

RESEARCH ARTICLE

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The Adoption of Cancer Screening and Prevention in Hawaiian Homestead Communities

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Abstract

Background: This study examined screening behaviors for breast, prostate, and cervical cancers among residents on several Native Hawaiian Homesteads. **Methods:** From 2016 to 2020, a cross-sectional survey was administered to identify the most relevant and modifiable factors associated with participants' health behaviors. The participating Homestead communities are located on the Islands of O‘okinaahu and Hawai‘i. A mailed invitation letter was sent to 1,582 lessees and/or the listed resident in each Homestead community. Respondents were identified as the Homestead lessee, lessees' successor, and/or designee who were over age 18. Sociodemographic and economic variables, as well as cancer-related and cancer screening behaviors, were assessed using items derived from the Behavioral Risk Factor Surveillance Survey (BRFSS). Four items assessing the ability to perform daily activities were also included. Descriptive statistics were calculated, followed by frequencies and percentages for categorical variables, and means and standard deviations for continuous variables. A p-value of < .05 (two-tailed) was used to determine statistical significance. **Results:** Out of 1,582 surveys sent, a total of 459 surveys (29%) were collected. Screening rates for several cancer sites (colon 72%, cervical 97%, breast 99%) were well-above average for Hawai‘i and the U.S. **Conclusion:** These results may be a direct reflection of the strong engagement efforts cultivated by community-based researchers and their longstanding university-community partnership that utilizes community-based participatory research approaches for health promotion.

Keywords: Native Hawaiian- Cancer Screening- Community-based participatory research

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Introduction

Disparities in cancer risk and outcomes across racial and ethnic groups may reflect genetic variations as well as differences in diet, tobacco and alcohol use, obesity, and other lifestyle exposures [1]. Native Hawaiians are a distinct and unique indigenous group with a historical continuity to the original inhabitants of the Hawaiian archipelago [2].

In Hawai‘i, Native Hawaiians have the shortest life expectancy and higher mortality rates than many other ethnic populations due to disproportionately higher incidences of cancer, heart disease, stroke, and diabetes [3]. Life expectancy for Native Hawaiians is 62.2 years, lower than the life expectancy for any other group in the State of Hawai‘i [4, 5]. Even though Native Hawaiian life

expectancy has increased by 11.8 years since 1950, there remains a 10-year gap between Native Hawaiians and the longest-living group in Hawai‘i at any given time.

Cancer is the second leading cause of death in Hawai‘i, after heart disease [1]. Annually, an average of 7,011 Hawai‘i residents are newly diagnosed with invasive cancer (incidence) and, on average, 2,347 Hawai‘i residents die of cancer each year (mortality). Cancer incidence and mortality vary substantially across Hawai‘i's five major racial/ethnic groups, which include Chinese, Filipinos, Japanese, Native Hawaiians, and Whites. Among males, overall cancer incidence was highest in Whites; however, overall cancer mortality was highest in Native Hawaiians. Among females, overall cancer incidence was highest in Whites and Native Hawaiians, yet overall cancer mortality was highest in

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Native Hawaiians [1]. Breast cancer remains the most frequently diagnosed cancer among women, and prostate cancer is the most common cancer among men. Hawai'i's liver and stomach cancer incidence and mortality rates are significantly higher than the U.S. Lung cancer continues to be the leading cause of cancer death in the state [1]. Although effective screening modalities exist for many of these cancer types, including breast, colon, and lung cancers, screening is often underutilized by Native Hawaiians, leading to these cancers being diagnosed in later stages with fewer treatment options and often with poor prognoses [1, 3].

In 2015, the Hawaiian Homestead Health Survey (HHHS) was created through a partnership between KULA, the Native Hawaiian beneficiary serving organization that supports Papakōlea Hawaiian Homestead, the John A. Burns School of Medicine (JABSOM), Department of Native Hawaiian Health (DNHH), and the University of Hawai'i Cancer Center (UHCC). The HHHS was intended to be used to better understand the similarities, unique differences, and issues related to the health and well-being of the Hawaiian Homestead communities across the State of Hawai'i, and to inform the implementation of programs that address the community's health needs. This manuscript addresses survey findings related to cancer screening in these recently surveyed homesteads.

