The Effects of Racism on Hypertension in Native Hawaiians

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Native Hawaiians

• Kānaka ʻŌiwi
  – Descendants of the original inhabitants residing in Hawaiʻi prior to 1778

_Eia Hawaiʻi, he moku, he kanaka_
Behold Hawaiʻi, an island, a person
### U.S. Demographics

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

<table>
<thead>
<tr>
<th>Detailed Group</th>
<th>Number</th>
<th>Percent of NHPI population</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>1,227,023</td>
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</tr>
<tr>
<td>Polynesian</td>
<td></td>
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<tr>
<td>Native Hawaiian</td>
<td>527,077</td>
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</tr>
<tr>
<td>Samoan</td>
<td>184,440</td>
<td>15%</td>
</tr>
<tr>
<td>Tongan</td>
<td>57,183</td>
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<tr>
<td>Micronesian</td>
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<tr>
<td>Guamanian/Chamorro</td>
<td>147,798</td>
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<tr>
<td>Marshallese</td>
<td>22,434</td>
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<tr>
<td>Melanesian</td>
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<tr>
<td>Fijian</td>
<td>32,304</td>
<td>3%</td>
</tr>
<tr>
<td>Other Pacific Islander</td>
<td>255,787</td>
<td>21%</td>
</tr>
</tbody>
</table>

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


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

- Native Hawaiian 23%
- Caucasian 19%
- Filipino 10%
- Japanese 17%
- Chinese 3%
- Korean 1%
- Samoan/Tongan 1%
- Mixed (except Hawaiian) 25%
- Black 1%

Population Growth

Projected Increase in Native Hawaiians, 2000 to 2050


“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.


Within Group Differences in Hypertension Prevalence


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

N = 572
Acculturation Strategy and Diabetes Risk

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

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.

# Racism and Hypertension

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

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

# Perceived Racism and Physiological Stress (Cortisol)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1*</th>
<th></th>
<th></th>
<th></th>
<th>Model 2**</th>
<th></th>
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<th></th>
<th>Model 3***</th>
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<td>SE</td>
<td>$P$</td>
<td>$\beta$</td>
<td>SE</td>
<td>$P$</td>
<td>$\beta$</td>
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<td>.12</td>
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<td>.20</td>
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<td>.9915</td>
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<td>SBP (mmHg)</td>
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<td>.26</td>
<td>.1542</td>
<td>.36</td>
<td>.27</td>
<td>.1893</td>
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<td>SBP (mmHg)</td>
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<td>.0342</td>
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</table>

- **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.

Note. **Model 1**: $R^2 = 0.20$, $F(6, 125) = 4.82$, $P = .0002$; **Model 2**: $R^2 = 0.23$, $F(10, 123) = 3.35$, $P = .0008$; **Model 3**: $R^2 = 0.24$, $F(13, 123) = 2.66$, $P = .0028$

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- 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).

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## Perceived Racism and Physiological Stress (Blood Pressure)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1*</th>
<th></th>
<th></th>
<th>Model 2**</th>
<th></th>
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<tr>
<td></td>
<td>( \beta )</td>
<td>( \text{SE} )</td>
<td>( P )</td>
<td>( \beta )</td>
<td>( \text{SE} )</td>
<td>( P )</td>
<td>( \beta )</td>
<td>( \text{SE} )</td>
<td>( P )</td>
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<td>17.54</td>
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<td>BMI (kg/m²)</td>
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</tbody>
</table>

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


![Diagram showing the relationship between perceived racism and psychological distress mediated by venting and disengagement coping styles with socio-demographic covariates.](image)

*Fig. 1* Structural equation model of significant indirect effects for the relationship between perceived racism and psychological distress mediated by venting and behavioral disengagement coping styles with socio-demographic covariates. Standardized coefficient (standard error) is reported for all paths. *p < .05, **p < .01, ***p < .001* 

N = 145
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 DBP 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.


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

<table>
<thead>
<tr>
<th>Activity</th>
<th>METs</th>
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<tr>
<td>Resting</td>
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</tr>
<tr>
<td>Walking (20 min/mile, level and firm surface)</td>
<td>3.3</td>
</tr>
<tr>
<td>Gardening (general)</td>
<td>4.0</td>
</tr>
<tr>
<td>Dancing (ballroom, fast)</td>
<td>5.5</td>
</tr>
<tr>
<td>Basketball (general)</td>
<td>6.0</td>
</tr>
<tr>
<td>Tennis (general)</td>
<td>7.0</td>
</tr>
<tr>
<td>Basketball or Volleyball (game)</td>
<td>8.0</td>
</tr>
<tr>
<td>Soccer (game)</td>
<td>10.0</td>
</tr>
<tr>
<td><strong>Hula low intensity</strong></td>
<td>5.7</td>
</tr>
<tr>
<td><strong>Hula high intensity</strong></td>
<td>7.5</td>
</tr>
</tbody>
</table>


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

<table>
<thead>
<tr>
<th>Phase</th>
<th>Duration</th>
<th>Goals</th>
</tr>
</thead>
</table>
| Warm-up     | 5–15 min | • Promote normal range of motion
                   • Stretches focusing on legs, arms, lower back
                   • Low-level, aerobic activity at 25–40 % MPHR |
| Conditioning| 20–40 min| Intensity
                   • Range 40–85 % VO\text{max} or 50–70 % MPHR
                   • Training intensity = (40 + [2 × Max METs]) %
                   • RPE: between 12 and 16 on Borg scale\(^{a}\)
                   • Target HR = (HR reserve × training intensity [%]) + HR\text{resting} |
| Cool-down   | 3–10 min | • Low-level, aerobic activity to allow BP and HR to return to resting level |

\(\text{MPHR}\) maximum predicted heart rate, \(\text{VO}_{\text{max}}\) maximal oxygen consumption, \(\text{METs}\) metabolic equivalents, \(\text{RPE}\) rating of perceived exertion, \(\text{HR}\) heart rate, \(\text{BP}\) 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 Community
Found a greater reduction in SBP for intervention group ($p = .04$)
  - Hula group -20 mmHg
  - Control -9 mmHg
72% of intervention group dropped $\geq 10$mmHg vs. 39% of control ($p = .022$)
Intervention led to significant improvements in social functioning, bodily pain, and lower perceived racism.

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?
KāHOLO 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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