

Sociodemographic Predictors of Physical Inactivity in Montana Adults

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Abstract Background: Physical activity (PA) intervention strategies that target specific priority populations can achieve greater public health impact. The aim of this research was to find sociodemographic predictors of physical inactivity (PIA) using multivariate analyses. **Methods:** Data for this study came from the 2020 Montana Behavioral Risk Factor Surveillance System (BRFSS). Seven different categorical sociodemographic characteristics (SDCs) were used and included age, sex, race/ethnicity, income, education, marital status, and rural/urban status. PIA was assessed from a question asking adults if they participated in any physical activities or exercises during the past month. Multiple logistic regression was employed to examine the relationship between the SDCs and PIA. **Results:** Bivariate analyses showed significant ($p < .0001$) relationships between PIA and age, income, education, marital status, and rural/urban status. Whereas, sex and race/ethnicity were not significantly related to PIA. Fully adjusted regression models showed increasing odds of PIA as age increased from reference group 18 to 24 years (ORs: 1.84 to 3.87, p for trend $< .0001$), as income decreased from reference group \$50,000+ (ORs: 1.42 to 2.73, p for trend $< .0001$), and as formal education decreased from reference group college graduate (ORs: 2.08 to 4.60, p for trend $< .0001$). Marital status and rural/urban status both lost predictive ability in light of the other SDCs. Additionally, analyses stratified by race/ethnicity indicated considerably greater odds (OR = 5.13, 95% CI: 1.58 – 16.74) of PIA for Hispanic females (compared to males), with no other race/ethnicity sex differences seen. **Conclusion:** This study found that several SDCs relate to PIA in adults. Health promotion specialists concerned with increasing PA should consider independently targeting lower income, less educated, and older individuals. Hispanic females may be a priority population for PIA intervention in the state of Montana.

Keywords: Physical activity (PA), Sociodemographic characteristics (SDCs), health promotion

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1. Introduction

Physical activity (PA) is recommended for all adults because of its protective effects against chronic disease and its ability to improve health-related quality of life (HRQOL) [1,2,3]. Thus, physical inactivity (PIA) is a health risk behavior of major concern to public health. The goal set by *Healthy People 2030* is to reduce the proportion of adults who engage in no leisure-time PA from 25.4% to 21.2% [4]. One intervention strategy that can increase the likelihood of success for reaching this objective is a health promotion needs assessment [5]. Included in a thorough needs assessment is a data collection procedure or epidemiological evaluation where subgroups at greater risk for health problems can be identified. For instance, with data indicating greater prevalence of PIA in certain sociodemographic subgroups, interventions can be designed specifically for these populations so as to increase effectiveness [6,7,8,9]. Despite this health promotion planning logic, multivariate data identifying special need populations for PIA are

surprisingly sparse. Therefore, the aim of this study was to examine the independent predictive ability of several different sociodemographic characteristics (SDCs) for PIA in adults.

2. Materials & Methods

Data for this study came from the 2020 Behavioral Risk Factor Surveillance System (BRFSS) and methodological details can be found elsewhere [10,11]. Briefly, the BRFSS is a state-based annual telephone survey designed to collect data on health behaviors and health status in noninstitutionalized U.S. adults 18 years of age and older. The Montana BRFSS data only were used for this study.

Seven different categorical sociodemographic variables (SDCs) were created for this study and included age, sex, race/ethnicity, income, education, marital status, and rural/urban status. Sex was used as a categorical male or female variable. Age was converted from numeric form to a six group categorical variable, including: 1) 18 to 24, 2) 25 to 34, 3) 35 to 44, 4) 45 to 54, 5) 55 to 64, and

6) 65+ years of age. Race was used as a categorical variable and comprised the following four groups: 1) Non-Hispanic White, 2) American Indian, 3) Hispanic, and 4) Multiracial. Income was used as a categorical variable, collected as household income, and comprised five different income brackets consisting of: 1) less than \$15,000, 2) \$15,000 to \$24,999, 3) \$25,000 to \$34,999, 4) \$35,000 to \$49,999, and 5) \$50,000+. Education was used as a categorical variable and comprised the following four categories: 1) Did not graduate high school, 2) Graduated high school, 3) Attended some college, 4) Graduated college. Marital status was used as a categorical variable indicating married (married or member of an unmarried couple) or not married (divorced, widowed, separated, or never married). Finally, rural/urban status was used as a categorical variable where those residing in a rural county were considered “rural” and those residing in an urban county were considered “urban”.

