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Health Behaviors of Native Hawaiian and Pacific Islander Adults in California

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Abstract

Smoking, diet and physical activity are associated with chronic diseases, but representative prevalence data on these behaviors for Native Hawaiian and Pacific Islander (NHPI) adults are scarce. Data from the 2005 California Health Interview Survey were analyzed for self-identified NHPI and non-Hispanic white (NHW) adults. Ethnic and NHPI gender differences were examined for socio-demographic variables, obesity and health behaviors. Compared to NHW, NHPI displayed higher prevalence of obesity ($p < 0.001$), smoking ($p < 0.05$) and consumption of unhealthy foods and beverages ($p < 0.05$). NHPI males were more likely than females to smoke ($p < 0.001$). NHPI adults appear to be at higher risk for chronic disease than NHW due to obesity, smoking and intake of unhealthy foods and beverages. Culturally-specific health promotion interventions are needed to reduce risks among the underrepresented NHPI population.

Keywords

diet; physical activity; smoking; obesity; health disparities; health promotion; Pacific Islanders

Introduction

Native Hawaiian and Pacific Islander (NHPI) populations display some of the highest levels of adult obesity world-wide^{1–5} and suffer disproportionately from chronic diseases such as cardiovascular disease,^{6–8} diabetes,^{9–11} and cancer.^{12,13} Despite the 1997 mandate that all federal programs recognize and identify ‘Native Hawaiians and Pacific Islanders’ separately from ‘Asians’,¹⁴ disaggregated health data for NHPIs remain sparse.

Healthy People 2010 acknowledged the diversity and disparities among US NHPIs, as well as the need to oversample and increase funds for studies where substantial numbers of NHPI reside. The majority of US NHPIs reside in two states: Hawai‘i and California. Between

2005-2006, California had the highest annual growth rate of NHPs (3,400), accounting for >25% of the increase in US NHP population.¹⁵

Smoking, diet and physical activity behaviors are risk factors for multiple leading chronic diseases, but adult prevalence data on these behaviors specific to NHPs in the U.S. are scarce, and available literature from non-representative samples have reported wide ranges. The proportion of current cigarette smokers has ranged from 15%¹⁶ to 49%,³ and the prevalence of eating at least five daily servings of fruits and vegetables (F&V) has ranged from 1%³ to 41%.^{16,17} Self-reported data from a San Diego-based studies reported that 20%³ to 33%¹⁶ of NHP participants engaged in sufficient levels of physical activity to reap health benefits, and only 3% of a Tongan sample was sufficiently active according to objective accelerometer data.¹⁸ None of the NHP studies cited were based on random or representative samples, and Healthy People 2010 did not report NHP data because samples did not meet criteria for reliability or quality. In the U.S., the non-Hispanic White (WH) population typically serves as the reference group for reporting and comparing minority health statistics. Ethnic-specific prevalence data on these important behaviors are necessary for developing health promotion priorities and strategies to decrease chronic disease among the underserved NHP populations and support Healthy People 2010 goals to eliminate health disparities.¹⁹

The present paper reports behavioral prevalence data collected during the 2005 California Health Interview Survey (CHIS) among NHP adults (≥ 18 years) in California, compares findings to the (WH) population, and examines socio-demographic correlates of health behaviors among the NHP sample.

Methods

The California Health Interview Survey (CHIS) is a random-digit-dial telephone survey conducted biannually to provide population-based estimates for California.²⁰ CHIS is the largest telephone survey in California and the largest state health survey in the US. A two-stage, geographically-stratified design was utilized in an effort to produce a representative sample of California adults (<http://www.chis.ucla.edu>). At stage one, a random sample of telephone numbers was computer-generated for 44 predefined geographic areas and screened for eligibility. At stage two, one adult aged 18+ years from each of the ~44,500 households was randomly selected to be interviewed on fourteen health-related topics via a computer-assisted telephone interviewing system. CHIS interviewers completed ~12 hours of training on interviewing techniques and the computer-assisted protocol, and were monitored throughout data collection for quality control. Pilot testing revealed that mean completion time for the entire interview was 39.2±8.8 minutes. Demographic and health behavior sections were completed in 2.5±1.2 and 8.1±2.4 minutes, respectively, which included additional variables not analyzed in the present study. The overall response rate was 29.2%.

