

Effects of Perceived Racism and Acculturation on Hypertension in Native Hawaiians

Joseph Keawe'aimoku Kaholokula PhD; Marcus K. Iwane MD; and Andrea H. Nacapoy MA

Abstract

Objective: To examine the effects of perceived racism and acculturation on the hypertension status of Native Hawaiians.

Design: Cross-sectional data from 94 Native Hawaiian adults were obtained which included the following: 1) socio-demographic variables and self-reported hypertension status; 2) a 5-item Hawaiian cultural identity subscale (HCSS) and a 5-item American cultural identity subscale (ACSS); and 3) perceived racism based on a 6-item modified version of the 32-item Oppression Questionnaire (OQ).

Results: Based on logistic regression analysis, the ACSS scores and OQ scores had significant ($p < .05$) and independent effects on hypertension status, after considering the effects of age, sex, and education level, and HCSS scores. Of the variables examined, OQ scores had the greatest magnitude of effect on hypertension status.

Conclusion: More perceived racism and a greater identification with the American mainstream culture were both, independently, related to self-reported hypertension in Native Hawaiians. These findings have important clinical and public health implications.

Introduction

Hypertension (high blood pressure) affects 26.7% of the US population and is a major risk factor for cardiovascular disease (CVD).¹ Native Hawaiians, the indigenous people of Hawai'i, have a higher prevalence of hypertension (31.8% to 39.6%) than many other US ethnic groups.²⁻⁴ They also have the highest coronary heart disease mortality rates (135.4 per 100,000) and die due to CVD an average of 7.5 years younger than other ethnic groups.⁵ Identifying important and modifiable risk factors of hypertension in Native Hawaiians can lead to effective interventions to ameliorate their CVD-related disparities as well as those of other Pacific Islanders and indigenous populations.

Studies established a strong link between various psychosocial stressors (e.g., work strain, social status, and emotional distress) and increased risk for hypertension.⁶ In some US ethnic groups, unique stress-related psychosocial factors associated with hypertension have been identified. Vaeth and Willett found that Hispanic Americans with high- to mid-acculturation levels (e.g., higher interaction with people from the US mainstream) were nearly three times more likely to have hypertension than those with low-levels of acculturation, even after adjusting for socio-demographics, health care access and utilization, and health behaviors and status.⁷ The Hispanic HANES and NHANES III studies found similar associations between acculturation levels and hypertension in Hispanic Americans despite employing different ways of measuring acculturation.⁸⁻⁹ Vaeth and Willett suggest that higher levels of acculturation for Hispanic Americans may be associated with greater acculturative stressors, such as being marginalized from their Hispanic community and not benefiting fully from the purported advantages associated with the "American lifestyle."⁷

Racism, also referred to as racial/ethnic discrimination or oppression, is another stress-related psychosocial factor associated with hypertension. In African Americans, studies found an association between perceived ethnic discrimination and an increased risk for

hypertension.¹⁰ Davis *et al.* found that degree of stress from perceived ethnic discrimination was a significant predictor of hypertension in a sample of 356 African American adults.¹¹ Steffen *et al.* found that perceived racism accounted for a significant proportion of the variance in waking systolic (7% of the variance) and diastolic blood pressure (4% of the variance) in 69 African American adults after adjusting for age, BMI, and income.¹²

In relation to hypertension, the effects of acculturation were examined exclusively in Hispanics while the same is true for African Americans concerning the effects of perceived racism. Native populations in the United States, such as American Indians, Alaska Natives, and Native Hawaiians, report ethnic discrimination and difficulties in acculturating toward the US mainstream.^{13,14} The higher prevalence of hypertension among native US populations compared to other US ethnic groups and the general population is well documented.^{3,5} However, no study to date examined the effects of acculturation factors and perceived racism on hypertension in native US populations.

