Nā Kānaka Maoli ma nā ʻĀina ʻĒ: Exploring Place of Residency as a Native Hawaiian Health Predictor During the COVID-19 Pandemic

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Abstract

Little is known about the impacts of living in diaspora from the Hawaiian Islands on Native Hawaiian health. To address this, the authors conducted an exploratory analysis using cross-sectional data from the 2021 Native American COVID-19 Alliance Needs Assessment. A total of 1418 participants identified as Native Hawaiian (alone or in any combination), of which 1222 reported residency in the continental US and 196 in Hawai'i. Residency status in the continental US vs Hawai'i was evaluated as a predictor of survey outcomes using likelihood ratio tests on linear and logistic regression models for linear and binary outcomes, respectively. Results showed that NH residency in the continental US was significantly associated with increased odds of reporting fair or poor self-rated health; increased odds for screening positive for anxiety, depression, and suicidality; and increased odds of health insurance loss (P's < .05). Residency in the continent was also associated with lower odds of reporting a diagnosed chronic health condition (P < .05). Residency in the continental US had no observed effect on the odds that participants engaged cultural activities or cultural coping strategies. These results support the role of place of residency as an important Native Hawaiian health predictor during and beyond the COVID-19 pandemic.

Keywords

Native Hawaiian, Diaspora, Residency, Indigenous Health, COVID-19

Abbreviations and Acronyms

NACA = Native American COVID-19 Needs Assessment Survey
COVID-19 = Coronavirus Disease 2019
NH = Native Hawaiian
NHPI = Native Hawaiian and other Pacific Islander

Introduction

In 2021, the US Census reported that for the first time ever the majority of Native Hawaiians (NHs) now live outside of Hawai'i.[1-2] There are many reasons for this shift in population including settler colonialism, socioeconomic opportunity, and changing social needs.[3-7] These causes and motivations are the roots through which off-island Hawaiians form the amorphous NH diaspora,[8] or *nā Kānaka Maoli ma nā ʻĀina ʻĒ* (NHs in away lands). Like NHs in Hawai'i, research indicates that NHs in the continental US face substantial physical, behavioral, social, and COVID-19 illness and morbidity disparities.[3,9-13] Furthermore, the migration from *ka pae* ʻāina (the Hawaiian homelands), community, and culture may uniquely jeopardize NH health.[3,11] However, unlike in Hawai'i, NHs in the continent do not readily have access to culturally relevant health care services, NH providers, nor care environments that are culturally responsive towards NHs.[14-17]

Recent studies have engaged NH residents in Nevada and California to better understand how living in the continental US affects NH health.[3,6,9,11] In a 2011 qualitative study of 27 NHs living in Las Vegas, Nevada, Lasseter et al. examined the perceived effect of migration on NH health and well-being. Few immediate changes were identified, though some participants detailed a sense of separation from Hawai'i which degraded their emotional and physical health.[11] A similar study by Browne and Braun in 2017 asked 30 NH elders in Los Angeles and San Diego, California, about their experiences living in diaspora. The elders reported more economic mobility and a continued "primacy" of Hawaiian culture; however, accessing NH health care providers was extremely difficult.[3] Although these studies provide excellent insights, there is a paucity of quantitative data on how living in the continental US interacts with measures of health. Such data would help target areas of need for those in the growing NH diaspora. Moreover, the COVID-19 pandemic's elevated impact on Native Hawaiians and other Pacific Islanders (NHPIs) in the continental US elevates the urgency of understanding how residency status impacts NH health outcomes.[13,18-20] To address this need, the present study explores how place of residency may act as a quantifiable health predictor for a large population of NHs during the COVID-19 pandemic.

Methods

Data Source

This study was a secondary analysis of data from the cross-sectional Native American COVID-19 Alliance Needs Assessment (NACA; N=8549), an Indigenous-focused study in the

National COVID-19 Communities of Color Needs Assessment conducted between January and March 2021.[21-22]

Criteria

The NACA study included adults 18 years and older who identified as American Indian, Alaskan Native, First Nations, NH, and/or PI and were residents of the US and its territories. For the present study, the authors filtered for respondents who identified as NH, either alone or in combination, and who lived in either Hawai'i or the continental US (including Alaska and excluding US territories). Responses were removed if participants did not live in Hawai'i or the continental US, were not NH, were in a foreign language, contained nonsense language, had improbable completion times, and/or were duplicates. The final sample for this secondary analysis included 1418 NH respondents from the NACA study, of whom 1350 were recruited through snowball sampling and 68 were recruited through Qualtrics panels.

