

The Effects of Racism on Hypertension in Native Hawaiians

Keawe'aimoku Kaholokula, PhD

Professor and Chair

Department of Native Hawaiian Health

John A. Burns School of Medicine

University of Hawai'i at Mānoa

kaholoku@hawaii.edu



Native Hawaiians

- **Kānaka ‘Ōiwi**
 - Descendants of the original inhabitants residing in Hawai‘i prior to 1778



Eia Hawai‘i, he moku, he kanaka
Behold Hawai‘i, an island, a person

U.S. Demographics

Table 1: Native Hawaiian and Pacific Islander Population Alone and in Combination, 2010

Detailed Group	Number	Percent of NHPI population
TOTAL	1,227,023	100%
<i>Polynesian</i>		
Native Hawaiian	527,077	43%
Samoan	184,440	15%
Tongan	57,183	5%
<i>Micronesian</i>		
Guamanian/Chamorro	147,798	12%
Marshallese	22,434	2%
<i>Melanesian</i>		
Fijian	32,304	3%
Other Pacific Islander	255,787	21%

Source: US Census Summary File 1

Institute for Social Research, University of Michigan, 2011

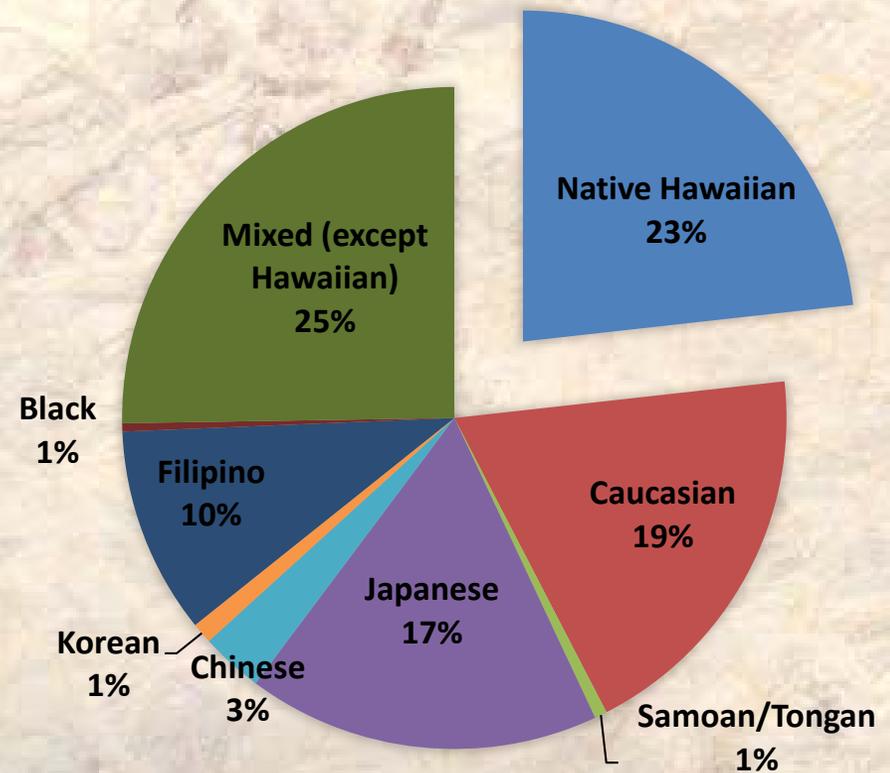


Hawai'i Demographics

- ~23% of population in Hawai'i
- >90% have multiple ethnic ancestries
 - 93% identify highly with Hawaiian ancestry & heritage

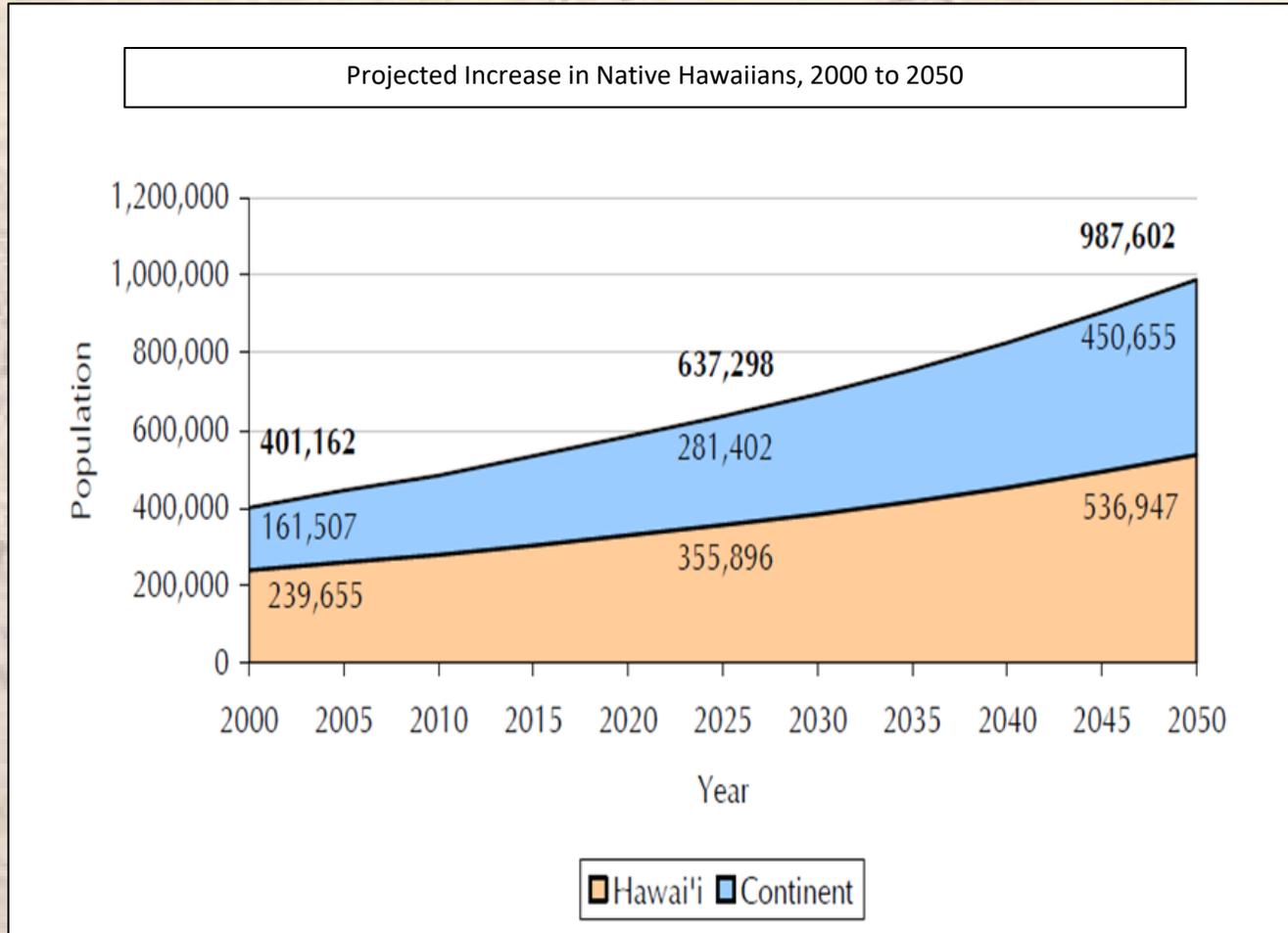
Source: Kaholokula, J.K. (2007). Colonialism, acculturation, and depression among Kānaka Maoli of Hawai'i. In: P. Culbertson, M.N. Agee, & C. Makasiale (Eds), *Penina Uliuli: Confronting Challenges in Mental Health for Pacific Peoples*. Honolulu, HI: University of Hawai'i Press, pp. 180-195