The physical inactivity (PIA) outcome variable in this study was created from a question asking participants if they did any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise. Participants who reported “no” were considered participating in no PA.

Statistical analyses included prevalence estimates (%) with standard errors (SEs) and 95% confidence intervals (CIs) for PIA overall and across each SDC. Tests for two-way relationships were employed using the Rao-Scott chi-square statistic (χ^2_{RS}). Logistic regression was used to estimate the odds of PIA (compared to not) for those within the respective SDC over the odds of PIA (compared to not) for those within the reference SDC. Analyses were weighted to produce generalizations representative of noninstitutionalized adults in Montana. SAS version 9.4 and SPSS version 27 were used for all analyses [12,13,14,15].

3. Results

A total of $N = 6,305$ participants had complete PA data with a loss of 79, 953, 15, and 44 for race/ethnicity, income, education, and marital status analyses, respectively. Table 1 contains prevalence of PIA overall and by SDC. Results showed significant ($ps < .001$) PIA and SDC relationships for age, income, education, marital status, and rural/urban status. No significant relationship was found between PIA and sex ($p = .3735$) or race/ethnicity ($p = .3376$).

Table 1. Prevalence of physical inactivity (PIA) by sociodemographic characteristic (SDC) in Montana adults, 2020

SDC	No Physical Activity					χ^2_{RS} <i>p</i>
	<i>N</i>	%	<i>SE</i>	<i>LL</i>	<i>UL</i>	
Overall	1,284	18.9	0.6	17.8	20.1	< .0001
Sex	1,284					.3735
Males		18.4	0.8	16.8	20.0	
Females		19.5	0.9	17.8	21.1	
Age Group (yr)	1,284					< .0001
18 to 24		11.9	1.7	8.7	15.2	
25 to 34		13.8	1.5	10.8	16.9	
35 to 44		16.2	1.6	13.1	19.2	
45 to 54		19.8	1.6	16.8	22.9	
55 to 64		20.7	1.4	18.0	23.4	
65+		25.4	1.1	23.1	27.6	
Race/Ethnicity	1,268					.3376
White		18.4	0.6	17.2	19.6	
American Indian		23.6	2.8	18.1	29.1	
Hispanic		20.5	4.4	11.9	29.1	
Multiracial		18.9	3.8	11.4	26.4	
Income (\$)	1,063					< .0001
<15,000		33.8	3.0	28.0	39.6	
15,000 to 24,999		26.1	1.9	22.4	29.8	
25,000 to 34,999		24.5	2.1	20.4	28.5	
35,000 to 49,999		19.4	1.8	16.0	22.9	
50,000+		12.5	0.7	11.1	13.9	
Education	1,279					< .0001
Did not graduate high school		34.0	3.3	27.5	40.5	
Graduated high school		24.8	1.2	22.4	27.2	
Attended some college		18.6	1.0	16.6	20.6	
Graduated college		9.1	0.6	7.9	10.4	
Marital Status	1,277					< .0001
Married		17.0	0.7	15.5	18.4	
Not married		21.8	1.0	19.9	23.8	
Rural Status	1,284					.0004
Rural		21.7	1.0	19.8	23.7	
Urban		17.4	0.7	16.0	18.9	

Note. $N = 6,305$. % is prevalence estimate. LL and UL are the lower limit and upper limit for the 95% confidence interval estimating population %. χ^2_{RS} is Rao-Scott chi-square statistic for difference in proportions.