As part of a first-year medical student research project at the John A. Burns School of Medicine (JABSOM), the effects of acculturation (based on both Native Hawaiian and American cultural identification) and perceived racism on self-reported hypertension in a convenience sample of Native Hawaiian adults were examined. Most studies examining the effects of acculturation on hypertension only measured the degree to which individuals identified with or had assimilated (i.e., adapted) toward the American mainstream. The team chose to also examine the degree to which individuals identify with their Native Hawaiian identity and affiliation as to avoid the assumption that a high American mainstream identity means a low ethnic identity.¹⁵ The team also chose to focus on these two cultural identifications as surrogate factors of acculturation because other commonly measured acculturation factors, such as length of US residence, generational status, and language preference are not relevant to native populations.¹⁶

Methods

Study Design and Participants

Using a cross-sectional correlational study design, Native Hawaiians were recruited for participation in this study from various monthly gatherings of Native Hawaiian civic and cultural organizations over a two-month period on the island of O'ahu. All Native Hawaiian adults (≥ 18 years of age) from these organizations were eligible to participate. In total, 94 adult Native Hawaiians (48 women and 46 men) participated in this study. A Native Hawaiian, as a distinct ethnic group, was defined as any descendent of the aboriginal people who resided in the islands now called Hawai'i prior to 1778.¹⁷

Assessments

Socio-demographic information and hypertension status were collected using a questionnaire that asked for the participant's sex, age, marital status (i.e., 'never married'; 'currently married'; 'divorced or separated'; or 'widowed'), and highest formal educa-

tional attainment (i.e., 'no high school diploma'; 'H.S. diploma or GED/CBase'; 'some college, technical, or vocational training'; or 'college graduate').

Hypertension status was assessed based on the participant's self-report with either a "Yes" or "No" response to the question, "Have you ever been told by a doctor that you have high blood pressure (hypertension)?" Cross-sectional studies of hypertension rely on participants' self-reported diagnosis of hypertension because of its feasibility.¹⁸ Studies found a high correlation between self-reported diagnosis of hypertension and confirmed hypertension diagnosis, with 72.1% sensitivity and 86.4% specificity.^{18,19}

Perceived racism was assessed using a 6-item modified version of the 32-item Oppression Questionnaire (OQ).²⁰ The OQ measures a person's beliefs about discrimination and oppression toward his or her own social group by those of other social groups. The instructions asked the respondents to answer in the context of how other social groups perceive and treat them as Native Hawaiians. Example items include "They consider us to be inferior" and "They don't give us equal rights" with responses ranging from 1 (not at all) to 4 (a great deal). The total possible scores ranged from 6 to 36, with higher scores indicating greater perceived racism. Because the OQ was modified for the purpose of this study, the Cronbach's alpha was calculated to assess its internal reliability and yielded an alpha of .93, suggesting a high degree of internal consistency.

Degree of Native Hawaiian cultural and American mainstream cultural identifications were assessed using an acculturation questionnaire designed for use with Native Hawaiians.¹⁶ The questionnaire consists of a 5-item Hawaiian cultural identity subscale (HCSS) and a 5-item American cultural identity subscale (ACSS). Each subscale separately assesses the participant's preference for their Native Hawaiian heritage and lifestyle and American heritage and lifestyle based on their reported degree of knowledge about; involvement in; association with; positive feelings toward; and the importance of these cultural groups to him or her. A 5-point response scale, ranging from 1 (very knowledgeable; very involved; very interested; very positive; or very important) to 5 (not knowledgeable; not involved or interested at all; very negative; not important at all) was used for each item. The responses to each item were reversed scored so that the total possible scores (ranging from 5 to 25) indicated a stronger identity. The HCSS and ACSS subscales have been used in a previous study of Native Hawaiians.¹⁶

Procedures

During the data collection period, a researcher attended several monthly meetings/gatherings of various Hawaiian civic and cultural organizations to recruit participants for this study. Permission from the organizations' leaders was obtained in advance. Recruitment from Hawaiian civic and cultural organizations was done because most of their membership is Native Hawaiian with a diverse socio-demographic representation, such as in age and educational background. At each meeting, a researcher spent about five minutes providing a brief educational talk about the health disparities experienced by Native Hawaiians and introducing the study to its membership. The educational talk did not cover information about psychosocial factors and hypertension as not to influence their responses if they chose to participate. Informed consent was obtained from interested individuals based on a standard consent process approved by the

Institutional Review Board of the University of Hawai'i. Those who consented completed the packet of questionnaires by themselves, which took about 10 minutes. The survey packets were collected by the researcher as to ensure privacy. Upon completion, the participants were given a brief written explanation of the study.

