of the Centers for Disease Control and Prevention (CDC) and U.S. states and territories. The objective of the BRFSS is to collect uniform, state-specific data on preventive health practices and risk behaviors that are linked to chronic diseases, injuries, and preventable infectious diseases that affect the adult population (CDC, 2012c). This study used publicly available data from the 2011 survey administration of the BRFSS from 4 of the 6 Deep South states: Alabama, Georgia, Mississippi, and South Carolina. Response rates ranged from 24.39% to 45.72% (CDC, 2012b).

Theoretical Model

The Behavioral Model of Health Services Use by Ronald Andersen suggests that health outcomes are affected by health services use and social and individual determinants of health (Andersen, 2008; Gelberg, Andersen, & Leake, 2000). In the Andersen model, predisposing, enabling, and need characteristics predict personal health practices, including the use of health services, and, ultimately, health status. *Predisposing characteristics* such as gender, age, race/ethnicity, marital status, education, and employment describe the propensity of an individual to use health services such as routine medical checkups or explain personal health practices such as substance use (Anderson, 2008). *Enabling characteristics* refer to the individual's ability to gain access to needed health services. Potential health care access issues are related to family resources such as insufficient household income, lack of adequate health insurance coverage, not having a regular source of medical care, and lacking the financial means to pay for health care when needed (Anderson, 2008). *Perceived need for care* is also a component of this model. *Need* includes both self-perception of health status and clinically diagnosed chronic conditions such as asthma, cardiovascular disease, and diabetes (Anderson, 2008). Self-perception of good health may decrease perceived need for subsequent use of health services or to improve health practices, while individuals with actual health needs are likely to have more health care encounters that may result in more opportunities to discuss other preventive health services with their health care provider (Gelberg et al., 2000).

For this study, there were two main variables of interest: ethnicity [report being Hispanic/Latino or White (non-Hispanic/Latino)] and participating in 150 minutes or more of physical activity outside of work, or LTPA. Ethnicity was ascertained by the variable «RACE2», calculated to derive categories *White only, non-Hispanic; Black only, non-Hispanic; Asian only, non-Hispanic; Native Hawaiian or other Pacific Islander only, Non-Hispanic; American Indian or Alaskan Native only, Non-Hispanic; Other race only, non-Hispanic, Multiracial, non-Hispanic; Hispanic; Don't know/Not sure/Refused*; and *Missing*. In this study, *White only, non-Hispanic* and *Hispanic/Latino* were retained for

analysis (CDC, 2012a). Physical activity was calculated from previous survey measures to estimate if adults participated in 150 minutes (or vigorous equivalent minutes) of physical activity per week. The variable «_PA150R1» was dichotomized to having met the ACSM guidelines versus having not met the guidelines (150 minutes or more of LTPA). Previous categories for this variable were *150+ minutes (or vigorous equivalent minutes) of physical activity; 1-149 minutes (or vigorous equivalent minutes) of physical activity; 0 minutes (or vigorous equivalent minutes) of physical activity; and Don't know/Not Sure/Refused/ Missing* (CDC, 2012a).

Other factors included in the study were operationalized based on Andersen's behavioral model of health services use. The Andersen model components included predisposing factors such as sex (*Male/Female*), race/ethnicity (*Latino/Hispanic and White [non-Latino/Hispanic]*), education (*Less than high school, High school completion, Greater than high school completion*), marital status (*Married, Divorced/Separated/Widowed, Single, Member of Unmarried Couple*), and number of children in the Household (*0, 1-2, 3-4, 5 or more*). Enabling factors included household income (*less than \$25,000, \$25,000 - \$49,999,*

Table 1.
Chi-square analysis of the characteristics of Deep South participants by gender, Behavioral Risk Factor Surveillance System, 2011.