Table 2. Multiple regression analyses examining the association between each sociodemographic characteristic (SDC) and physical inactivity (PIA) in Montana adults, 2020

SDC	Unadjusted			Age & Sex Adjusted			Fully Adjusted		
	OR	LL	UL	OR	LL	UL	OR	LL	UL
Sex									
Males	1.00	reference		1.00	reference		1.00	reference	
Females	1.07	0.92	1.25	1.05	0.90	1.23	1.05	0.88	1.25
Age Group (yr)									
18 to 24	1.19	0.79	1.77	1.18	0.79	1.77	1.84	1.14	2.96
25 to 34	1.42	0.97	2.09	1.42	0.97	2.09	2.61	1.63	4.17
35 to 44	1.82	1.26	2.63	1.82	1.26	2.63	3.38	2.15	5.32
45 to 54	1.92	1.35	2.74	1.92	1.35	2.73	3.40	2.20	5.26
55 to 64	2.51	1.80	3.51	2.50	1.79	3.50	3.87	2.56	5.85
65+	1.00	reference		1.00	reference		1.00	reference	
<i>p</i> for trend	< .0001			< .0001			< .0001		
Race/Ethnicity									
White	1.00	reference		1.00	reference		1.00	reference	
American Indian	1.37	0.99	1.88	1.57	1.14	2.15	0.98	0.65	1.47
Hispanic	1.14	0.67	1.95	1.40	0.82	2.39	0.98	0.54	1.80
Multiracial	1.03	0.63	1.69	1.20	0.72	2.01	1.22	0.66	2.24
Income (\$)									
<15,000	3.58	2.67	4.79	3.94	2.92	5.33	2.73	1.94	3.83
15,000 to 24,999	2.47	1.96	3.11	2.72	2.14	3.45	1.81	1.38	2.39
25,000 to 34,999	2.27	1.75	2.93	2.38	1.83	3.08	1.87	1.42	2.48
35,000 to 49,999	1.69	1.31	2.18	1.70	1.31	2.20	1.42	1.08	1.87
50,000+	1.00	reference		1.00	reference		1.00	reference	
<i>p</i> for trend	< .0001			< .0001			< .0001		
Education									
Did not graduate high school	5.12	3.70	7.07	6.05	4.38	8.37	4.60	3.09	6.86
Graduated high school	3.28	2.69	3.99	3.72	3.05	4.54	3.00	2.39	3.78
Attended some college	2.27	1.87	2.77	2.41	1.98	2.94	2.08	1.66	2.60
Graduated college	1.00	reference		1.00	reference		1.00	reference	
<i>p</i> for trend	< .0001			< .0001			< .0001		
Marital Status									
Married	1.00	reference		1.00	reference		1.00	reference	
Not married	1.36	1.17	1.59	1.55	1.31	1.83	1.07	0.87	1.30
Rural Status									
Rural	1.32	1.13	1.54	1.26	1.08	1.46	1.07	0.89	1.29
Urban	1.00	reference		1.00	reference		1.00	reference	

Note. OR is odds ratio. LL and UL are the lower limit and upper limit for the 95% confidence interval estimating population OR. ORs defined as odds of PIA (compared to not) for those within the respective SDC over the odds of PIA (compared to not) for those within the reference SDC. ORs in bold are significantly ($p < .05$) different from reference.