Data Reduction and Analysis

All statistical analyses were done using JMP statistical software, release 7.0 (SAS Institute Inc. 2007). A probability value of $< .05$ was used to determine statistical significance. The separated, divorced, and widowed marital statuses were collapsed into a single category because of small sample size in each, and is referred to as 'disrupted marital status' from here on. For reporting sample characteristics, all study variables were examined by hypertension status (participants who reported hypertension versus those who did not).

Analysis of variance (ANOVA) was done to examine the statistical association of the continuous variables of age and OQ, HCSS, and ACSS scores with the dichotomous variable of hypertension status (1 = No; 2 = Yes). Chi-square analysis (χ^2) was done to examine the statistical association of the dichotomous variables of sex, educational attainment, and marital status with hypertension status. For all subsequent analyses, sex (1 = male and 2 = female) and educational attainment (1 = no H.S. diploma to 4 = college graduate) were dummy coded and Pearson Product Moment Correlation coefficients were calculated between all study variables (except marital status).

In predicting hypertension status (a dichotomous outcome variable), a 3-step logistic regression analysis was done to examine the independent effects of the socio-demographic variables (Step 1); the independent effects of HCSS scores and ACSS scores when entered into the analysis with the socio-demographic variables (Step 2); and the independent effects of OQ scores when entered into the analysis with the socio-demographic variables and HCSS and ACSS scores (Step 3). Wald test was done to confirm that an independent variable had a statistically significant relationship with hypertension status in the logistic regression analysis.

Results

Participants' Characteristics and Bivariate Associations with Hypertension Status

The characteristics of the participants are summarized in Table 1 by hypertension status and combined sample. The prevalence of self-reported hypertension was 39%. Participants who reported having hypertension were significantly older in age [$F(1,92) = 24.68, p < .0001$]; lower in educational attainment [$\chi^2(3, N=94) = 10.46, p < .05$]; and had higher mean scores on the OQ [$F(1,92) = 22.53, p < .0001$], HCSS [$F(1,92) = 4.24, p < .05$], and ACSS [$F(1,92) = 7.66, p < .01$]. Participants who reported having hypertension were also more likely [$\chi^2(3, N=94) = 18.22, p < .001$] to be currently married or have a disrupted marital status.

Intercorrelations between Study Variables

The intercorrelations between study variables and their means and standard deviations (SD) are summarized in Table 2. HCSS scores had a significant positive correlation with age ($r = .24$) and OQ scores ($r = .35$). ACSS scores OQ scores both had a significant positive correlation with age ($r = .43$ and $.26$, respectively). Education level had a significant negative correlation with age ($r = -.25$).

Characteristics	No Hypertension 61% (57)	Hypertension 39% (37)	Combined 100% (94)
Age (years)**	35.6 ± 17.0	55.2 ± 20.7	43 ± 20.7
Female (vs. male)	53% (30)	49% (18)	51% (48)
Educational attainment*			
No high school diploma	0	8% (3)	3% (3)
High school diploma/GED/CBase	9% (5)	19% (7)	13% (12)
Some college/technical/vocational	35% (20)	16% (6)	28% (26)
College graduate	56% (32)	57% (21)	56% (53)
Marital Status**			
Never married	60% (34)	22% (8)	45% (42)
Currently married	28% (16)	46% (17)	35% (33)
Divorced/separated/widowed	12% (7)	32% (12)	20% (19)
OQ scores**	11.2 ± 4.6	16.0 ± 4.9	13.1 ± 5.2
HCSS scores*	21.2 ± 2.2	22.1 ± 1.9	21.6 ± 2.1
ACSS scores**	19.5 ± 3.0	21.0 ± 1.9	20.1 ± 2.7