Survey Respondent Characteristics	Men		Women		Chi-Square Value	p-value
	n	%	n	%		
Sex	10,406	38.30	16,764	61.70	-	-
Ethnicity					1.36	0.243
Latino/Hispanic	363	3.49	541	3.23		
White (Non-Latino/Hispanic)	10,043	96.51	16,223	96.77		
Age					121.50	< 0.0001 *
18 - 34	1,441	13.90	1,844	11.08		
35 - 54	3,060	29.53	4,493	26.99		
55 - 64	2,414	23.29	3,758	22.58		
65 or Older	3,449	33.28	6,549	39.35		
Education					34.729	< 0.0001 *
< High School Completion	1,176	11.33	1,964	11.75		
High School Graduate	2,922	28.15	5,223	31.24		
> High School Completion	6,281	60.52	9,532	57.01		
Household Income					295.83	< 0.0001 *
< \$25,000	2,392	25.89	4,802	35.32		
\$25,000 - \$49,999	2,504	27.10	3,775	27.77		
\$50,000 - \$74,999	1,607	17.39	1,944	14.30		
\$75,000 or more	2,736	29.61	3,075	22.62		
Marital Status					915.33	< 0.0001 *
Married	6,700	64.49	8,921	53.38		
Divorced/Separate/ Widowed	2,238	21.54	6,416	38.39		
Single	1,270	12.22	1,161	6.95		
Member of Unmarried Couple	181	1.74	213	1.27		
# of Children (age <18) in Household					1.64	0.649
0	7,863	75.59	12,767	76.18		
1 - 2	2,049	19.70	3,225	19.24		
3 - 4	433	4.16	669	3.99		
5 or more	57	0.55	99	0.59		
General Health					10.87	0.012 *
Excellent	1,709	16.48	2,608	15.60		
Very Good/Good	6,448	62.17	10,272	61.46		
Fair	1,397	13.47	2,434	14.56		
Poor	818	7.89	1,400	8.38		
Body Mass Index					783.44	< 0.0001 *
Underweight	89	0.87	422	2.70		
Normal Weight	2,645	25.74	6,301	40.25		
Overweight	4,490	43.70	4,893	31.26		
Obese	3,050	29.69	4,039	25.80		
Self-report High Blood Pressure					17.72	0.0001 *
Yes	4,630	44.60	7,403	44.79		
Borderline	181	1.74	187	1.13		
No	5,571	53.66	8,938	54.08		
Self-report High Cholesterol					0.78	0.377
Yes	4,297	48.35	7,236	48.94		
No	4,590	51.65	7,548	51.06		
Heavy Alcohol Drinker					67.03	< 0.0001 *
Yes	674	6.93	715	4.53		
No	9,053	93.07	15,056	95.47		
Smoking Behavior during month					48.10	< 0.0001 *
Everyday	1,609	26.53	2,158	30.14		
Some days	487	8.03	726	10.14		
Non-smoker	3,968	65.44	4,276	59.72		
Last Medical Check-Up					183.66	< 0.0001 *
Within 12 months	7,145	70.92	12,591	77.21		
1 - 2 years	1,100	10.92	1,714	10.51		
3 - 4 years	843	8.37	961	5.89		
5 or more years	987	9.80	1,042	6.39		
Health Insurance Coverage					31.22	< 0.0001 *
Yes	8,999	86.84	14,901	89.09		
No	1,364	13.16	1,825	10.91		
Has a Personal Doctor					377.25	< 0.0001 *
Yes, only one	7,443	71.76	12,968	77.49		
Yes, more than one	1,008	9.72	2,033	12.15		
No	1,921	18.52	1,735	10.37		
Avoid Seeing a Doctor when necessary due to cost					61.59	< 0.0001 *
Yes	1,216	11.72	2,526	15.11		
No	9,157	88.28	14,195	84.89		
150 Minutes of Physical Activity per Week					102.68	< 0.0001 *
Yes	5,175	53.26	7,255	46.71		
No	4,541	46.74	8,277	53.29		