Community-engaged efforts aimed at education and prevention through screening and early detection efforts are one approach to reducing disparities and improving health outcomes for Native Hawaiians. The purposes of this article are to examine the screening behaviors for breast, colorectal, prostate, and cervical cancers among residents residing on several Native Hawaiian Homesteads and to assess the implications of these findings for cancer prevention.

Materials and Methods

The HHHS design and Pretesting

From 2016 to 2020, a cross-sectional survey was administered within three Native Hawaiian Homestead communities: Papakōlea (2016), Kailapa (2018), and Kapolei (2020). The Papakōlea homestead communities were established beginning in 1934 near an urban area of Honolulu and consist of Papakōlea, Kewalo, and Kalawahine. The Kailapa Hawaiian homestead is a single rural Hawaiian community located on the Kohala coast of the Island of Hawai'i. The Kapolei homestead communities are located on the western side of the Island of O'ahu in a suburban area and consist of Malu'ōhai, Kaupē'a, Kānehili, and Ka'uluokaha'i [6]. The goal of the survey was to identify the most relevant and modifiable factors associated with the health behaviors of Native Hawaiians residing on these Homestead lands. The survey packet combined instruments assembled from a variety of validated, self-report measures to capture socio-demographic (e.g., age, gender), socioeconomic (e.g., education, income), psychosocial (e.g., social support, subjective social status, depression, resiliency, flourishing, and perceived social, physical and occupational functioning), socio-cultural (e.g., perceived

discrimination, acculturation, ethnic identity) factors, cancer-related behaviors (e.g., low fiber diet, exercise, tobacco use, alcohol use, BMI, health care access), and cancer screening factors (e.g., breast and cervical cancer screening, colorectal cancer screening, and prostate cancer screening). This study focuses on items related to the cancer screening behaviors practiced in the Homestead communities.

The survey packet's design was guided by Total Design Method to reduce the perceived costs, increase the perceived benefits of completing the survey, and improve response rates [7]. To pilot-test the administration of the mailed survey, cognitive interviews were conducted with a convenience sample of ten adult Native Hawaiian participants who reside in Hawaiian Homesteads or who were Native Hawaiian. The cognitive interviews were designed to evaluate potential response errors, instructions, response format, comprehension, retrieval, decision making, and the interviewees' response processes in answering questions [8]. Cognitive interviewing was selected as a pretesting method because it focuses on respondents' cognitive processes in answering survey questions [8]. Tourangeau's model [9] of verbal probing was used to guide the interviews, and the interviews were conducted after participants completed the surveys. Simultaneous data collection and analysis were done, constructing analytic codes and identifying themes to guide any needed revision of the survey.

Participants, Sampling and Survey Administration

The revised survey and a study consent form were formatted for delivery through the U.S. Postal Service. A letter of invitation was addressed to the 1,582 lessees and/or the listed resident on a curated mailing list from each homestead community, Papakōlea, Kailapa, and Kapolei, which comprised the total sampling frame. Only one survey and consent form per household were mailed. Survey respondents were identified as the homestead lessee, lessees' successor, and/or designee who were over age 18. A pre-addressed and pre-stamped return envelope was included with the survey packet. Respondents were encouraged to return the completed survey within 2 weeks by mail and received a \$25 gift card for survey completion.

Cancer Screening Questionnaire and variables Sociodemographic and economic variables were assessed using items derived from the Behavioral Risk Factor Surveillance Survey (BRFSS) [10]. Demographic variables included age, ethnic heritage, marital status, and gender. Socio-economic variables included education, income, employment, and household size. Question formats and response ranges matched questions offered in the statewide BRFSS survey and were used to support comparisons with existing local and national data [10]. A single item overall health question was posed to the respondents using five response Likert scale categories. In addition, four items assessing participant's ability to perform daily activities including ascending stairs or vacuuming were included in the survey.