ETHNIC DISTRIBUTION IN HAWAI'I
TOTAL = 1,392,313



Source: Hawai'i State Department of Health, The State of Hawai'i Data Book, A Statistical Abstract.

Population Growth



Source: http://www.stats.govt.nz/browse_for_stats/people_and_communities/pacific_peoples.aspx



“He lei poina ‘ole ke keiki”
(A lei never forgotten is a child)

Hypertension in Native Hawaiians

- Hypertension (HTN) is a major risk factor for coronary heart disease (CHD) and stroke.
- Native Hawaiian/Pacific Islanders compared to Whites are...
 - 70% more likely to have HTN,
 - Less likely to receive adequate HTN treatment,
 - 3 to 4x more likely to have CHD and stroke,
 - Contracting these diseases a decade sooner.

Aluli NE, Reyes PW, Brady SK, et al. All-cause and CVD mortality in Native Hawaiians. *Diabetes Res Clin Pract.* 2010;89(1):65–71.

Nakagawa K, Koenig MA, Seto TB, Asai SM, Chang CW. Racial disparities among Native Hawaiians and Pacific Islanders with intracerebral hemorrhage. *Neurology.* 2012;79(7):675–80.

Within Group Differences in Hypertension Prevalence

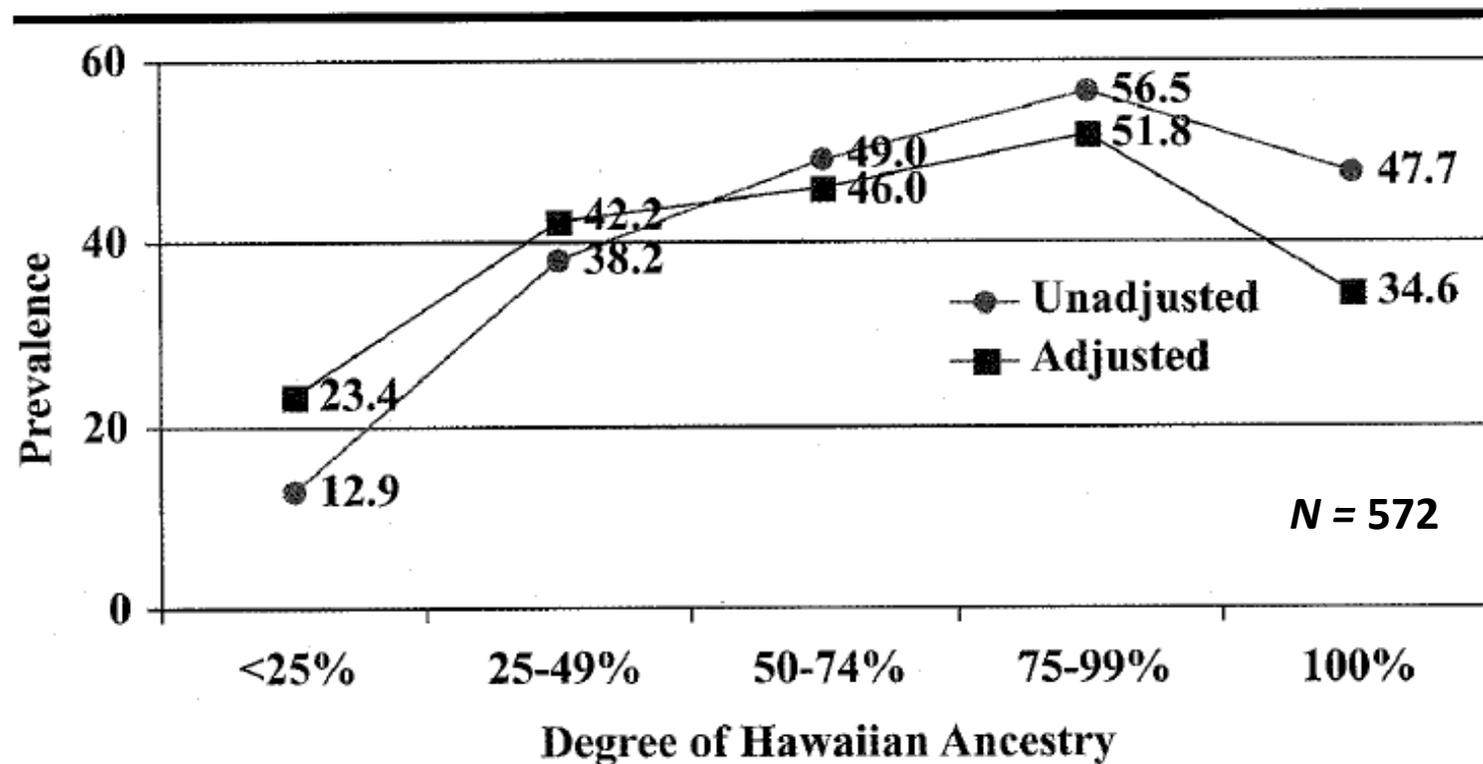
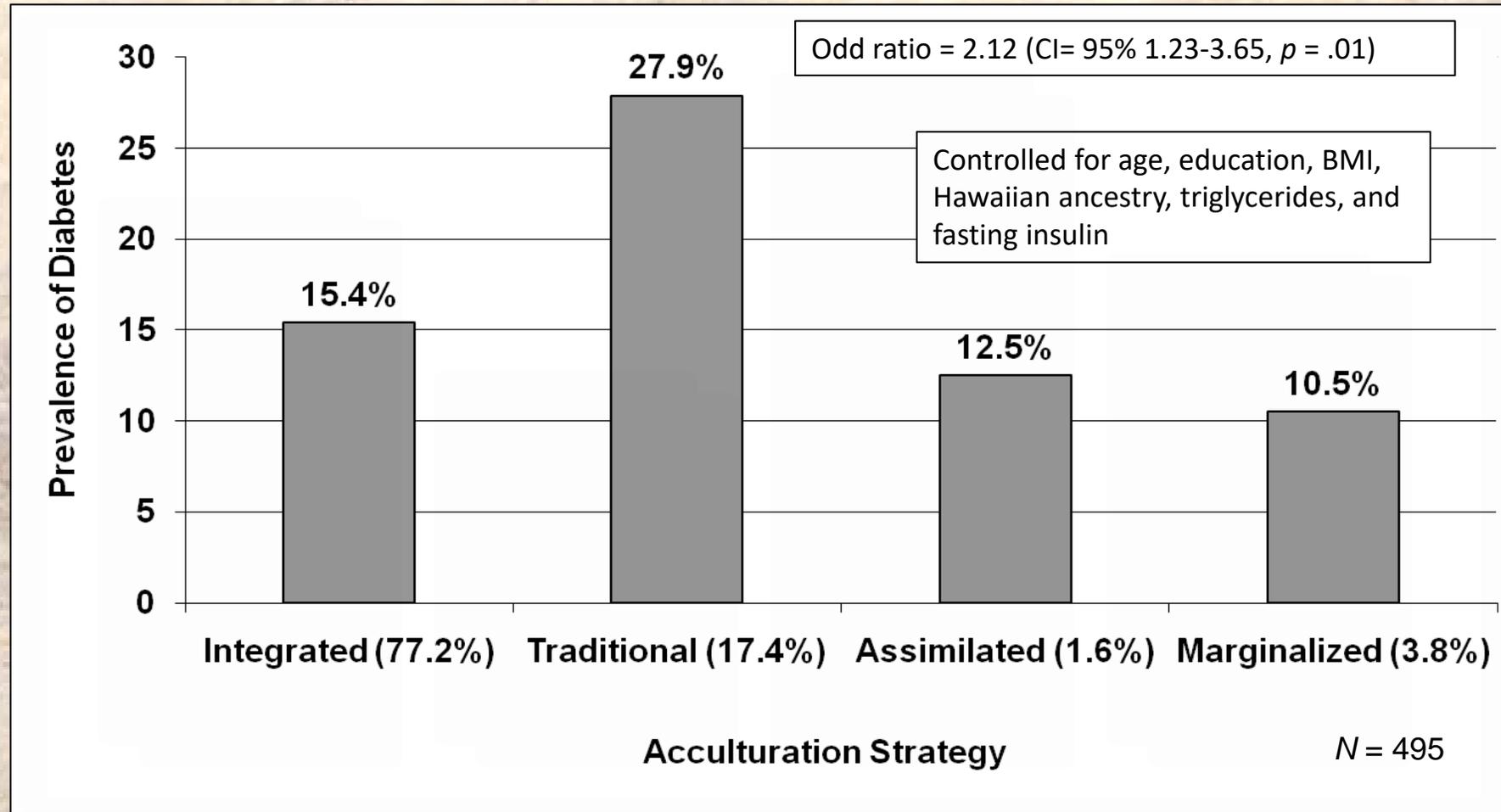


Fig 1. Proportion of participants with hypertension and degree of Hawaiian ancestry