* = Significant at < 0.05

\$50,000 - \$74,999, and \$75,000 or more) and access to health care through factors such as having health insurance (Yes/No), having a personal health provider (Yes/No), not seeking health care when needed due to cost (Yes/No), and receiving last medical check-up (within 12 months, 1–2 years, 3–4 years, 5 or more years). Factors included in the study demonstrating need for physical activity included self-perception of health status (Excellent, Very Good, Good, Fair, Poor), Body Mass Index (Underweight, Normal Weight, Overweight, and Obese), self-reported chronic conditions such as hypertension (Yes, Borderline, High) and high cholesterol (Yes/No). Personal health practices were included in the model. Behaviors included as personal health practices were smoking (Everyday, Some Days, and Non-smoker) and heavy drinking. Heavy drinking for women is described as 1 or more drinks per day and 2 or more drinks per day for men.

SAS v.9.4 was used to perform count and weighted frequency analysis. χ^2 tests were performed on the sample data to obtain descriptive characteristics of the sample and to assess the significance of bivariate relationships between the outcomes of interest (i.e., ethnicity and ACSM guidelines). Analysis was limited to survey participants living in the four southern states: Alabama, Georgia, Mississippi, and South Carolina. Additionally, individuals who self-reported Hispanic/Latino ethnicity and individuals self-reporting White (non-Hispanic/Latino) race were included in the analysis. All other ethnic/racial groups and all other state/territory data were excluded from analysis. Other exclusions were made for missing data and participants reporting «I don't know» to variables included in the study.

Results

Among those included in our sample from the 2011 administration of the BRFSS living in the Deep South; approximately 38% were male and over 96% of study participants were White (Non-Hispanic/Latino). Significant differences were observed between men and women by age. For example, greater proportions of men were observed in age categories below age 65 (Table 1). Differences also existed by education status with greater proportions of women completing high school (31.24%) when compared to men, but men reported receiving greater than high school education in larger proportions (60.52%). Additionally, men reported greater proportions of higher household income and greater proportions of being married (Table 1).

Regarding health indices, greater proportions of men reported better health and lesser proportions of men reported smoking «everyday» or «some days» out of the past 30 days (Table 1). However, men reported greater proportions of heavy drinking when compared to women. Men also reported being overweight (43.70%) and obese (29.69%) in greater proportions than women (Table 1). Furthermore, men in the sample reported having a medical checkup in the past 12 months in lower proportions when compared to women (70.92% vs. 77.21%), while women reported greater proportions of not seeing a doctor due to medical costs during the past year (15.11%) (Table 1). Additionally, men reported being covered by health insurance and having a personal doctor in lower proportions when compared to women. In contrast, men reported greater proportions of the accumulation of at least 150 minutes of physical activity when compared to women (Table 1).

Differences in respondent characteristics were observed among participants who accumulated 150 minutes or more LTPA when compared to respondents who did not meet ACSM guidelines. Weighted estimates detail greater proportions of women (58.46%) not meeting the threshold of 150 minutes or more of LTPA within the study sample (Table 2). Significant differences were also observed between the proportions of Hispanic/Latino survey respondents meeting ACSM guidelines (5.23%) and Hispanic/Latino not meeting guidelines (6.95%) (Table 2). Examining socioeconomic status (SES), 65.29% of persons with greater than high school education reported accumulating 150 minutes or more of LTPA per week compared to 52.99% with similar education not meeting ACSM guidelines. Similar trends of accumulating

150 or more minutes of LTPA were observed for the highest level of income (27.71% vs. 19.50) when comparing meeting ACSM guidelines versus not meeting guidelines. Likewise, a greater proportion of those not meeting ACSM guidelines were observed among those with income levels less than \$25,000.00 (37.8%) (Table 2).

Regarding health indices, weighted estimates illustrate greater proportions of lower (fair 16.46%) (poor 9.59%) levels of perceived health, reporting high blood pressure (39.25%), reporting high cholesterol (47.65%), smoking everyday (38.35%), last having a checkup five or more years ago (11.14%), not seeing a doctor due to medical costs (21.57%), not having a personal doctor (23.10%), and not having health coverage (21.40%); was observed among those accumulating less than 150 minutes of LTPA per week when compared to survey respondents who did meet ACSM guidelines (Table 2). Additionally, survey participants who met ACSM guidelines regarding LTPA reported greater proportions of normal weight (39.81%) and lesser proportions of obesity (21.33%), when compared to participants with less than 150 minutes of LTPA per week (Table 2).