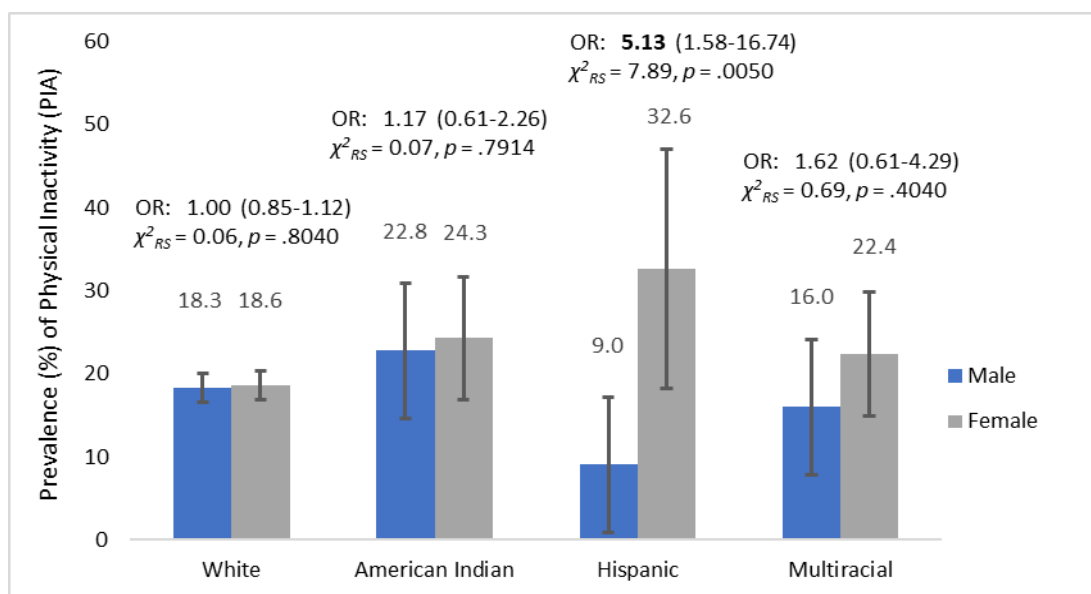


Figure 1. Prevalence of PIA by sex and race/ethnicity in Montana adults, 2020 (Note. $N = 6,226$. OR (95% CI) is odds ratio defined as odds of PIA (compared to not) for those who are female over the odds of PIA (compared to not) for those who are male. CI is confidence interval. ORs are by race/ethnicity. χ^2_{RS} is Rao-Scott chi-square statistic for difference in proportions. ORs in bold are significantly ($ps < .05$) different from reference)

Table 2 contains the multiple regression analyses examining the association between each SDC and PIA. Fully adjusted regression models showed increasing odds of PIA as age increased from reference group 18 to 24 years (ORs: 1.84 to 3.87, p for trend $< .0001$), as income decreased from reference group \$50,000+ (ORs: 1.42 to 2.73, p for trend $< .0001$), and as formal education decreased from reference group college graduate (ORs: 2.08 to 4.60, p for trend $< .0001$). In the age and sex adjusted models, PIA was associated with marital status (OR = 1.55, 95% CI: 1.31 – 1.83) and rural/urban status (OR = 1.26, 95% CI: 1.08 – 1.46), however, both lost predictive ability in the fully adjusted model with all SDCs. Figure 1 displays the PIA and sex relationship stratified by race/ethnicity. This graph indicates considerably greater odds (OR = 5.13, 95% CI: 1.58 – 16.74) of PIA for Hispanic females (compared to males). No other race/ethnicity sex differences were significant.

4. Discussion

The purpose of this study was to examine the independent predictive ability of several different sociodemographic characteristics (SDCs) for PIA in adults. Crude associations indicate that age, income, education, marital status, and rural/urban status each predict PIA, with sex and race/ethnicity providing no predictive power. Multivariate analyses confirmed sex and race/ethnicity unrelated to PIA with marital status and rural/urban status added to those null associations. Thus, age, income, and education were shown to be independent predictors of PIA, with the lower income, less educated, and older adults seeing the greatest prevalence of PIA. The most noteworthy finding from this study, however, is the PIA and sex relationship in Hispanics. These findings showed that Hispanic females had considerably greater prevalence of PIA, as compared to their male counterparts. This finding is particularly noteworthy due to the fact that both sex and race/ethnicity were neither crude nor multivariate predictors of PIA. Therefore, race/ethnicity moderated the sex-by-PIA relationship.

The fact that this study used a large representative sample of noninstitutionalized adults in Montana adds to the strength of these results. Additionally, the large number of SDCs assessed by the BRFSS allowed for a thorough examination using several predictor variables. These findings should aid health promotion program planning in the state of Montana. However, some limitations are worth mentioning. The most critical limitation of the BRFSS is its cross-sectional nature. This limitation underscores the fact that cause-and-effect associations are not possible and that this paper in no way implies that any particular SDC causes PIA. As well, the PIA outcome variable in this research was assessed via a self-report mechanism using telephone interviews. Therefore, misclassification and measurement error cannot be ruled out. Consequently, findings from this study should be viewed with caution.

5. Conclusions

This study found that several SDCs relate to PIA in adults. Health promotion specialists concerned with increasing PA should consider independently targeting adults with lower income, who are less educated, and who are older in age. Hispanic females may be a priority population for PIA intervention in the state of Montana.

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