Grandinetti, A., Chen, R., Kaholokula, J.K., Yano, K., Rodriguez, B., Chang, H.K., & Curb, J.D. (2002). Relationship between blood pressure and degree of Hawaiian ancestry. *Ethnicity & Disease*, 12(2), 221-228.

Acculturation Strategy and Diabetes Risk



Kaholokula, J.K., Nacapoy, A.H., Grandinetti, A., & Chang, H.K. (2008). Association between acculturation modes and Type 2 Diabetes in Native Hawaiians. *Diabetes Care*, 31, 698-700.

Racism and Health Inequities

- Racism is the beliefs, acts, and institutional measures that devalue people because of their phenotype or ethnic affiliation (Clark et al. 1999).
- Within many ethnic minority groups across the U.S., interpersonal and internalized racism has been found associated with a higher risk for....
 - Depression, anxiety, substance use, and psychological distress
 - Adverse birth outcomes (e.g., preterm and low birth weights)
 - Hypertension
 - Obesity
 - Diabetes
 - CVD
 - Breast cancer

Perceptions of Racism

Over the past 12 months...

- 48% of Native Hawaiians report being discriminated against 'often' to 'most of the time.'
- 52% report being discriminated against 'sometimes.'



The Stanford Native community protesting the use of "Native" themes at campus frat parties in 2009.