Demographic (gender, highest level of education, annual household income), body mass index (BMI) and health behavior (tobacco use, dietary intake, leisure-time physical activity) variables were retrieved from the 2005 CHIS for individuals who self-identified as NHP or WH, according to US Census 2000 definitions.²¹ Education levels were categorized ranging from 'no formal education' to 'at least a Bachelor's degree' and mean annual household income was reported as a continuous variable. NHP ethnicity was defined as "any person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands", and included 'Native Hawaiian', 'Guamanian or Chamorro', 'Samoan', and 'Other Pacific Islander' races. The WH sample was defined as "any person having origins in any of the original peoples of Europe, the Middle East, or North Africa", and included individuals

who indicated their race as "White" or reported entries such as Irish, German, Italian, Lebanese, Near Easterner, Arab, or Polish. The NHPI sample was analyzed collectively, rather than being disaggregated into subgroups, due to the small sample size. All data were presented for NHPI and WH groups, and by gender.

Tobacco use questions on the CHIS 2005 were standard smoking questions used by the U.S. Census Bureau, National Cancer Institute and the Centers for Disease Control and Prevention. Although validity and reliability have not been reported, these questions are similar to those used in the California Tobacco Surveys since 1990.^{22,23} Respondents who had smoked 100+ cigarettes in their lifetime were classified as 'ever smokers'. Current smoking behavior of 'ever smokers' further classified individuals as either 'former' or 'current' smokers. Current smokers reported the average number of cigarettes they smoked per day.

Dietary intake questions asked respondents to think about all the foods and beverages consumed in the past month, including meals and snacks. Consumption of specific foods, similar to the Behavioral Risk Factor Surveillance System questions (www.cdc.gov/brfss/questionnaires/questionnaires.htm) that report moderate validity and test-retest reliability,²⁴ were reported as 'per week' and answers were converted to servings per day. F&V consumption included fruit, 100% fruit juices, potatoes, beans, salads and vegetables, and respondents consuming at least five daily servings were categorized as 'meeting F&V guidelines'. Unhealthy food consumption included sodas, fruit-flavored drinks, fries, ice cream/frozen desserts and cakes/pies/cookies, and a sum score of servings per day was computed.

The physical activity questions originated from the National Health Interview Survey (www.cdc.gov/nchs/nhis.htm) and were adapted for telephone administration. Leisure-time physical activity included exercise, sports and physically active hobbies performed for at least 10 minutes during one's leisure time. They were categorized as moderate-intensity, vigorous-intensity or resistance training. Although not validated, the classifications resulting from these questions are consistent with the recommendations set forth for adults in the Healthy People 2010 Objectives. Moderate-intensity activities were defined as those causing light sweating or a slight to moderate increase in breathing or heart rate and included walking for transportation (to get some place such as work, school, a store, or restaurant) and walking for fun (including walking for relaxation, exercise, or walking a dog). Vigorous-intensity activities included those that caused heavy sweating or large increases in breathing or heart rate (e.g., jogging, aerobic dance), and resistance training was defined as activities performed specifically to improve or maintain muscular strength or endurance (e.g., lifting weights or doing calisthenics).

Average duration (min/day) and frequency (days/week) reported for moderate- and vigorous-intensity activity were multiplied to calculate weekly durations (min/week), which were then summed to calculate total weekly physical activity (min/week). The proportion of respondents meeting current physical activity guidelines was determined for moderate-intensity (150 min/week), vigorous-intensity (75 min/week), the combination of both moderate- and vigorous-intensity activity (150 min/week) and resistance training (2 days/week).²⁵

Guidelines for health behaviors were based on Healthy People 2010 objectives¹⁹ or the United States Department of Health and Human Services physical activity guidelines.²⁵ Mean BMI values, calculated from self-reported height and weight, categorized respondents as 'normal weight' (25.0 kg/m^2), 'overweight' ($25.0\text{--}29.9 \text{ kg/m}^2$), or 'obese' (30.0 kg/m^2).

Data analyses conducted in SPSS v17.0 included independent t-tests and Pearson Chi-Square to examine ethnic and NHPI gender differences for continuous and categorical variables, respectively. Binary logistic regressions were used to investigate associations between socio-demographic correlates of NHPIs meeting health behavior guidelines and to examine ethnic differences in obesity and smoking habits while controlling for education and income. Hierarchical linear regression was used to investigate ethnic differences in unhealthy food consumption and number of cigarettes smoked while controlling for education and income.