Data shown as % (n) or mean ± standard deviation. * p < .05, ** p < .01

Logistic Regression Analysis Predicting Hypertension Status

The 3-step logistic regression analysis described earlier was done to examine the independent effects of the socio-demographic variables, the acculturation variables (HCSS and ACSS), and OQ scores in predicting hypertension status. Marital status was not included in the analysis for parsimony and to avoid multicollinearity because of its significant positive linear relationship [$F(3, 92) = 49.05, p < .0001$] with age (i.e., young adults more likely to be never married and older adults more likely to have a disrupted marital status). As summarized in Table 3, age was the only socio-demographic variable with a significant and independent effect on hypertension status (i.e., older participants were more likely to report having hypertension) in Step 1 of the logistic regression analysis [$\chi^2(3, N=93) = 21.04, p < .0001$]. In Step 2, the effects of age remained significant while HCSS scores and ACSS scores had no significant effects on hypertension status [$\chi^2(5, N=93) = 24.27, p < .001$]. When OQ scores were added to the analysis in Step 3, age no longer had a significant effect on hypertension status while ACSS scores and OQ scores had significant and independent effects on hypertension status (higher scores on both were associated with self-reported hypertension) [$\chi^2(6, N=92) = 38.49, p < .0001$].

Discussion

The authors examined the effects of perceived racism and acculturation (based on both Native Hawaiian and American cultural identifications) on self-reported hypertension status in a sample of Native Hawaiian adults, after considering the effects of socio-demographic variables. The bidirectional approach to understanding acculturation (i.e., measuring both ethnic and mainstream identifications) the authors employed here helps to account for their possible independent effects, given that people can simultaneously identify with both to varying degrees.²¹ To date, this is the first study to examine the effects of both acculturation and perceived racism on hypertension in an indigenous US population. However, these findings should be

Variables	1	2	3	4	5	6
1. Age	1.0					
2. Sex	-.03	1.0				
3. Education	-.25*	-.05	1.0			
4. HCSS scores	.24*	.06	.08	1.0		
5. ACSS scores	.43***	-.05	-.02	.05	1.0	
6. OQ scores	.26*	-.11	-.04	.35**	-.13	1.0
N	93	94	94	94	94	93
M	43.2	-	3.4	21.6	20.1	13.1
SD	20.7	-	0.8	2.1	2.7	5.2

*p < .05, **p < .001, ***p < .0001

considered preliminary since hypertension was based on self-report only and based on a non-random convenience sample.

The findings suggested that Native Hawaiians who strongly identified with the American mainstream culture and lifestyle (i.e., higher ACSS scores) as well as those who perceived greater racism were more likely to report having hypertension. Their effects on self-reported hypertension status were independent of each other, but perceived racism had a greater magnitude of effect on hypertension status. The finding regarding American identity is consistent with similar studies among Hispanics⁷ while the finding regarding perceived racism is consistent with similar studies among African Americans.¹⁰ Perceptions of racism as a unique psychosocial stressor for other ethnic groups is well-documented. Mays *et al.*, in their review of ethnic/racial discrimination in African Americans, noted that such discrimination can lead to physiological wear-and-tear on a person (e.g., chronic activation of the hypothalamic-pituitary-adrenal axis stress-response) as to place them at risk for heart disease, diabetes, obesity, and infection.²²

Table 3.— Summary of Logistic Regression Analysis Predicting Hypertension Status					
Variables	B	SE	Odds ratio (95% CI)	R2	Wald statistic
Step 1				.17	
Age	0.05	0.01	1.05 (1.03, 1.08)		15.38***
Sex (male)	0.04	0.24	0.92 (0.36, 2.41)		0.02
Education level	-0.14	0.31	0.87 (0.47, 1.59)		0.20
Step 2				.20	
Age	0.04	0.01	1.04 (1.01, 1.07)		6.54**
Sex (male)	0.05	0.25	0.90 (0.34, 2.38)		0.04
Education level	-0.23	0.32	0.79 (0.41, 1.47)		0.54
HCSS scores	0.19	0.13	1.21 (0.95, 1.58)		2.19
ACSS scores	0.11	0.10	1.12 (0.92, 1.38)		1.17
Step 3				.31	
Age	0.03	0.02	1.03 (0.99, 1.06)		3.38
Sex (male)	-0.14	0.28	1.32 (0.44, 1.19)		0.25
Education level	-0.25	0.38	0.78 (0.37, 1.64)		0.43
HCSS scores	0.03	0.14	1.03 (0.78, 1.38)		0.05
ACSS scores	0.26	0.13	1.30 (1.02, 1.70)		4.36*
OQ scores	0.22	0.06	1.25 (1.11, 1.43)		12.43***