Kaholokula, J.K. (2014). Achieving Social and Health Equity in Hawai'i. In: Goodyear-Ka'opua, J.N. & Yamashiro, A. (Eds), The Value of Hawai'i 2: Ancestral Roots, Oceanic Visions. Honolulu: University of Hawai'i Press.

Racism and Hypertension

Table 1.— Summary of Participants' Characteristics by Hypertension Status and Combined Sample			
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

Kaholokula, J.K., Iwane, M.K., & Nacapoy, A.H. (2010). Effects of perceived racism and acculturation on hypertension in Native Hawaiians. *Hawaii Medical Journal*, 69 (Suppl. 2), 11-15.

Perceived Racism and Physiological Stress (Cortisol)

Variables	Model 1*			Model 2**			Model 3***		
	β	SE	P	β	SE	P	β	SE	P
OQ-A scores	-.29	.12	.0139	-.28	.12	.0213	-.27	.12	.0301
Age (years)	-.34	.14	.0185	.52	.19	.0085	-.50	.20	.0142
Sex	-.13	.06	.0495	-.17	.07	.0138	-.18	.07	.0117
Education level	-.25	.11	.0325	-.21	0.12	.0704	-.24	.12	.0497
Never married	.07	.14	.5976	-.05	.15	.7443	-.05	.16	.7604
Currently married	-.21	.09	.0185	-.14	.20	.1496	-.15	.10	.1212
Disrupted marital status	.14	.12	.2331	.19	.12	.1166	.20	.12	.1001
Hawaiian Ancestry				.03	.13	.8115	-.04	.13	.7762
BMI (kg/m ²)				-.02	.16	.8856	-.00	.17	.9915
SBP (mmHg)				.38	.26	.1542	.36	.27	.1893
DBP (mmHg)				-.67	.30	.0264	-.65	.30	.0342
HCSS scores							-.10	.17	.5759
ACSS scores							.23	.19	.2377
PSS scores							.05	.15	.7276

- Lower cortisol output found in persons with PTSD (Heim et al., 1998), burnout (Pruessner et al., 1999), and atypical depression (Gold & Chrousos, 2002).
- Lower cortisol levels associated with learned helplessness (Croes et al., 1993).

Note. OQ-A = attributed perceived oppression scale; BMI = body mass index; SBP = systolic blood pressure; DBP = diastolic blood pressure; HCSS = Hawaiian cultural subscale; ACSS = American cultural subscale; PSS = Perceived Stress Scale.

* Model 1: $R^2 = .20$, $F(6, 125) = 4.82$, $P = .0002$; **Model 2: $R^2 = .23$, $F(10, 123) = 3.35$, $P = .0008$; ***Model 3: $R^2 = .24$, $F(13, 123) = 2.66$, $P = .0028$

Kaholokula, J.K., Stefan, K., Mau, M.K., Nacapoy, A.H., Kingi, T.K., & Grandinetti, A. (2012). Association between perceived racism and physiological stress indices in Native Hawaiians. *Journal of Behavioral Medicine*, 35(1), 27-37.

Perceived Racism and Physiological Stress (Blood Pressure)

Variables	Model 1*			Model 2**			Model 3***		
	β	SE	<i>P</i>	β	SE	<i>P</i>	β	SE	<i>P</i>
OQ-F scores	4.77	2.32	.0417	3.11	2.25	.1689	2.23	2.31	.3368
Age (years)	19.71	3.29	< .0001	17.54	3.44	< .0001	19.02	3.57	< .0001
Sex	-.95	1.44	.5106	-1.16	1.37	.3989	-1.55	1.38	.2643
Education level	-.77	2.55	.7632	-.90	2.45	.7143	-1.17	2.50	.6409
Never married	.95	3.25	.7693	-1.11	3.11	.7213	-1.06	3.13	.7354
Currently married	-1.59	1.99	.4267	.12	1.93	.9489	-.13	1.96	.9478
Disrupted marital status	.63	2.61	.8092	.99	2.49	.6915	1.19	2.49	.6338
Hawaiian Ancestry				3.45	2.60	.1875	3.31	2.59	.2049
BMI (kg/m ²)				11.56	3.19	.0004	11.32	3.21	.0006
HCSS scores							2.61	3.60	.4695
ACSS scores							2.28	3.98	.5678
PSS scores							4.77	3.20	.1391

Note. OQ-F = felt perceived oppression scale; BMI = body mass index; HCSS = Hawaiian cultural subscale; ACSS = American cultural subscale; PSS = Perceived Stress Scale.

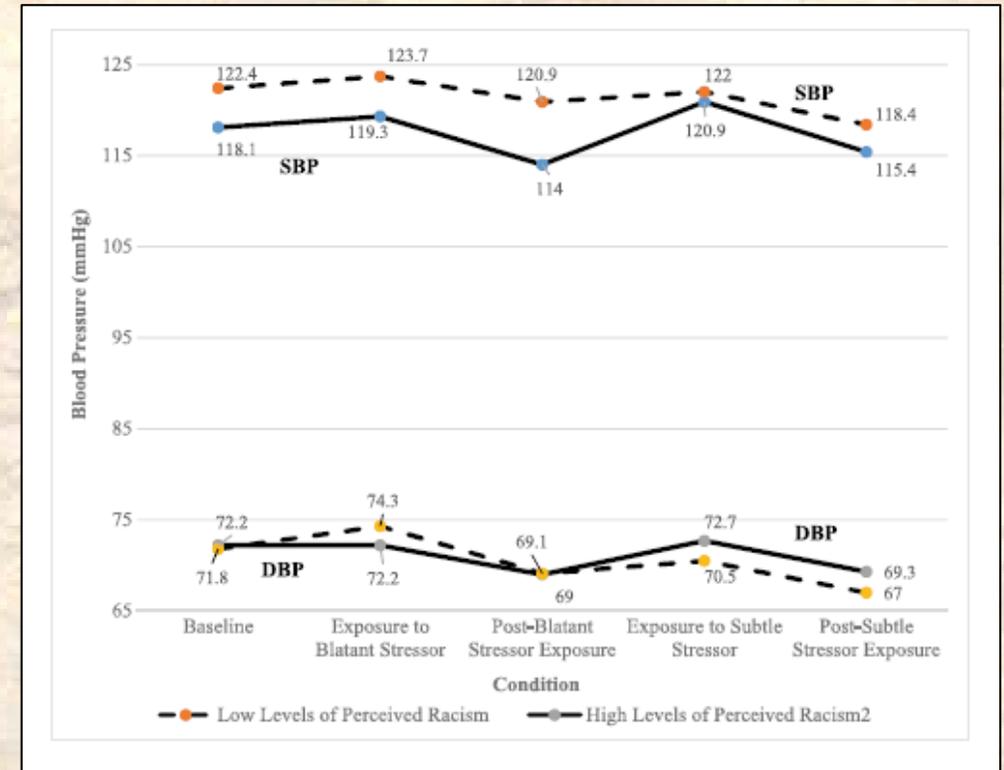
*Model 1: $R^2 = .28$, $F(6, 142) = 9.03$, $P < .0001$