Results

Ethnic Differences

The CHIS 2005 data included N=130 NHPI and N=30,554 WH respondents. Demographic and health behavior variables are presented in Tables 1 and 2, respectively. NHPI adults had significantly lower proportions with at least a Bachelor's degree (23.1% vs. 42.3%; $p<0.05$), lower household incomes (\$57K vs. \$75K; $p<0.01$), and higher BMI values (28.9 ± 6.4 kg/m² vs. 26.4 ± 5.4 kg/m²; $p<0.001$) and prevalence of obesity (36.9% vs. 20.2%; $p<0.001$), compared to WHs (Table 1). Binary logistic models for obese classification showed a significant overall model (Nagelkerke $R^2=.018$; $\chi^2=360.40$; $p<0.001$), with NHPI ethnicity remaining a significant predictor after controlling for gender, smoking, education and income (OR = 2.10, 95% CI = 1.46, 3.02).

The proportion of 'ever smokers' (former or current) was similar between NHPIs (42.3%) and WHs (47.6%). NHPI 'ever smokers' reported a significantly higher proportion of current smokers (45.5% vs. 29.7%; $p<0.05$) compared to WHs. The effects for former smokers remained significant after controlling for education and income levels (Nagelkerke $R^2=.001$; $\chi^2=20.78$; $p<0.001$), with NHPI ethnicity remaining a significant lower predictor after controlling for education and income (OR = 0.57, 95% CI = 0.37, 0.86). While the majority of 'current smokers' from both groups were 'daily smokers' (NHPI: 68.0%; WH: 73.9%), NHPI smoked significantly fewer cigarettes per day (10.7 ± 7.4 vs. 15.6 ± 8.9 ; $p<0.05$). Ethnic differences in number of cigarettes per day did not remain significant after controlling for education and income.

The proportion of NHPIs (20.0%) and WHs (20.4%) consuming at least five daily F&V servings were similar. NHPIs reported consuming significantly more unhealthy foods per day (1.32 ± 1.6 vs. 0.98 ± 1.0 ; $p=0.015$; Table 2). The effects for unhealthy food consumption remained significant after controlling for education and income levels (Adj. $R^2=.001$; $F=108.61$; $p<0.001$; $F=10.13$; $p=0.001$), with NHPI ethnicity remaining a significant predictor ($B=0.29$ (0.1), $\beta=0.02$; $t=3.18$, $p=0.001$).

No significant ethnic differences were observed in physical activity variables. Total physical activity for both groups was more than double current recommendations of 150 min/week, with similar proportions meeting current guidelines in terms of moderate- (54.6%–60.0%) or vigorous-intensity (19.6%–23.8%) aerobic activity, a combination of both moderate- or vigorous-intensity activity (60.4%–65.4%), and resistance training (40.3%–47.7%) (Table 2).

Gender differences within the NHPI sample (N = 130)

The proportion of 'ever smokers' was significantly higher among NHPI males compared to NHPI females (60.3% vs. 36.4%; $p<0.001$) (Table 2). Binary logistic regression models for current smoking habit (Nagelkerke $R^2=.209$; $\chi^2=18.13$; $p=0.003$) among NHPIs were significant. No significant gender differences were found for healthy or unhealthy food consumption or any physical activity variables.

Discussion

Past studies of NHPI health behaviors have been based on convenience samples, and CHIS provided a sample of randomly-selected NHPIs who can be compared to WHs recruited similarly. The present study revealed significant ethnic differences between NHPI and WH on several health behaviors. Compared to WHs, NHPIs were at increased risk for obesity, unhealthy dietary intake and current tobacco use. BMI values and obesity prevalence were significantly higher among NHPI, and remained so after controlling for gender, smoking, education and income. Although consumption of F&V was similar to WH, NHPIs reported significantly higher consumption of unhealthy energy-dense foods. The proportion of current NHPI smokers was significantly higher compared to WH, and there was a lower proportion of former smokers among NHPI. Though NHPI current smokers reported smoking significantly fewer cigarettes per day, this difference was explained by NHPIs' lower education and income levels.

Healthy People 2010 set a target to reduce the proportion of adult smokers to 12%.¹⁹ The present study revealed that 19% of the NHPI sample were current smokers, approximately 50% above the Healthy People 2010 target and significantly higher than the current smoking rate among WH in California (14%). Due to the low percent of NHPI 'former smokers', it appears this group is not successful in smoking cessation.