Unit odds ratios (i.e., per unit change in regressor) are reported for continuous variables.
* p < .05, ** p < .01, *** p < .001

The finding that a high American identity, as measured in this study, was associated with having hypertension in Native Hawaiians suggests that it may be a marker of other psychosocial stressors not examined in this study. As Vaeth and Willett explained in their report on Hispanic Americans, a higher level of acculturation for Hispanics and its association with hypertension could be due to being marginalized from their Hispanic community while not fully being accepted by the American mainstream.⁷ A similar situation could be occurring with Native Hawaiians in which those with a higher American identity are being disenfranchised from their Hawaiian community while having difficulty "fitting into" the American mainstream. Another possible explanation is that a greater American identity in Native Hawaiians could be associated with psychosocial stressors unique to the adoption of an American lifestyle. Studies found that many people at risk for CVD report having high job and family demands and inadequate social and economic resources.²³ Future studies are needed to examine whether such factors mediate the relationship between American mainstream identity and hypertension status in Native Hawaiians.

The finding that perceived racism was strongly related to having hypertension in Native Hawaiians has both clinical and public health policy implications. Researchers have postulated that many Native Hawaiians are devalued and marginalized by other social groups in Hawai'i.^{13,24} Other researchers have described how a lower social status can negatively impact a person's health and well-being.^{23,25} Knowing that perceived ethnic discrimination may lead to increased hypertension risk in Native Hawaiians can inform the development

of psychological interventions targeting how they manage or deal (e.g. coping strategy) with such discrimination as to not wear on their physiological stress-response system over time. These findings can also inform public health policies and initiatives to effectively address their risk for CVD by addressing psychosocial stressors imposed on them by larger societal factors (e.g., lower assigned social status and negative stereotypes).

Some methodological limitations of this study are worth noting. Again, it is important to recognize the preliminary nature of these findings. First, the participants' hypertension status was based on their self-report. Studies have found that self-report can be a reasonably valid measure of hypertension status.¹⁸ Notwithstanding, future studies should base hypertension status on a confirmed diagnosis rather than self-report as to ensure validity in the outcome measure. Second, a convenience sample of Native Hawaiians was used, which might limit the generalizability of the findings to the larger Native Hawaiian population. However, evidence suggests that the sample used in this study was somewhat representative. Specifically, the hypertension prevalence in this study (39%) was comparable to that found in large survey studies of Native Hawaiians, which range between 32% and 40%.²⁴ Finally, the sample size was small but large enough to detect differences suggesting adequate statistical power.

In conclusion, a high degree of perceived racism and a high American mainstream identification appear to be independently associated with having hypertension in adult Native Hawaiians. The association of these two psychosocial factors with hypertension was not explained away by socio-demographic factors, such as age, sex, and education level. However, more studies that improve on the methodology used are needed to lend support for the findings and conclusions drawn here.

No potential conflicts of interest relevant to this article were reported.

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Authors' Affiliations:

- Department of Native Hawaiian Health, John A. Burns School of Medicine, University of Hawai'i at Manoa, Honolulu, HI 96813 (J.K.K., A.H.N.)
- John A. Burns School of Medicine, University of Hawai'i at Manoa, Honolulu, HI 96813 (M.K.I.)
- Department of Psychology, University of Hawai'i at Manoa, Honolulu, HI 96826 (A.H.N.)

Correspondence to:

Joseph Keawe'aimoku Kaholokula PhD
Department of Native Hawaiian Health
651 Ilalo Street, MEB 307L
Honolulu, HI 96813
Ph: (808) 692-1047
Fax: (808) 692-1255
E-mail: kaholoku@hawaii.edu

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