**Model 2: $R^2 = .34$, $F(8, 139) = 8.49$, $P < .0001$

***Model 3: $R^2 = .36$, $F(11, 139) = 6.66$, $P < .0001$

Cardiovascular Reactivity and Recovery

- Hermosura et al.'s (2018) psychophysiological laboratory experiment examining the effects of racism on CVD risk among Native Hawaiians.
 - SBP recovery following exposure to both subtle and blatant types of stressors was significant for both groups.
 - Albeit non-significant, trends in the high-perceived racism group observed in several areas:
 - Greater reactivity to the subtle stressor exposure compared to the blatant stressor,
 - Incomplete heart rate recovery after exposure to both stressors,
 - Partial SBP and DBP recovery following exposure to the subtle stressor.
 - Overall, the participants reported greater subjective distress following the blatant stressor exposure compared to that of the subtle.



Pathways from Racism to Health Inequities

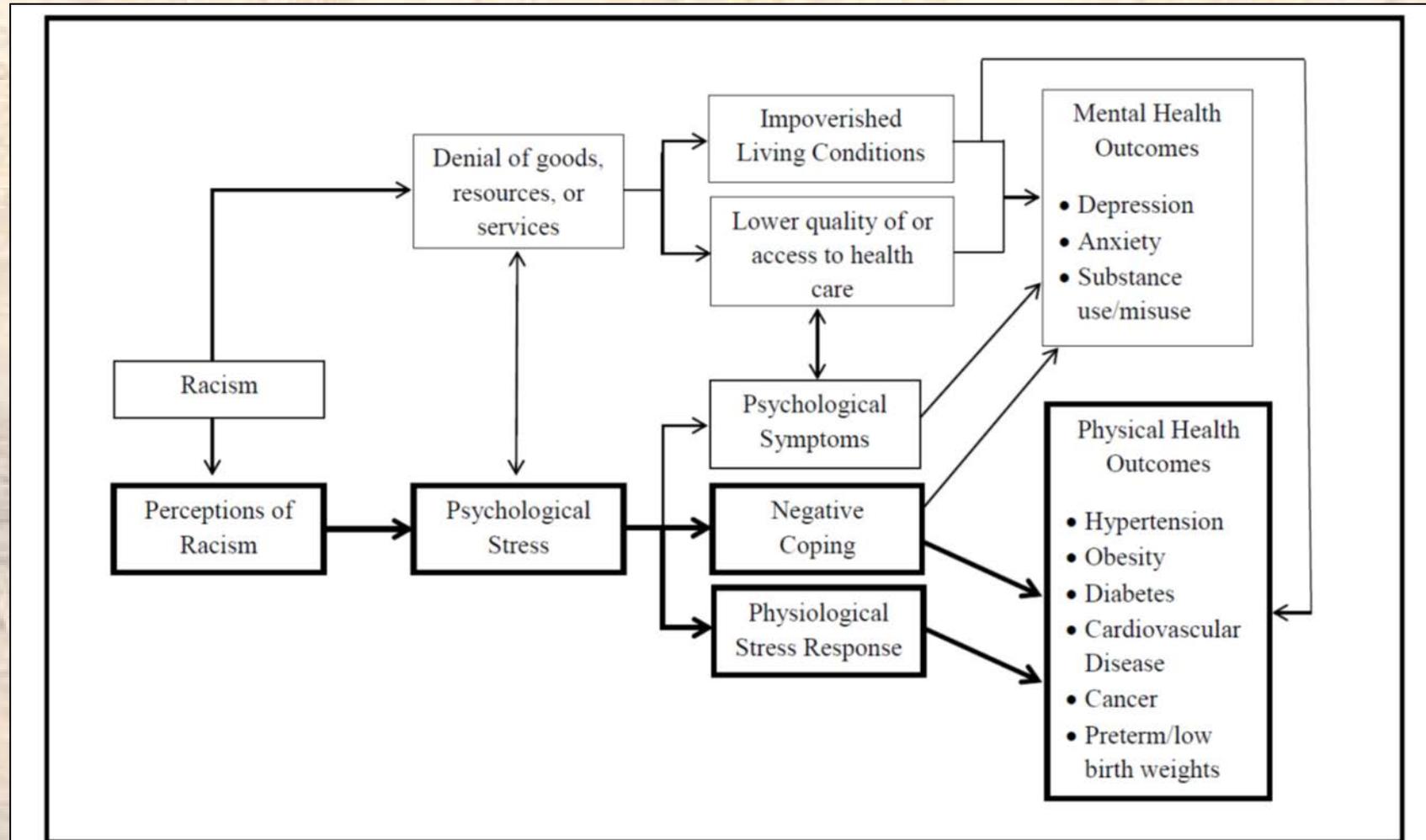
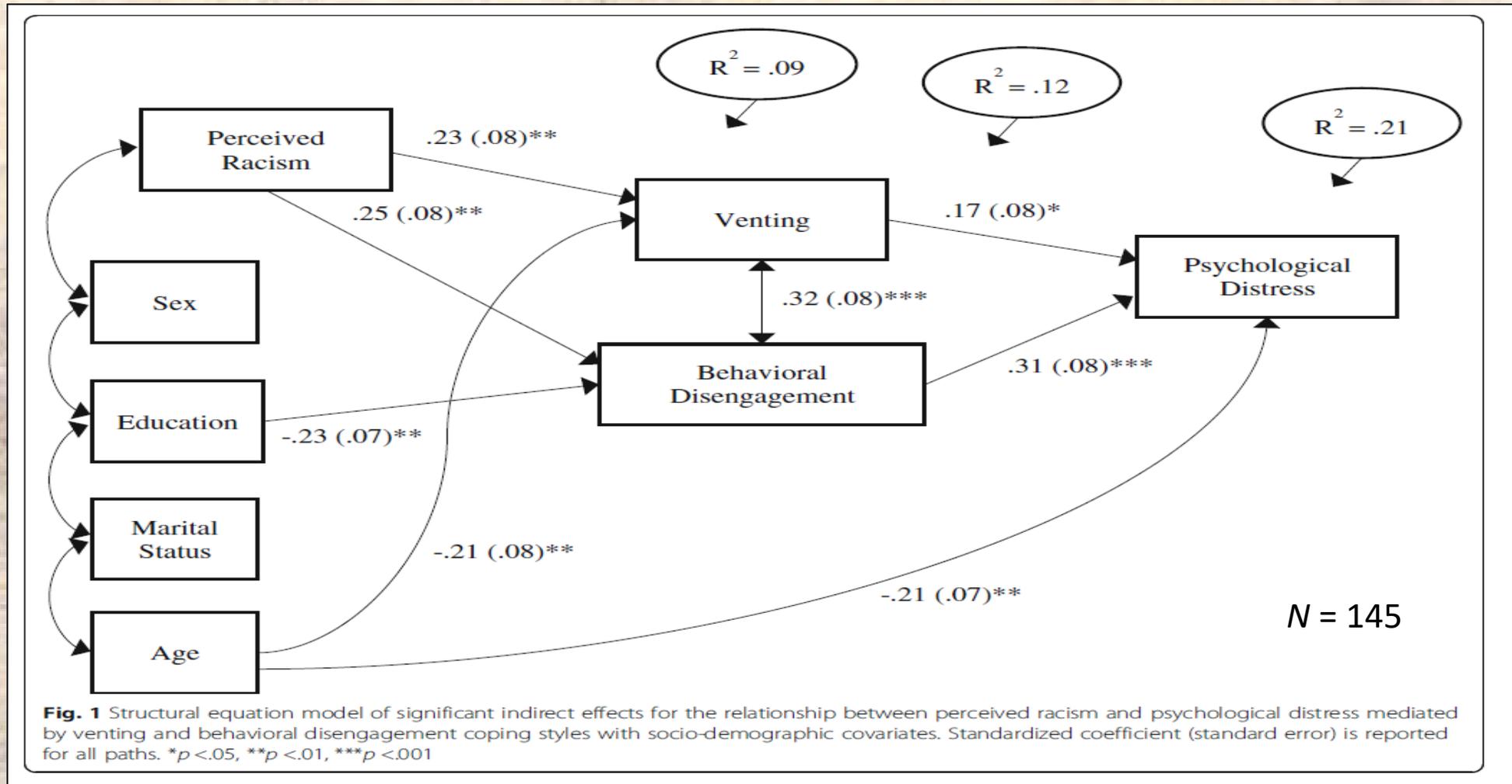