Recruitment and Sampling

The NACA study utilized a 2-pronged sampling approach that included respondents recruited from snowball sampling and Qualtrics panels, to ensure a diverse and balanced sample. Participants were sampled proportionally to the distribution of Indigenous populations across the four US Census regions (Northwest, Midwest, South, West). A 50% male-to-female split was sought for the NACA sample with 22% being from rural areas/tribal lands and 78% from urban areas.

Snowball recruitment was conducted through outreach to a national network of Indigenous researchers, community partners, universities, and national Indigenous organizations. In the NACA dataset, 7834 were recruited through the convenience snowball sample. The NACA also received a total of 11 617 (12.7%) raw Qualtrics responses. Of these, 1470 responses were screened by Qualtrics as being valid completions of the total responses. Further screening by the NACA team resulted in *N*=715 (6.2%) being deemed as meeting the eligibility criteria of being US residing Indigenous adults.

Data Collection

The 20-minute NACA survey was administered in English using the Qualtrics online platform.

Measures

Demographic measures. The survey instrument included questions on various demographics. This study focused on tribal identification, race/ethnicity, age, sex (female or male), household income, educational attainment, residential region type (rural/tribal land vs urban), and place of residency.

Place of residency. Continental US residency was coded as those who, at the time of survey completion, self-reported residency in the continental US including Alaska and excluding US territories. Hawai'i residency was coded as self-reported residency in Hawai'i at the time of survey completion. Responses were coded by residential region type by the NACAS team where responses from urban/suburban census classified zip codes were urban and rural responses were classified by census zip codes or if respondents were living on reservation lands or Hawaiian Homelands.

Self-rated health status was assessed using a single item asking respondents to self-rate their health status, with response options including excellent, very good, good, fair, and poor.

Health care. Three indicator variables for health care were calculated based on whether respondents reported (1) at least one diagnosed health condition from a list of 18 possible common physical and mental chronic health conditions (see **Appendix 1**), (2) insurance/benefits loss due to the pandemic, and (3) pandemic-caused difficulty accessing needed health care.

Mental health. The 4-Item Patient Health Questionnaire (PHQ-4L) was used for the anxiety and depression screens.[23] To assess suicidality, respondents were asked: "In the past month, have you seriously considered suicide, that is, seriously considered thoughts or plans to harm yourself in some way?" Participants responded either "yes" or "no". A cumulative measure was analyzed by assessing if participants were positive to any of the included mental health screens.

Cultural engagement. To assess cultural engagement, the authors examined responses to 2 questions: (1) "What have you done to cope with your stress related to the COVID-19 pandemic?", and (2) "What have been some of your thoughts, experiences, or activities during the COVID-19 pandemic?" Response options to these 2 questions included various cultural coping strategies used to protect against pandemic adversity (eg, prayed for relatives, or used traditional medicine). The authors examined responses to a third question: "Due to the constraints of the COVID-19 pandemic, was your family able to take on more of these types of activities?" Response options included "cooking together" and "engaging in cultural gatherings" among others. Relevant answers for cultural engagement measures were chosen based on interpreted alignment with NH cultural health practices.[24]

Statistical Approach

Likelihood Ratio Tests were conducted on linear regression models (linear) and logistic regression (binary) models to assess if adding the variable of residency in Hawai'i or the continental US significantly improved upon the fit of the base model (95% CI, α=.05). As a sensitivity test, 2-way analysis of covariance

(ANCOVA) tests were conducted for all measures. All models were adjusted for relevant covariates including age, educational attainment, annual household income, having another Pacific Islander identity, residential region (urban or rural), and sex. Adjusted odds ratios (aOR's) of continental living NHs (=1) to Hawai'i living NHs (=0) were reported for all binary outcomes and standardized beta (ß) coefficients for linear outcomes. Stata16, release 16 (StataCorp LLC, College Station, TX) and R version 2023.06.1 (R Foundation for Statistical Computing, Vienna, Austria) were used for data processing and analysis.[25-26] Complete case analysis was used for all statistical analyses.