Table 2.
Chi-square analysis of the characteristics of Deep South participants by meeting ACSM guidelines for Physical Activity. Behavioral Risk Factor Surveillance System, 2011.

Survey Respondent Characteristics	≥ 150 minutes per week		< 150 minutes or more per week		Chi-Square Value χ^2	p-value
	n ^a	% ^b	n ^a	% ^b		
Sex					4,467.88	< 0.0001 *
Men	5,175	46.25	4,541	41.54		
Women	7,255	53.75	8,277	58.46		
Ethnicity					2,550.97	< 0.0001 *
Latino/Hispanic	347	5.23	471	6.95		
White (Non-Latin o/Hispanic)	12,083	94.77	12,347	93.05		
Age					2,572.93	< 0.0001 *
18 - 34	1,525	26.28	1,505	23.61		
35 - 54	3,430	32.12	3,701	34.78		
55 - 64	2,893	18.82	2,977	19.31		
65 or Older	4,582	22.78	4,599	22.29		
Education					35,051.41	< 0.0001 *
< High School Completion	944	9.04	1,867	15.40		
High School Graduate	3,231	25.66	4,253	31.60		
> High School Completion	8,236	65.29	6,669	52.99		
Household Income					24,641.75	< 0.0001 *
< \$25,000	2,667	28.56	3,968	37.88		
\$25,000 - \$49,999	2,943	27.48	2,969	28.34		
\$50,000 - \$74,999	1,812	16.25	1,582	14.27		
\$75,000 or more	3,357	27.71	2,212	19.50		
Marital Status					3,200.90	< 0.0001 *
Married	7,473	53.88	7,180	53.70		
Divorced/Separated/ Widowed	3,597	26.76	4,343	29.36		
Single	1,146	16.44	1,096	13.97		
Member of Unmarried Couple	196	2.92	174	2.97		
# of Children (age < 18) in Household					1,403.50	< 0.0001 *
0	9,453	68.58	9,703	66.99		
1 - 2	2,418	25.38	2,518	26.42		
3 - 4	498	5.08	522	5.90		
5 or more	60	0.95	75	0.69		
General Health					70,139.09	< 0.0001 *
Excellent	2,622	22.98	1,431	13.45		
Very Good/Good	8,053	63.82	7,519	60.50		
Fair	1,248	9.62	2,278	16.46		
Poor	485	3.59	1,549	9.59		
Body Mass Index					27,659.02	< 0.0001 *
Underweight	205	2.05	244	2.26		
Normal Weight	4,634	39.81	3,703	32.22		
Overweight	4,543	36.81	4,242	33.90		
Obese	2,708	21.33	3,969	31.61		
Self-report High Blood Pressure					9,593.35	< 0.0001 *
Yes	5,030	32.60	6,158	39.25		
Borderline	179	1.46	160	1.11		
No	7,114	65.94	6,367	59.65		
Self-report High Cholesterol					9,837.74	< 0.0001 *
Yes	4,990	39.82	5,816	47.65		
No	6,085	60.18	5,201	52.35		
Heavy Alcohol Drinker					3,963.16	< 0.0001 *
Yes	781	8.14	582	5.83		
No	11,385	91.86	11,890	94.17		
Smoking Behavior during month					5,321.07	< 0.0001 *
Everyday	1,408	31.79	2,090	38.35		
Some days	563	12.40	555	9.83		
Non-smoker	3,975	55.81	3,739	51.81		
Last Medical Check-Up					2,842.22	< 0.0001 *
Within 12 months	9,191	69.67	9,148	66.25		
1 - 2 years	1,292	11.65	1,325	12.71		
3 - 4 years	805	9.25	891	9.91		
5 or more years	872	9.43	1,026	11.14		
Health Insurance Coverage					4,707.76	< 0.0001 *
Yes	11,134	82.46	11,116	78.60		
No	1,259	17.54	1,671	21.40		
Has a Personal Doctor					1,803.96	< 0.0001 *
Yes, only one	9,490	70.04	9,521	67.26		
Yes, more than one	1,297	9.00	1,509	9.63		
No	1,616	20.96	1,762	23.10		
Avoid Seeing a Doctor when necessary due to cost					7,251.81	< 0.0001 *
Yes	1,388	16.80	2,093	21.57		
No	11,010	83.20	10,699	78.43		

