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Disaggregating Health Outcomes Among Native Hawaiian and Pacific Islander Subgroups

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Background

- Native Hawaiians and Pacific Islanders (NHPIs) have typically been aggregated with Asian populations or as one NHPI group.
- Disaggregation of NHPI health data has revealed that NHPIs have higher chronic disease prevalence as compared to Asians.
- Few studies have examined NHPI ethnic groups independently

Objective

- To compare chronic disease outcomes and obesity measures among self-identified Chamorros, Native Hawaiians, and Samoans.

Methods

- From 2013-2014, self-administered surveys (n=163) were given to NHPI participants in San Diego, CA
- Participants were recruited at local NHPI cultural festivals, civic and social clubs, community based organizations, and private residences
- Survey items assessed diabetes and cardiovascular disease (CVD) diagnosis by a doctor, and biological family history of cancer
- Anthropometric measures (height, weight, and waist circumference) were used to calculate Body Mass Index (BMI) and Waist-to-Height Ratio (WHtR)
- 156 participants identified as Chamorro, Native Hawaiian, or Samoan
- Chronic disease outcomes (diabetes, CVD, and cancer) were compared using Chi-Square tests
- BMI, WHtR, and Waist Circumference (WC) were compared using one-way ANOVA
- Significant tests were analyzed post-hoc utilizing multiple linear regression (BMI, WHtR, WC) and logistic regression (diabetes, CVD, cancer) while controlling for age, gender, and monthly household income

Participant Characteristics

- Mean Age in Years (SD): Chamorro – 46.5 (19.2), Native Hawaiian – 46.2 (17.9), Samoan 34.1 (11.5)
- % Women (n): 67.9% (106)
- % Monthly Household Income Above $3000 (n): 72.4% (108)

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Results

Table 1
Chronic Disease Prevalence Among Pacific Islander Ethnicities

	Chamorro (n = 70)	Native Hawaiian (n = 48)	Samoan (n = 38)	χ^2
% Diabetes	31.4 (22)	27.7 (13)	8.1% (3)	7.41*
% CVD	11.8 (8)	14.9 (7)	2.6 (1)	3.60

Note: CVD = Cardiovascular Disease. Participants include self-identified Chamorro, Native Hawaiian, and Samoan participants. *$p < 0.05$

Table 2
Cancer Prevalence in Families Among Participants 40+ Years Old

	Chamorro (n = 42)	Native Hawaiian (n = 26)	Samoan (n = 12)	χ^2
% Family Cancer History	45.2 (19)	57.7 (15)	25.0 (3)	3.57

Note: Family Cancer History = Includes participants whose biological family members have had cancer. Participants include self-identified Chamorro, Native Hawaiian, and Samoan participants. *$p < 0.05$

Table 3
Obesity Measures

	Chamorro (n = 70)		Native Hawaiian (n = 48)		Samoan (n = 38)		
Measure	M	SD	M	SD	M	SD	F
BMI (kg/m^2)	31.60	6.09	31.05	6.24	35.56	7.91	5.35†
WC (cm)	103.08	14.21	104.42	14.70	110.16	15.21	2.66
WHtR	.64	.10	.61	.13	.56	.18	3.91*

Note. BMI = Body Mass Index. WC = Waist Circumference. WHtR = Waist-to-Height Ratio. Participants include self-identified Chamorro, Native Hawaiian, and Samoan participants * $p < 0.05$, $^\dagger p < 0.01$, $^\ddagger p < 0.001$

Table 4
Predictors of BMI Measures

	Model 1			Model 2			Model 3			Model 4		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Constant	36.217‡	1.675	-	35.716‡	1.954	-	35.921‡	1.939	-	35.479‡	2.436	-
Ethnicity	-1.710*	.705	-.201	-1.806*	.732	-.212	-1.690*	.728	-.199	-1.663*	.732	-.197
Age				.016	.032	.043	.023	.032	.060	.023	.032	.060
Gender							-2.295	1.205	-.159	-2.327	1.213	-1.61
Income										.087	.287	.025
R^2		.040			.042			.067			.067	
F		5.886			3.053			3.284			2.470	

Note. BMI = Body Mass Index. "Model 1" includes self-reported ethnicity. "Model 2" introduces the interaction of age. "Model 3" introduces the interaction of gender. "Model 4" introduces the interaction of monthly income. Participants include self-identified Chamorro, Native Hawaiian, and Samoan participants * $p < 0.05$, $^\dagger p < 0.01$, $^\ddagger p < 0.001$