Results

Demographics

Of the 1418 NHs in the sample, 86% (*n*=1222) reported continental US residency and 14% (*n*=196) reported Hawai'i residency. Median educational attainments for survey respondents in the continental US and those in Hawai'i were some college and an associate's degree respectively. Median ages for those living in the continental US and those in Hawai'i were 36 and 37 years of age respectively. Among NH continental US residents, 49% identified as female compared to 59% in Hawai'i. Sixty-seven percent of continental US residents lived in urban/suburban areas and 33% in rural areas. Comparatively, 35% of NHs in Hawai'i lived in urban/suburban areas and 65% in rural areas. An 82% majority of NH continental residents had an additional Pacific Islander identity compared to 47% of NHs in Hawai'i. States with the most respondents were Hawai'i (*n*=196), California (*n*=133), Texas (*n*=117), New York (*n*=78), and Washington (*n*=59) (data not shown). Hawai'i zip codes with the greatest number of respondents were: Honolulu (*n*=53); Wailuku (*n*=17); Wai'anae (*n*=13); Hilo (*n*=12); and Kāne'ohe (*n*=11) (data not shown). **Table 1** displays the demographics of this study compared to US Census data.

Descriptive Results

Forty percent of NH continental residents rated their health as fair or poor compared to 28% of NH Hawai'i residents. Fewer continental residents reported being diagnosed with a health condition over their lifetime than NHs in Hawai'i (61% and 79%, respectively). One in three Hawai'i and continental residents reported difficulty in accessing needed health care services due to the COVID-19 pandemic. Nearly one-third (32%) of continental residents reported losing health insurance or benefits due to the pandemic, compared to 12% of Hawai'i residents. Almost two-thirds (60%) of NH continental residents screened positive for anxiety compared to one-third (33%) of NH Hawai'i residents. Fifty-nine percent of continental residents screened positive for depression compared to 23% of Hawai'i residents. Forty-three percent of continental residents reported suicidal thoughts compared to 7.7% of Hawai'i residents. In all, 87% of continental residents screened positive for at least 1 mental health screen (anxiety, depression, and suicidality) compared to 42% of Hawai'i residents. Reported participation in family cultural activities was similar between continental NH residents and Hawai'i NH residents– 98% and 93% respectively. When asked how they dealt with stress from the pandemic, overall engagement in at least 1 cultural coping strategy was similar across groups (90% in the continent and 92% in Hawai'i). **Table 2** highlights descriptive analysis results.

Table 1. Native American COVID-19 Alliance Needs Assessment Native Hawaiian Participant Demographics by Residency Compared to the US Census (N=1418)

	NACA Survey data (N=1418)		US Census Data[1-3,40]	
Demographic Variables	**NH Continent Residents** (n=1222)	**NH Hawai'i Residents** (n=196)	**NH Continent Residents**	**NH Hawai'i Residents**
Proportion of sample residency	86%	14%	53%	47%
Median annual household income	$50 000-74 999	$50 000-74 999	$62 970[a]	$57 358
Median educational attainment	Some college	Associate's degree	Some college/ associate's degree*	Some college/ associate's degree
Median age (sd)	36 (7)	37 (15)	30*	32
% Female	49%	59%	49%*	49%
Other Pasifika identity in addition to NH	82%	47%		
Residential region type				
Rural	33%	65%		
Urban/suburban	67%	35%		

sd= standard deviation NH= Native Hawaiian. [a] Data from NH living in California (n=88 307).