^a = Crude count from study participants
^b = Weighted count of study participants
* = Weighted data significant at < 0.05

Table 3.
Chi-square analysis of the characteristics of Deep South participants by ethnicity, Behavioral Risk Factor Surveillance System, 2011.

Survey Respondent Characteristics	Latino/Hispanic		White (Non-Latino/Hispanic)		Chi-Square Value	p-value
	n ^a	% ^b	n ^a	% ^b		
Sex					757.67	<0.0001*
Men	363	47.53	1,004	43.66		
Women	541	52.47	1,623	56.34		
Age					4,806.60	<0.0001*
18 - 34	261	45.72	3,024	23.92		
35 - 54	343	38.55	7,210	32.82		
55 - 64	129	9.57	6,043	19.44		
65 or Older	160	6.17	9,838	23.82		
Education					47,386.75	<0.0001*
< High School Completion	240	31.71	2,900	11.55		
High School Graduate	280	28.77	7,865	29.23		
> High School Completion	375	39.52	15,438	59.22		
Household Income					2,118.64	<0.0001*
<\$25,000	358	53.27	6,836	32.76		
\$25,000 - \$49,999	204	24.11	6,075	28.02		
\$50,000 - \$74,999	65	10.15	3,486	15.39		
\$75,000 or more	123	12.47	5,688	23.83		
Marital Status					32,702.65	<0.0001*
Married	475	49.64	15,146	53.81		
Divorced/Separated/Widowed	211	16.56	8,443	29.05		
Single	161	25.05	2,270	14.61		
Member of Unmarried Couple	49	8.75	345	2.53		
# of Children (age < 18) in Household					68,040.09	<0.0001*
0	466	38.72	20,164	69.52		
1 - 2	303	42.00	4,971	24.90		
3 - 4	121	16.79	981	4.84		
5 or more	13	2.50	143	0.74		
General Health					5,094.06	<0.0001*
Excellent	137	16.08	4,180	18.01		
Very Good/Good	559	61.40	16,161	62.06		
Fair	147	18.58	3,684	12.87		
Poor	58	3.94	2,160	7.05		
Body Mass Index					1,139.41	<0.0001*
Underweight	18	1.48	493	2.20		
Normal Weight	254	34.15	8,692	36.06		
Overweight	314	39.68	9,069	35.13		
Obese	216	24.69	6,873	26.61		
Self-report High Blood Pressure					17,641.33	<0.0001*
Yes	268	19.70	11,765	37.12		
Borderline	7	0.41	361	1.33		
No	618	79.89	13,891	61.55		
Self-report High Cholesterol					4,718.90	<0.0001*
Yes	246	31.53	11,287	43.97		
No	395	68.47	11,743	56.03		
Heavy Alcohol Drinker					1,330.48	<0.0001*
Yes	30	4.24	1,359	7.02		
No	779	95.76	23,330	92.98		
Smoking Behavior during month					4,867.82	<0.0001*
Everyday	84	26.61	3,683	35.75		
Some days	52	21.01	1,161	10.80		
Non-smoker	192	52.38	8,052	53.45		
Last Medical Check-Up					4,785.06	<0.0001*
Within 12 months	589	61.70	19,147	68.25		
1 - 2 years	129	16.40	2,685	12.08		
3 - 4 years	77	13.21	1,727	9.28		
5 or more years	73	8.70	1,956	10.39		
Health Insurance Coverage					8,1093.60	<0.0001*
Yes	610	50.22	23,290	82.31		
No	292	49.78	2,897	17.69		
Has a Personal Doctor					79,294.86	<0.0001*
Yes, only one	515	42.28	19,896	69.99		
Yes, more than one	69	4.43	2,972	9.85		
No	317	53.29	3,339	20.16		
Avoid Seeing a Doctor when necessary due to cost					1,3943.52	<0.0001*
Yes	226	31.59	3,516	18.40		
No	673	68.41	22,679	81.60		
150 Minutes of Physical Activity per Week					2,550.97	<0.0001*
Yes	347	41.71	12,083	49.18		
No	471	58.29	12,347	50.82		