Cancer-related and cancer screening behaviors were assessed using items from the BRFSS [9]. Participants over age 50 were assessed for having had one of several

colon cancer screening tests including a fecal occult blood test (FOBT), sigmoidoscopy, or colonoscopy with the item, “Have you ever had one of these tests?”, with response selections as yes, no, or do not know/not sure. To ascertain participants’ adherence, or ability to follow the current colon cancer screening guidelines from the United States Preventative Services Task Force (USPSTF), an additional item assessed, “How long has it been since you have had this test,” with response choices being, within the past year, 2 years, 3 years, 4 years, 5 years, or do not know/not sure.

Male participants over age 40 were assessed for having had a Prostate Specific Antigen (PSA) test for prostate cancer with the item, “Have you ever had a PSA test?”, with response selections as yes, no, or do not know/not sure. To ascertain participants’ adherence to recommended guidelines an additional item assessed, “How long has it been since you have had a PSA test” with response choices being, within the past year, 2 years, 3 years, 4 years, 5 years or do not know/not sure. Also, in accordance with questions asked on the 2014 BRFSS, men were asked if they had a Digital Rectal Examination (DRE) commonly used at that time as a screening method for prostate cancer [10].

The female participants over age 50 were assessed for having had a mammogram with the item, “Have you ever had a mammogram?”, with response selections as yes, no, or do not know/not sure. To ascertain participants’ adherence to recommended guidelines an additional item assessed, “How long has it been since you have had a mammogram?” with response choices being, within the past year, 2 years, 3 years, 4 years, 5 years or do not know/not sure.

Finally, female participants over the age of 21 were assessed in a similar fashion with individual items for having had a clinical breast examination and for having had a Papanicolaou (Pap) test for cervical cancer with the item, “Have you ever had a Pap test?”, with response selections as yes, no, or do not know/not sure. To ascertain participants’ adherence to screening guidelines an additional item assessed, “How long has it been since you have had a Pap?” with response choices being, within the past year, 2 years, 3 years, 4 years, 5 years or do not know/not sure. Similar items were used to assess frequency of having a clinical breast examination by a clinician.

Data entry and Statistical analysis

All survey data was entered into a REDCap database by study staff. All analyses were conducted using IBM SPSS Statistics 26 software, and a p-value of $< .05$ (two-tailed) was used to determine statistical significance. Descriptive statistics were calculated first. Frequencies and percentages were calculated for the categorical variables, and means and standard deviations were calculated for continuous variables. Participants’ self-reported cancer screening behaviors were contrasted with similar data obtained from the National and Hawai‘i BRFSS data, with comparisons of rates for homestead residents with BRFSS data from Native Hawaiians statewide and with the national BRFSS dataset [10]. Since the homestead data set was not derived from a randomized sample as

is National and Hawai‘i BRFSS data, statistical testing of sample means and sample distribution characteristics was not possible.

Ethical Considerations

The University of Hawai‘i okinai’s Office of Research Compliance’s Institutional Review Board approved the study and its procedures

Results

In all, response rates to the mailed surveys were as follows, with a total of 459 surveys (29%) completed from 1,582 mailed out across all homestead communities. In Papakōlea, 124 surveys were completed from a total of 390 mailed (31%). In Kailapa, 43 surveys were completed from a total of 150 mailed (29%), and in Kapolei 291 survey were completed from a total of 1,042 mailed (28%).

Demographic Data

Most respondents self-reported their age as 50 or over (65%), sex as female (67%), and ethnicity as Native Hawaiian (99%). Self-reported socioeconomic factors indicated that the majority of participants reported an annual household income over \$50,000/year, with most graduating from high school or higher level of education (99%). Most residents reported having lived on a homestead for 10 years or more (See Table 1).

Health Status

Many residents (35%) reported very good or excellent health, 35% good health, and 26% poor or fair health. The distribution of self-reported chronic diseases indicated that cases of hypertension were more common in homestead communities than Hawaiians in the state, the general state population, and in the U.S. as a whole (See Figure 1). These high levels were also found in cases of hypercholesterolemia (high cholesterol), asthma, diabetes and cancer. However, cases of arthritis and depression were lower in homestead communities as compared with Hawaiians statewide, the general state population, and the U.S. as a whole (See Figure 1).