Table 2. Descriptive Outcomes for Native Hawaiian (NH) NACA Survey Participants by Place of Residency (N=1418)		
	NH Continent Residents (n=1222) % (n)	**NH Hawai'i Residents (n=196) % (n)**
Test Variables		
Self-rated health "fair" or "poor"	40% (485)	18% (36)
Excellent	4% (54)	6% (12)
Very good	31% (374)	36% (70)
Good	25% (309)	40% (78)
Fair	22% (265)	14% (28)
Poor	18% (220)	4% (8)
Reported chronic health condition	61% (742)	79% (154)
Had difficulty accessing health care when it was needed	34% (419)	32% (63)
Lost health insurance/benefits	32% (391)	12% (24)
Positive anxiety screen[a]	60% (732)[b]	33% (64)[b]
Positive depression screen[a]	59% (719)[b]	23% (46)[b]
Seriously considered suicide[b]	43% (523)	7.7% (15)
Any positive mental health screen[c]	87% (1063)	42% (83)
Cultural Coping Strategies to Manage Pandemic Stress		
Prayed for friends and relatives to help them get through COVID-19's impact on their families	24% (289)	68% (133)
Prayed for spiritual support/help of creator/god/ancestors to help get through the pandemic	24% (291)	54% (105)
Cleansed self spiritually to help self or family through the stress caused by COVID-19	22% (264)	18% (35)
Talked to a medicine person/traditional healer	21% (255)	12% (24)
Reached out to elders or respected native health leaders	21% (255)	16% (32)
Engaged in meditation or mindfulness practices	20% (249)	35% (69)
Talked to a spiritual advisor	19% (233)	18% (36)
Traditional medicine/healing	19% (233)	27% (52)
Attended religious, spiritual, ceremonial, or traditional practices	18% (220)	18% (35)
Traditional chanting, singing, ceremonial drumming (eg, oli)	18% (214)	16% (32)
MEAN QUANTITY OF CULTURAL COPING STRATEGIES ENGAGED PER RESPONDENT (mean, sd)	2.05 (1.88)	2.82 (1.25)
ENGAGED AT LEAST 1 CULTURAL COPING STRATEGY	90% (1100)	92% (181)
Family Cultural Activities During the Pandemic		
Cooking together	45% (554)	55% (108)
Exercising, taking walks or doing sports or fitness together	43% (525)	55% (107)
Helping others in the community together	43% (524)	34% (67)
Working on art, crafts, or other artistic/creative skills	43% (526)	43% (84)
Practicing or starting to learn traditional language ('Ōlelo Hawai'i for NHs)	42% (517)	31% (61)
Engaging in online or social distance cultural gatherings, hula dancing, etc.	40% (493)	37% (72)
Hanging out together/family leisure time together	26% (316)	52% (102)
Engaging in social activism	19% (228)	17% (34)
MEAN QUANTITY OF CULTURAL ACTIVITIES PARTICIPATED IN BY FAMILY PER RESPONDENT (mean, sd)	3.01 (.98)	3.24 (1.72)
FAMILY PARTICIPATED IN AT LEAST 1 CULTURAL ACTIVITY	98% (1194)	93% (182)

NACA = Native American COVID-19 Alliance Needs Assessment
[a] phq-4l positive when total score ≥3
[b] n = 1413 responses analyzed due to missing data
[c] any positive depression screen, anxiety screen, and/or suicidality screen

Table 3. Inferential Analysis of the Relationship Between Living in the Continental US and NH Health Outcomes in the NACA Survey (N=1418)				
Test Variables	**Inferential statistics**		**Likelihood Ratio Test[a]**	
	aOR (95% CI)	**ß (95% CI)[a]**	***X*² (1)**	***P***
Self-rated health "fair" or "poor"[a,b]	1.24 (1.14, 1.35)	–	26.6	<.001
Reported at least one chronic health condition[a,b]	.84 (.78, .92)	–	16.5	<.001
Had difficulty accessing health care when it was needed[a,b]	.93 (.86, 1.01)	–	2.64	.106
Lost health insurance/benefits[a,b]	1.17 (1.08, 1.27)	–	15.6	<.001
Positve anxiety screen[a,b,c]	1.24 (1.14, 1.35)	–	24.6	<.001
Positive depression screen[a,b,c]	1.30 (1.19, 1.41)	–	36.5	<.001
Seriously considered suicide[a,b,e]	1.37 (1.26, 1.49)	–	56	<.001
Any positive mental health screen[a,d]	1.41 (1.32, 1.49)	–	117	<.001
Mean cultural coping strategies engaged per individual[a]	–	-.10 (-.29,.10)	10.9	.001
Engaged at least one cultural coping strategy[a,b]	.97 (.90, 1.03)	–	1.06	.305
Mean cultural activities participated in by family[a]	–	-.08 (-.25, .10)	6.85	.009
Family participated in at least one cultural activity[a,b]	1.00 (1.00, 1.00)	–	0	.981

NOTE: NACA = Native American COVID-19 Alliance Needs Assessment; aOR = adjusted odds ratio of NH Continent Residents (=1): Hawai'i Residents (=0); ß = standardized beta coefficient, CI=95% confidence interval; X^2 (1) = chi-square statistic (degrees of freedom); and *P* = *P*-value. Significance was assessed as when *P*-values were less than .05.