Figure 1. Modified from Paradies et al. (2013), the pathways from perceived racism to physical health outcomes are depicted here. The bolded squares and arrows indicate the pathways reviewed in this chapter.

Racism and Depression Symptoms

- Antonio et al. (2016) examined the relationship between discrimination and depression symptoms in 104 Native Hawaiian residents of a Hawaiian homestead community.
 - Significant positive correlation between perceived discrimination and depression symptoms ($r = .32$), adjusting for differences in socio-demographics and degree of both Native Hawaiian and American cultural identity.
 - Unlike previous studies, Hawaiian cultural identity did not significantly correlate with perceived discrimination, which could be due to the small sample size (i.e. not enough statistical power to detect a significant correlation) or due to characteristics unique to Hawaiian homestead communities.

Racism, Coping, and Psychological Distress



Kaholokula, J. K., Antonio, M. C., Ing, C. K., Hermosura, A., Hall, K. E., Knight, R., & Wills, T. A. (2017). The effects of perceived racism on psychological distress mediated by venting and disengagement coping in Native Hawaiians. *BMC Psychol*, 5(1), 2.

Ola Hou

I KA HULA



Physical Activity

- Physical activity helps to prevent and treat HTN.
- Increased physical activity reduces systolic blood pressure (SBP) by 5 to 10 mmHg and diastolic blood pressure (DBP) by 1 to 6 mmHg in hypertensive patients.
- Reduction of 5.5 mmHg in SBP and 3 mmHg in DPB lowers risk of CHD by 15 %, stroke by 27 %, and all-cause mortality by 7 %.
- Physical activity effects magnified when coupled with sodium reduction and weight loss, and are likely synergistic with pharmacologic interventions.

Cultural Grounded Approaches

- NHPI prefer indigenous approaches to health promotion that consider their spiritual and cultural values and delivered within a familiar community setting.
 - Distrust toward Western medicine.
- Culturally grounded health promotion strategies could have a larger reach and relevance leading to sustainable behavior changes.



Look MA, Batti-Trask MK, Agres R, Mau ML, Kaholokula JK. *Assessment and Priorities for Health & Well-being in Native Hawaiians & Other Pacific Peoples*, Center for Native and Pacific Health Disparities Research. Honolulu HI: University of Hawai'i; 2013.

Kaholokula JK, Saito E, Mau M, Latimer R, Seto T. Pacific Islanders' perspectives on heart failure management. *Patient Educ Couns*. 2008;70(2):281–91.

Hula, the Traditional Dance of Hawai‘i

Hula is the language of the heart, therefore the heartbeat of the Hawaiian people.