Cancer Screening

Most notably, cancer screening data indicated most homestead residents were screened for colon cancer (72%), had Pap testing (97%) and mammography (99%). As with other screening modalities, the men in Papakōlea are being screened with the Prostate Specific Antigen (PSA) test at a rate (68%) well above the rates for other men across the state (46%) and in the U.S. (32%) as a whole [18]. In Hawai‘i, DRE was the predominately used method for prostate cancer screening. DRE screening rate for men in Papakōlea (46%) and Kailapa (58%) were well above the U.S. rate (42%) but below the average rate for all men in Hawai‘i (66%), with the men in Kapolei having the lowest screening rate (32%).

Screening Frequency

In addition to examining the overall prevalence of cancer screening for men and women in the three

Table 1. Demographic Data

		Papakōlea N (%)	Kailapa N (%)	Kapolei N (%)	Total
Sex	Male	35 (28%)	20 (47%)	95 (33%)	150 (33%)
	Female	89 (72%)	23 (53%)	195 (67%)	307 (67%)
Age	Mean	58 yrs.	61 yrs.	55 yrs.	57 yrs.
Age Groups	18 to 29	5 (4%)	2 (5%)	4 (1%)	11 (2%)
	30 to 39	6 (5%)	3 (7%)	34 (12%)	43 (9%)
	40 to 49	20 (16%)	5 (12%)	69 (24%)	94 (21%)
	50 to 59	29 (23%)	6 (14%)	75 (26%)	110 (24%)
	60 to 69	39 (31%)	11 (26%)	59 (20%)	109 (24%)
	70 to 79	17 (14%)	12 (29%)	40 (14%)	59 (13%)
	80 and above	8 (7%)	3 (7%)	8 (3%)	19 (4%)
Education	< High School	1 (1%)	1 (2%)	0 (0%)	2 (1%)
	High School Grad	49 (40%)	18 (42%)	88 (31%)	110 (27%)
	Some College	44 (35%)	17 (40%)	89 (31%)	150 (37%)
	College Grad or +	29 (24%)	7 (16%)	109 (38%)	145 (35%)
Income	<\$35,000	38 (30%)	8 (18%)	31 (10%)	77 (17%)
	\$35,000 to \$50,000	18 (15%)	10 (23%)	42 (15%)	70 (15%)
	\$50,000 to \$75,000	10 (8%)	11 (25%)	55 (19%)	76 (17%)
	>\$75,000	42 (33%)	12 (27%)	145 (50%)	199 (43%)
	Did not know, answer	16 (13%)	3 (7%)	16 (5%)	35 (8%)
Resident Years	< 10 yrs.	8 (6%)	14 (32%)	84 (29%)	106 (23%)
	+ 10 yrs.	116 (94%)	30 (68%)	159 (55%)	305 (67%)
	+ 20 yrs.	0 (0%)	0 (0%)	47 (16%)	47 (10%)