[a] Adjusted by educational attainment, age, income, sex, other Pacific Islander identity, and residential region type
[b] Binomial variable
[c] PHQ-4L positive when total score ≥3
[d] Any positive depression screen, anxiety screen, and/or suicidality screen
[e] N=1413 responses analyzed due to missing data

Inferential Statistics

After adjusting for covariates including age, educational attainment, annual household income, having another Pacific Islander identity, residential region (urban/suburban or rural), and sex, residency in the continental US was associated with 16% lower odds of reporting a diagnosed chronic health condition (aOR=.84, 95% CI=.78-.92) and 24% greater odds of reporting poor or fair self-rated health (aOR=1.24, 95% CI=1.14-1.35). It was further associated with 24% greater odds of a positive anxiety screen (aOR=1.24, 95% CI=1.14-1.35), 30% greater odds of a positive depression screen (aOR=1.30, 95% CI=1.19-1.41), 37% greater odds of a positive suicidality screen (aOR=1.37, 95% CI=1.26-1.49), 41% greater odds of screening positive for depression/anxiety/suicidality (aOR=1.41, 95% CI=1.32-1.49), and 17% greater odds for pandemic-related health insurance loss (aOR=1.17, 95% CI=1.08-1.27). NH continental residency was also associated with a lower mean quantities of family cultural activities (ß=-.10, 95% CI=-.25-.10) and cultural coping strategies (ß=-.08, 95% CI=-.29-.10). After controlling for covariates, residency in the continent had no significant impact on the odds for having difficulty accessing needed health care (aOR=.93, 95% CI=.86-1.01), for engaging at least 1 cultural coping strategy (aOR=.97, 95% CI=.90-1.03), nor for engaging at least 1 family cultural activity (aOR=1.00, 95% CI=1.00-1.00). **Table 3** depicts the inferential analysis results.

Discussion

This study explored the quantitative relationship between NH health outcomes during the COVID-19 pandemic and place of residency in the 2021 NACA dataset. The results showed that continental residents had significantly higher odds of reporting their health as fair or poor. The lower perceptions of health among continental-living NHs may have been a result of the increased burden of COVID-19 on continental NH communities. In 2020, COVID-19 case rates per 100 000 in California, Oregon, Utah, and King County, Washington, were nearly 5 times higher than experienced by NHPI in Hawai'i.[18-19] Moreover, 30% of NHPI continental residents in 2021– when the NACA survey was conducted– had at some point been positive for COVID-19, and 16% had lost a family member due to COVID-19.[13]

This burden likely led to heightened emotional distress among continental NHs in the survey.[27] Sixty percent of continental NHs were positive for anxiety, 59% positive for depression, and 43% had considered suicide. The prevalence of positive depression and anxiety screens were considerably higher than other assessments of NH mental health,[13,28] suggesting this particular point in the pandemic (winter 2021) uniquely affected NH mental health, especially in the diaspora; however, these results may also indicate an anomalous result in this survey. Possible mechanisms behind the high prevalence of positive mental health screens among continental NHs are complex but may have been related to the loss of loved ones, socioeconomic challenges, regionally-specific COVID-19 quarantine/social

gathering policies, barriers to cultural practices, and/or other factors independent of the pandemic.[13,29-31] Though NHs in Hawai'i also had a high prevalence of poor mental health screens, it was smaller than continental residents, perhaps because living in Hawai'i allowed more access to community, culture, and land despite pandemic restrictions.[29-31] In any case, the substantial emotional distress among NH continental residents is alarming and etiologies/interventions should be urgently explored.