^a = Crude count from study participants
^b = Weighted count of study participants
* = Weighted data significant at < 0.05

Regarding weighted estimates of different proportions in participant characteristics within our sample, a lesser proportion of the sample were women (52.47%) when compared to White (Non-Hispanic/Latino) (Table 3).

The participants of Hispanic/Latino ethnicity self-reported younger age categories in greater proportions when compared to their White (non-Hispanic/Latino) counterparts in the study. Regarding socioeconomic status (SES), the Hispanic/Latino group reported lower household income in greater proportions and lower proportions of education beyond completing high school (Table 3). Survey respondents with Hispanic/Latino ethnicity reported lesser proportions of high blood pressure (19.70%), lesser proportions of high cholesterol (31.53%), lower proportions of heavy alcohol drinking (4.24%), and lower proportions of smoking everyday (26.61%) when compared to White (Non-Hispanic/Latino) respondents (Table 3). When examining BMI, participants with Hispanic/Latino ethnicity reported greater proportions of overweightness (39.68%), but lesser proportions of obesity (24.69%) when compared to White (Non-Hispanic/Latino). Still, survey participants with Hispanic/Latino ethnicity reported mee-

ting the ACSM guidelines of 150 minutes of LTPA in lower proportions than Whites (Non-Hispanic/Latino) (Table 3).

Discussion

The purpose of this investigation was to examine factors which are associated with achieving the recommended minimum amount of moderate-intensity (or vigorous activity equivalent) physical activity (e> 150 minutes/week) for health among participants of Hispanic/Latino ethnicity and non-Hispanic/Latino whites within 4 states in the United States Deep South (Mississippi, Alabama, Georgia, South Carolina). Our results are in agreement with others (Crespo, Smit, Carter-Pokras, & Andersen, 2001) that persons of Hispanic/Latino ethnicity reported lower proportions of meeting ACSM recommendations for the accumulation of LTPA (> 150 minutes/week) compared to non-Hispanic/Latino whites. When comparing physical activity by race/ethnicity, our findings indicate that individuals with lower than high school education and combined annual household income below \$25,000 were considerably less like to achieve the ACSM recommendations for LTPA. In a related fashion, not seeing a physician due to medical costs was highly associated with lower categorical reporting of meeting recommended LTPA levels. The findings also indicate a higher rate of being overweight among Hispanic/Latinos compared to White (non-Hispanic/Latino) which is in line with the lower probability of achieving the physical activity recommendations or that being overweight makes it more difficult to initiate LTPA, thereby limiting the number of individuals achieving the recommendations.

Hispanic/Latinos in the U.S., are one of the largest ethnic groups in the country comprising over 48 million individuals or 15.7% of the population (Ickes & Sharma, 2012). Unfortunately, significant disparities have been observed in overweight and obesity (Flegal, Carroll, Ogden, & Curtin, 2010; «Health disparities experienced by Hispanics—United States.» 2004). The consequences of overweight and obesity include chronic disease conditions such as diabetes, cancer and cardiovascular disease. As the number of Latinos in the U.S. is expected to double by 2050 (Martyn-Nemeth, Vitale, & Cowger, 2010), it is crucial that we explore novel lifestyle interventions to reduce overweight/obesity as a strategy to reduce the personal and economic burden of disease. Previous investigations indicated that lifestyle interventions which combine both energy restriction and exercise provide superior effects on weight loss and weight maintenance than energy restriction or physical activity alone (Redman et al., 2009). Therefore, physical activity is an important component of a healthy lifestyle for weight maintenance and for reducing the burden of disease even in the presence of weight-gain following energy restriction and exercise (Fisher, Hunter, & Gower, 2012). While it is clear that physical activity/exercise produces numerous health benefits, the primary issue for the field is how to increase the number of individuals who perform physical activity on a daily basis.