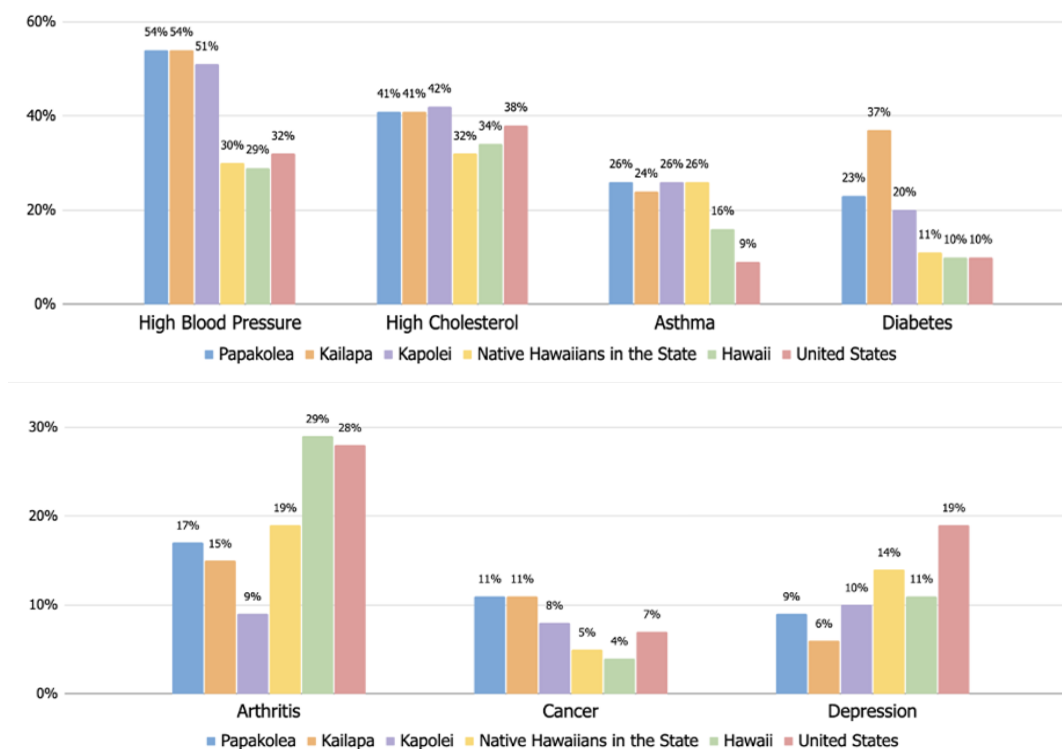


Figure 1. Chronic Diseases - Survey Respondents, Native Hawaiians In Hawai'i, Total Population In Hawai'i and the US

Table 2. Cancer Screening Data Comparison

	Papakōlea	Kailapa	Kapolei	Hawai‘i State 2014 (BRFSS)	U.S. Rates 2014 (CDC)	Healthy People 2020 Goal
Women over 18 having a Pap test in the last three years	97%	96%	97%	76.10%	78%	93%
Women over 18 who have had a clinical breast exam in last two years	89%	88%	91%	83%	n/a	n/a
Women over 50 who have had a mammogram in the last two years	83%	87%	86%	83%	78%	81%
Men and women over 50 who have had a test for colon cancer	72%	46%	56%	68%	52%	71%
Men over 40 who had a PSA test	68%	50%	40%	35%	42%	n/a
Men over 40 who had a DRE test	46%	58%	32%	66%	42%	n/a

Homestead communities, the frequency of each examination was assessed as compared to the frequency recommendations by USPSTF Guidelines for Clinical Preventative Services [11].

In the sample, 24.7% of women over age 18 in Homestead communities have had their last Pap test beyond the 3-year recommended range. For clinical breast examinations, 21.4% of women over age 50 have not had an exam within the past 2 years, and 27.5% of these women have not had a mammogram within the recommended 2-year interval. For FOBT, 67% of women and 72% of men have not had an FOBT within the recommended 2-year interval. However, adherence to colonoscopy and sigmoidoscopy guideline were 48% of women and 43% of men obtaining these screening exams within the USPSTF-recommended 5-year interval.

Discussion

The results of the Homestead Health Survey conducted with the Papakōlea, Kailapa, and Kapolei communities are part of a longstanding university-community partnership in health promotion. KULA, JABSOM’s DNHH, and UHCC have deliberately pursued and cultivated a collaborative and equitable partnership which strives to ensure that any research endeavor conducted in Papakōlea and other homestead communities has meaning for the community. All data collected is the sole property of the community, and permission to access and disseminate the data is granted by the community to research partners.

In the three Hawaiian homestead communities identified in this study, the screening rates for several cancer sites reported in the survey were unexpectedly found to be well above the average for the state of Hawai‘i and the U.S., except for colorectal cancer screening (See Table 2). Cancer screening rates for Pap testing and mammograms were also at, or exceeded, both the 2010 goals for cancer screening set by the CDC to reduce the risk for these cancer types across the U.S., and the Healthy People 2020 goals. These high screening rates for breast cancer were evident in all homestead communities. The high rates for breast cancer screening are contrasted with rates in the homestead communities for colon cancer and prostate cancer screening.