Cultural access challenges also present concerns. Consistent with prior studies,[3,5,9] cultural engagement appeared to be important to NH continental residents' well-being during the pandemic as more than 90% of continental residents reported engaging in family cultural activities and cultural coping strategies. Moreover, the odds of engaging cultural activities and coping strategies were not significantly different between NHs in Hawai'i or the continent. This high engagement in culture suggests that engaging NH cultural identity was health-protective against pandemic adversity for continental residents. However, continental residency was also associated with a lower magnitude of engagement in cultural coping strategies and family cultural activities. This lower magnitude of engagement is possibly a result of limited access to organized cultural resources in the continent.[3,31] Barriers to cultural engagement may therefore limit continental residents' ability to engage identity-based well-being practices and, in turn, affect their self-rated health.

Difficulties in accessing health care may have also contributed to increased health adversity experienced by NHs living in the continental US. While a similar proportion of NHs in the continent and NHs in Hawai'i faced barriers to accessing health care when they needed it, NHs in the continent had significantly higher odds of losing health insurance than NHs in Hawai'i. It is widely understood that having health insurance improves rates of illness diagnosis, quality of care, and perceptions of health.[33-35] Poorer access to insurance could mean that NHs in the continent suffer from unseen and untreated chronic health conditions. This could explain why NHs in the continent had lower odds than NHs in Hawai'i of having a chronic condition despite worse self-rated health. To address health care inaccessibility for NH continental residents, the authors recommend steps be taken to reduce NH health care barriers such as structural racism, cultural incompetence, underrepresentation of NH providers, insurance inaccessibility, data invisibility, and health care affordability.[17,34,35-38] Consequently, it is important to improve diaspora NH access to NH or Indigenous health care services in the continental US.[14,24,39]

Limitations

The NACA study provided a unique opportunity to conduct an exploratory analysis of residency status as a NH health predictor due to its robust and geographically inclusive dataset. However, there were some limitations: the analysis used binary comparisons between NHs living in the continent and those in Hawai'i, rather than a more nuanced operationalization of place of residency (such as length of time living in the continental US); and all measures were self-reported, cross-sectional, and limited diagnostically. Possible population bias arose due to demographic characteristics which differed substantially from national data– for example, 86% of participants were continental US residents whereas, in US Census data, around 54% of NHs are continental US residents.[1-3,40] This disparity may be because the census-based sampling approach focused on representing Indigenous Americans at-large rather than NH-specifically; lastly, internet-related access difficulties may have limited the study population.

Conclusion

This exploratory study underscores that NH health may be quantifiably impacted by different environmental, social, and systemic factors which are unique to living in diaspora from the Hawaiian Islands. As such, there is a need for future research which studies how living in diaspora operates as a social determinant of health for NHs.

Conflict of Interest

This article was prepared, in part, while Dr. Walters was employed at the University of Washington, Indigenous Wellness Research Institute. The present study was internally funded by the Ola Pasifika Lab. The authors claim no conflict of interest.

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Contributors

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Appendix 1. Chronic Conditions Measures from the Native American COVID-19 Alliance Needs Assessment Survey	
Descriptive Measure	**Question and Analysis Procedure**
Reported at least one chronic health condition	Analyzed by coding a binary "Yes/No" based on if a respondent made one or more selections from the following question on the NACA survey: Have you ever been told by a doctor, nurse, or medical provider that you have (Select all that apply): 1. High blood pressure or hypertension 2. Diabetes (not including pre-diabetes) 3. Pre-Diabetes 4. Cardiovascular disease or heart disease (including blocked or hardening of the arteries, angina, heart attack, stroke or mini stroke) 5. Congestive heart failure (including weakened heart muscle or leaky valve) 6. Lung disease (like asthma, exercise-induced asthma, chronic bronchitis, emphysema, COPD) 7. Cancer that you are getting treatment for now 8. Autoimmune disease (like lupus, rheumatoid arthritis, psoriasis) 9. Kidney disease, including weak or failing kidneys (DO NOT Include kidney stones or problems with urinating) 10. HIV/AIDS 11. Hepatitis B or Hepatitis C 12. Sleep disorders/apnea 13. Low immunity/suppressed immune system (or any medication that decreases your immunity, such as for transplant or an immune disease) 14. Chronic liver disease (like fatty liver, cirrhosis) 15. Anxiety 16. Depression 17. Post-Traumatic Stress Disorder 18. Other mental health conditions