A significantly higher proportion of NHPI males were 'ever smokers', compared to females. This sizable gender difference is consistent with a recent study of Pacific Island countries and territories.²⁶ Despite the small sample size for NHPIs, the smoking estimates presented here are useful. No reports to the state of California based on statewide California Tobacco Surveys^{22,27} included NHPI-specific data. Thus, present results provide statewide estimates of smoking among NHPIs. Present findings suggest NHPI men are at high risk for smoking and that efforts to reduce smoking among NHPI remain an important priority. Studies are needed that develop and evaluate smoking cessation interventions tailored for NHPIs.

Previous studies of NHPI convenience samples reported conflicting results for dietary intake.^{3,16,28} In the present study, rates of meeting F&V guidelines were low (about 20%) and similar for NHPI and WH samples. However, NHPI reported significantly higher intake of unhealthy foods than WH, about a 30% difference that persisted after adjustment for education and income. High consumption of unhealthy foods (i.e. sodas and takeaway food) have also been reported for a Samoan sample in New Zealand.²⁹ Study findings suggest that health differences between NHPI and WH are more strongly influenced by higher intakes of high-fat, high-sugar foods among NHPIs, rather than low levels of physical activity or F&V consumption. These findings highlight the need for NHPI dietary interventions that include a specific focus on the reduction of unhealthy food intakes.

Both NHPIs and WHs were above the Healthy People 2010 target of 50% for meeting physical activity guidelines for aerobic activity.¹⁹ Self-reported activity among NHPIs tended to be greater for every aerobic and resistance training activity component, compared to WHs. The assumption of accurate self-reported physical activity levels by NHPIs infers that the benefits associated with sufficient physical activity may be hindered due to high intakes of unhealthy foods. The significantly higher obesity rate among NHPIs in the present study also raises concern regarding the validity of telephone-administered physical activity surveys for NHPIs, who in past studies reported lower activity levels compared to WHs.^{3,4,30} NHPIs may have different interpretations of common terminology associated with physical activity than WH,³¹ raising questions about the comparability of self-reported physical activity across cultural groups. Culturally-adapted questionnaires and studies using

objective measures are needed to improve on physical activity prevalence estimates for NHPIs.

The large gender difference in current smoking, with males having higher rates, was consistent with available literature on NHPI.²⁶ Because men are consistently found to be more physically active than women,³² it was surprising that there were no significant differences in this sample of NHPIs. These findings should not be considered definitive due to the small sample sizes and should be followed up with larger studies using the best available measures.

Though this is one of the largest reports on health behaviors from a randomly-selected sample of NHPIs, it is important to acknowledge limitations. The CHIS surveys were conducted only in residential households with landline telephones. Although estimates were statistically adjusted by sample weights to compensate for households without landline telephones, an increase in cellular telephones replacing landlines introduces potential coverage problems for the random digit dial sampling method. Rapid changes in telecommunications may have contributed to the low response rate (29.2%), suggesting that telephone-based survey methods may not be ideal, particularly for NHPI populations.

The inherent limitations associated with self-reported data are well known, and interpretation bias of physical activity surveys is a concern for NHPIs.^{31,33} The NHIS physical activity questions have not been validated. Dietary data were collected via brief food frequency surveys, and self-report of servings per day are likely not as valid as a quantitative method such as 24-hr dietary recalls or food diaries that collect detailed data on specific foods and quantity eaten throughout the day. Additionally, the BRFSS food intake items may not accurately reflect NHPI diets. The NHPI sample size was small, which made it necessary to aggregate NHPI subgroups into one category. Overseas studies that include large NHPI samples report varying levels of risk for chronic diseases between NHPI subgroups.⁷ Future studies designed to yield large enough samples to allow NHPI subgroup-specific analyses are needed.

Conclusion

Present results provide useful comparisons on obesity and health behaviors between NHPIs and WHs. NHPIs were not found to have significantly more favorable health behaviors on any variable, but smoking rates, intake of unhealthy energy-dense foods and beverages, and obesity rates indicated several areas in which NHPIs were at particularly high risk. These findings can be used to prioritize health promotion interventions targeted to the needs of NHPIs and provide baseline data for monitoring trends in this understudied population.