— King David Kālakaua (1874 to 1891)

- Hallmark of Hawaiian culture performed to convey history, spiritual beliefs, and one’s connection to the natural world.
- Appeals to many different people spreading to places such as Japan, Mexico, and Europe.
- Using the entire body, hula is comprised of specific controlled rhythmic movements that illustrate the meaning or poetry of the accompanying songs or chants.
 - Can vary in intensity/duration depending on the choreography, tempo of the music, and skill level of the dancer.
 - Can be modified to accommodate people who have physical limitations.



Process of Intervention Development

- **Used a community-based participatory research (CBPR) approach to...**
 - Engage the kumu hula (hula masters and keepers of the tradition) community.
 - Establish a research team and advisory group that balanced cultural expertise/wisdom and medical/scientific expertise.
 - Determine the cultural relevance of using hula to address CVD with Native Hawaiian patients.
 - Connects on the spiritual, cultural, emotional, social, and physical level.
 - Develop and test the feasibility of a hula intervention for HTN management.

MET Study of Hula

Activity	METs	
Resting	1.0	
Walking (20 min/mile, level and firm surface)	3.3	
Gardening (general)	4.0	low intensity hula (5.7)
Dancing (ballroom, fast)	5.5	
Basketball (general)	6.0	Hula 6.6
Tennis (general)	7.0	
Basketball or Volleyball (game)	8.0	
Soccer (game)	10.0	high intensity hula (7.5)

Ainsworth, BE et al (2000). Compendium of physical activities: an update of activity codes and MET intensities. *Medicine & Science in Sports and Exercise*, 32(9 Suppl), S498-504.

Usagawa, T., Look, M., de Silva, M., Stickley, C., Kaholokula, J.K., Seto, T., & Mau, M.K. (2013). Metabolic equivalent determination in the cultural dance of hula. *International Journal of Sports Medicine*, 35(5), 399-402.

Intervention Components

- 12 weeks of hula lessons
 - 1 hour group hula class, 2x per week
 - Both kahiko (ancient hula) and 'auana (modern hula)
- 4 hours of culturally tailored heart health education
- Designed to be delivered by a Kumu Hula from the community
 - Kumu undergoes training on the protocols and class structure.
- Class components:
 - walk-sing warm up
 - stretches
 - footwork
 - continuous dancing (5-40 min)
 - walk-sing cool down

Phase	Duration	Goals
Warm-up	5–15 min	<ul style="list-style-type: none">• Promote normal range of motion• Stretches focusing on legs, arms, lower back• Low-level, aerobic activity at 25–40 % MPHR
Conditioning	20–40 min	<p>Intensity</p> <ul style="list-style-type: none">• Range 40–85 % VO_{max} or 50–70 % MPHR• Training intensity = $(40 + [2 \times \text{Max METs}]) \%$• RPE: between 12 and 16 on Borg scale^a• Target HR = $(\text{HR reserve} \times \text{training intensity } [\%]) + \text{HR}_{\text{resting}}$
Cool-down	3–10 min	<ul style="list-style-type: none">• Low-level, aerobic activity to allow BP and HR to return to resting level

MPHR maximum predicted heart rate, *VO_{max}* maximal oxygen consumption, *METs* metabolic equivalents, *RPE* rating of perceived exertion, *HR* heart rate, *BP* blood pressure

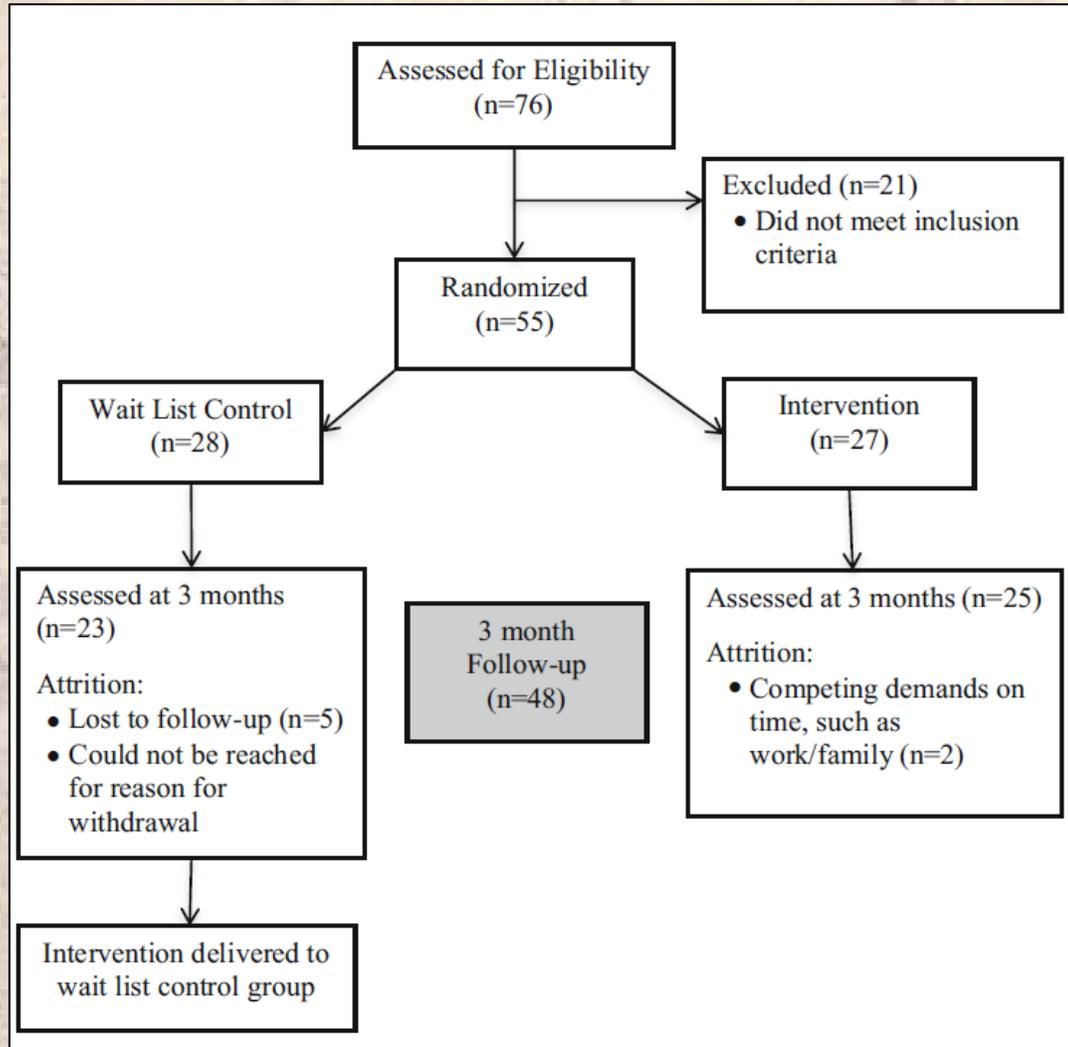
^a The Borg scale is commonly used in cardiac rehabilitation as a subjective measure of physical exertion. The participant gives a subjective score between 6 and 20 during exercise to indicate his or her level of physical intensity [45]