Table 5
Predictors of Waist Circumference

	Model 1			Model 2			Model 3			Model 4		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Constant	112.570‡	3.695	-	108.224‡	4.281	-	108.202‡	4.289	-	106.867‡	5.399	-
Ethnicity	-3.258*	1.547	-.183	-4.077*	1.587	-.229	-3.932*	1.603	-.221	-3.875*	1.615	-.218
Age				.139	.071	.174	.145*	.072	.182	.146*	.072	.182
Gender							-1.937	2.766	-.062	-2.067	2.793	-.066
Income										.257	.628	.036
R^2		.033			.062			.065			.067	
F		4.437			4.171			2.933			2.227	

Note. "Model 1" includes self-reported ethnicity. "Model 2" introduces the interaction of age. "Model 3" introduces the interaction of gender. "Model 4" introduces the interaction of monthly income. Participants include self-identified Chamorro, Native Hawaiian, and Samoan participants. * $p < 0.05$, $^\dagger p < 0.01$, $^\ddagger p < 0.001$

Table 6
Predictors of Waist-to-Height Ratio (WHtR)

	Model 1			Model 2			Model 3			Model 4		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Constant	.517‡	.035	-	.462‡	.040	-	.461‡	.038	-	.470‡	.048	-
Ethnicity	.041†	.014	.245	.032*	.015	.186	.037†	.014	.221	.037*	.014	.219
Age				.002*	.001	.227	.002†	.001	.265	.002†	.001	.265
Gender							-.083†	.025	-.279	-.083†	.025	-.276
Income										-.002	.006	-.024
R^2		.060			.108			.182			.183	
F		8.232			7.744			9.436			7.047	

Note. "Model 1" includes self-reported ethnicity. "Model 2" introduces the interaction of age. "Model 3" introduces the interaction of gender. "Model 4" introduces the interaction of monthly income. Participants include self-identified Chamorro, Native Hawaiian, and Samoan participants. * $p < 0.05$, $^\dagger p < 0.01$, $^\ddagger p < 0.001$

Discussion

- Diabetes prevalence significantly differed by ethnicity ($p = .025$).
  - When compared to Samoans, Chamorros and Native Hawaiians had significantly higher diabetes prevalence.
  - Inclusion of sociodemographic variables (age, gender, monthly household income) attenuated differences in diabetes prevalence by ethnicity.
  - Age became significantly associated with diabetes prevalence when included in the logistical model.
  - Gender and monthly household income were not significantly associated with diabetes prevalence.
- BMI ($p = .006$) and WHtR ($p = .022$) were significantly differed by ethnicity.
  - Post-hoc Bonferroni adjustment revealed pairwise differences in BMI between Samoans and Native Hawaiians ($p = .009$) and Samoans and Chamorros ($p = .014$).
  - Post-hoc Bonferroni adjustment revealed significant pairwise differences in WHtR between Samoans and Chamorros ($p = .018$).
  - Differences in obesity measures by ethnicity remained significant after inclusion of sociodemographic variables in the multiple linear regression model.
- Strengths include detailed analysis of chronic disease and obesity measures, disaggregation of NHPIs by ethnicity, inclusion of sociodemographic confounders, and regression analysis to examine possible contributions to outcome differences.
- Limitations include the relatively small sample size between different NHPI ethnicities, and possible interaction of ethnicity with covariates.

Conclusion

- Different measures of obesity differ by ethnicity within San Diego's NHPI population after controlling for sociodemographic variables.
- Disaggregation of health data by ethnicity reveals distinct differences in health outcomes.
- Future studies should consider continued data disaggregation of health data by ethnicity and continue exploring the distinct cultural backgrounds of different ethnic communities to create comprehensive programming.

Acknowledgements

The authors would like to thank the PIC Health Research Advisory Board for their continued feedback and guidance throughout the study. We would also like to thank the Native Hawaiian and Pacific Islander community and participants of PIC Health study for telling us their stories and giving us a vibrant view of NHPI health.

This research is funded by the American Cancer Society, Postdoctoral Fellowship awarded to Christina K. Holub in Cancer Health Disparities Research, Grant #: PF-13-017-01-CPPB

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