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Education, Income and Body Mass Index among Native Hawaiian and Pacific Islander and Non-Hispanic White adults (18 years) in California, 2005

Table 1

	Native Hawaiian and Pacific Islanders (NHPI)		Non-Hispanic Whites (WH)	
	Males N=58	Females N=72	Total Sample N=130	Total Sample N=30,554
Education Categories				
None/less than high school	13.9	9.7	11.5	6.9
At least high school diploma	50.0	56.9	53.8	43.3
At least an Associate's degree	6.9	15.3	11.5	8.5
At least a Bachelor's degree	29.2	18.1	23.1***	42.3
	Mean (SD)			
Annual household income	\$53,228 (52,079)	\$61,000 (49,213)	\$57,566 (50,448)**	\$75,026 (62,806)
Body mass index (kg/m ²)	29.9 (6.4)	28.2 (6.2)	28.9 (6.4)***	26.4 (5.4)
Body Mass Index Categories				
Underweight (0-18.49 kg/m ²)	0.0	2.8	1.5	2.0
Normal (18.5-25.0 kg/m ²)	25.9	27.8	26.9	43.1
Overweight (25.0-29.99 kg/m ²)	25.9	41.7	34.6	34.7
Obese (≥ 30.0 kg/m ²)	48.3	27.8	36.9***	20.2

p<0.01

p<0.001 compared to reference group, Non-Hispanic Whites

Smoking, Diet and Physical Activity among Native Hawaiian and Pacific Islander and Non-Hispanic White adults (18 years) in California, 2005

Table 2

	Native Hawaiian and Pacific Islander (NHPI)		Non-Hispanic White (WH)	
	Males N=58	Females N=72	Total Sample N=130	Total Sample N=30,554
Smoking Categories				
			%	
Never smokers ^a	39.7	72.3***	57.7	52.4
Ever smokers	60.3	36.4***	42.3	47.6
Former smokers (among 'ever smokers')	57.1	50.0	54.5*	70.3
Current smokers (among 'ever smokers')	42.9	50.0	45.5*	29.7
Daily smokers (among 'current smokers')	66.7	70.0	68.0	73.9
Occasional smokers (among 'current smokers')	34.3	30.0	32.0	26.1
Current Smoker Characteristics			Mean (SD)	
Number of cigarettes per day (among 'current smokers')	13.4 (8.2)	6.9 (4.0)*	10.7 (7.4)*	15.6 (8.9)
Dietary Intakes^{b,c}			Mean (SD)	
Total fruits and vegetables intake ^b (servings/day)	3.7 (2.6)	3.4 (2.1)	3.6 (1.9)	3.6 (1.9)
Total 'unhealthy food' intake ^c (servings/day)	1.4 (1.9)	1.3 (1.4)	1.3 (1.6)*	0.98 (1.1)
Meeting Fruits and Vegetables Recommendation			%	
Consuming 5 daily fruit and vegetable servings	24.1	16.7	20.0	20.4
Physical Activity Variables			Mean (95% CI)	
Moderate physical activity (min/week)	370.6 (226.0, 515.1)	278.9 (185.0, 372.8)	319.8 (237.8, 401.8)	291.0 (286.4, 295.6)
Vigorous physical activity (min/week)	94.3 (26.2, 162.4)	55.1 (25.4, 84.7)	72.6 (38.4, 106.8)	52.6 (50.9, 54.4)
Total physical activity (min/week)	464.9 (296.7, 633.1)	334.0 (227.9, 440.1)	392.4 (297.8, 487.0)	343.7 (338.4, 348.9)
Resistance training (days/week)	2.2 (1.6, 2.8)	1.7 (1.2, 2.3)	1.9 (1.5, 2.3)	1.6 (1.6, 1.6)
Meeting Physical Activity Guidelines			%	
Meeting moderate (150 min/week)	58.6	61.1	60.0	54.6
Meeting vigorous (75 min/week)	25.9	22.2	23.8	19.6
Meeting combination of moderate and vigorous (150 min/week)	65.5	65.3	65.4	60.4
Resistance training (2 days/week)	51.7	44.4	47.7	40.3

* p<0.05

p<0.01

p<0.001 compared to reference groups non-Hispanic Whites and males

^aNever smokers were respondents who reported smoking <100 cigarettes in their lifetime. The remainder of the sample was classified as 'ever smokers', and categorized as 'former' or 'current' smokers

^bFruit and vegetable intake includes fruit, 100% fruit juices, potatoes, beans, salads and vegetables

^cUnhealthy food intake includes sodas, fruit flavored drinks, fries, ice cream/frozen desserts and cakes/pies/cookies