Hula Lessons

- Establish *aloha* as a class expectation
- Other Hawaiian values promoted
 - *Laulima* (cooperation)
 - *Pono* (harmony/balance)
 - *‘Ohana* (extended family)
- Fosters a connection to place and others
- Circle sharing in first & last class



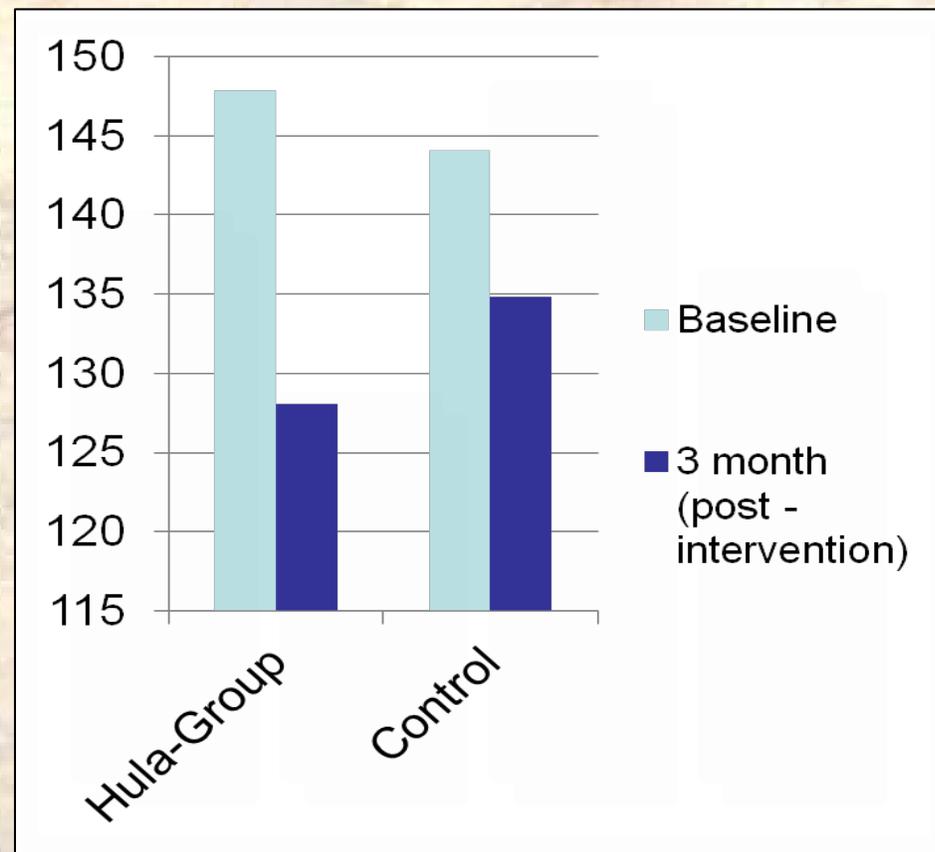
Pilot Trial Design



- **Eligibility:**
 - Native Hawaiian or other Pacific Islander with physician diagnosed HTN
 - SBP > 140 (or >130 if have diabetes)
 - Under a physician's care for ≥ 6 months
 - ≥ 21 years of age
 - Independently ambulatory
- **Waitlist control**
 - 1:1 randomization by site
 - Kōkua Kalihi Valley Family Comprehensive Services
 - Papakōlea Hawaiian Homestead Communitiy

- Found a greater reduction in SBP for intervention group ($p=.04$)
 - Hula group -20 mmHg
 - Control -9 mmHg
- 72% of intervention group dropped ≥ 10 mmHg vs. 39% of control ($p = .022$)
- Intervention led to significant improvements in social functioning, bodily pain, and lower perceived racism.

Change in Systolic Blood Pressure



Lessons Learned

- Hula benefited other Pacific Islanders equally well.
 - Ola Hou led to clinically significant improvements in SBP
- Social functioning improvement was strongly associated with SBP improvement.
- Perceptions of racism changes seen in the intervention group suggest a psychosocial/sociocultural benefit beyond the clinical benefits.
- Questions remaining...
 - What are the longer-term benefits of a hula program on HTN management?
 - What is the mechanism by which hula affects HTN management?

KāHOLLO Project

Preventing CVD in Native Hawaiians

- **5-year definitive study (R01 HL126577) to:**
 - Aim 1:** Compare the efficacy of a 6-month intervention using hula plus self-care education to a wait-list control group in reducing SBP among NH with physician-diagnosed HTN.
 - Aim 2:** Compare CVD risk scores in the hula plus self-care education and wait-list control conditions post-intervention and at 12 month follow-up.
 - Aim 3:** Test whether intervention effects are mediated through psychosocial and cultural factors.

Mahalo Nui

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- The content of this presentation is solely the responsibility of the presenter(s) and does not necessarily represent the official views of the NIH.