Epidemiological evidence indicates that more than 60% of the U.S. population is physically inactive (Office of the Surgeon et al., 2001). Within the population, there are considerable disparities between the accumulation of LTPA with Hispanic/Latinos attaining over 40% less physical activity than non-Hispanic whites (Larsen et al., 2013). In the current investigation using interview data from the BRFSS, we found that Hispanic/Latino men and women are significantly less likely to report engaging in physical activity that meets or exceeds the ACSM recommendations. We found that education beyond high school, greater income and a lower burden of cost to seek medical support as significant factors of whether someone met or did not meet the physical activity recommendations by ACSM. While previous studies have shown significant disparities in health coverage and routine health care between Hispanic/Latino and non-Hispanic white populations (Villa et al., 2012), this study is the first to show that not seeing a physician due to medical costs or having a check-up for 5 or more years, also is associated with lower probability of meeting the ACSM recommendations for physical activity among Deep South residents. These findings are important as they indicate that SES has a major influence on whether individuals

meet the ACSM recommendations or not. An interesting finding from this study was that Hispanic/Latinos had a greater proportion of overweightness compared to Whites (non-Hispanic/Latino) suggesting that not achieving the physical activity recommendations is linked with the likelihood of being overweight or that being overweight increases the burden of performing LTPA, thereby reducing the propensity to achieve the ACSM recommendations. Future studies are required to determine the magnitude of the association between race/ethnicity and physical activity guidelines, and the influence of related factors on the association of ethnicity and LTPA. Additionally, prospective studies should be considered to help determine causal relationships with regards to these findings since previous studies show that exercise improves mechanical efficiency for a given task, thereby increasing the likelihood that an individual will expend a greater amount of activity and non-activity related energy expenditure which would be expected to produce beneficial effects on weight loss and maintenance (Hunter, Bickel, Fisher, Neumeier, & McCarthy, 2013).

One of the primary limitations of this study is that over 96% of the study participants within the BRFSS dataset were White (non-Hispanic/Latino). However, weighted and unweighted measures for each parameter suggest that the interpretation of our data and inference to the larger population of the U.S. Deep South is valid. Another limitation was that we were unable to incorporate any measures of dietary quantity or quality and their influence on the overall prediction of achieving the recommendations. Additionally, due to the cross-sectional nature of the study, we are unable to determine temporal sequence to ascertain causality. Longitudinal studies are required to more thoroughly evaluate the contribution of each of the predictor variables on the achievement of the ACSM recommendations. Finally, we are limited by selection bias and recall bias. Although many persons were asked to be interviewed for the BRFSS, participants self-selected to participate. In addition, participants were asked a series of questions related to different time periods during the past 30 days, past year, and past 5 years. Thus, participants may have recalled events in error, resulting in bias by the respondent. Still, strengths of the study include an exploratory examination of the «Deep South» population regarding physical activity and factors influencing the achievement of ACSM guidelines among a specific minority. Moreover, this study illustrates the importance of individual, contextual, and behavioral factors in influencing physical activity accumulation.

In conclusion, the results of the current investigation indicate that Hispanic/Latino men/women are significantly less likely to meet the ACSM recommendations (> 150 minutes/week) compared to non-Latino/Hispanics. Lower amounts of income, education, and access to health care are all important determinants of whether Hispanic/Latinos in the Deep South achieved the ACSM recommendations.

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