At the time of the study, 2020, the USPSTF

recommended a Pap test every 3 years for women 18 to 65 years, annual clinical breast examination for women 50 to 75, biennial mammography for women over ages 50 to 75, annual Fecal Occult Blood screening, or colonoscopy/sigmoidoscopy every 5 years for men and women over ages 50 to 75 [11]. Prostate cancer screening is controversial. Early detection of prostate cancer on a population level has not been shown to reduce deaths from the disease, and the psychological burden of finding prostate cancer early may outweigh the therapeutic benefit [12]. Routine prostate cancer screening using DRE or PSA tests are not recommended by the Task Force; however, the Task Force guidelines encourage men to discuss their individual risk with physicians after age 55. This discussion of prostate cancer risk may be important for Native Hawaiian men. Although the incidence rates for Native Hawaiian men are often low, their mortality rates are high, leading to some of the highest mortality to incidence ratios (MIR) of any other ethnic group in the state [1, 12].

With the exception of Papakōlea, whose colon cancer screening rates surpassed the Healthy People 2020 goals, the colon cancer screening rates were lower in Kailapa and Kapolei when compared to the state or national data [10]. These disparate results may be a direct reflection of the longstanding community engagement efforts cultivated by KULA and its partners within the homestead communities of Papakōlea and the still nascent community engagement efforts being cultivated in the homestead communities of Kailapa and Kapolei.

These findings reinforce the importance of the cultural and community context in the development and maintenance of cancer prevention behaviors. Community-based participatory research (CBPR) can begin with a health issue or research topic of importance to the community and incorporate the inherent strengths and expertise which are already present in the community. CBPR is not a research method, but rather an orientation or an approach that promotes partnerships, seeks to enhance community health capacity, and ultimately provides community-driven, culturally tailored health and human services that can lead to health equity within the community [13].

These findings also have important implications for prevention efforts focused on social determinants of

health and health disparities among Native Hawaiians. Community engaged research seeks to create social change within the community as a result of the research endeavor in order to address and mitigate health disparities. A CBPR approach does not seek data and knowledge simply for knowledge's sake, but seeks to enhance community wellness by combining knowledge and action to promote social change and ultimately eliminate health disparities. The results of this study's assessment indicate that community engaged approaches may have collateral benefits within communities beyond the initial focus of intervention. In Papakōlea and the other Hawaiian Homestead communities there was not a direct effort with the community-engaged collaborative research projects to specifically promote cancer screening. The focus of many of the previous projects were to improve the community's exercise and dietary behaviors to promote health [14]. However, it is hypothesized that the efforts to engage the community to promote health had an indirect effect of promoting health in other areas, including cancer screening.

This study also has implications for additional community engaged research with other Native Hawaiian Homesteads and similar Indigenous communities, such as Tribal communities on the Continental U.S. The CBPR approach used to administer the Hawaiian Homestead Health Survey provides a successful model for the continued assessment of more than 30,000 homestead residents across the seven Hawaiian islands, as well as non-homestead Hawaiians living in Hawai'i and throughout the U.S. Mainland. It is expected that the assessments will serve as a cue for these community to reflect upon their current health behaviors and prompt efforts to address any apparent concerns.

As with all research studies, there are several inherent limitations present in the study design. A convenience, non-randomized sampling was utilized with a restricted number of Hawaiian homesteads, thus the results cannot be generalized to the general population of Hawai'i nor to the other unique homestead communities. Data were self-reported and not confirmed with clinical reports. There may have been selection bias based on participant availability, in which there is an over-representation of older women and an underrepresentation of men and young people. Despite these limitations, the administration and assessment of data from the Hawaiian Homestead Survey provides vital insights to the health behaviors on Native Hawaiians living in Homesteads and information on potential health promotional strategies to reach these communities.

Author Contribution Statement

Conceptualization: AD, SMM, KC; Development of study materials and acquisition, analysis, and interpretation of data: AD, SMM, BPK, CTI, MA, MK, SKO, MK, SA, JKK, KC; Drafting of the manuscript: AD, SMM, KC; Editing: JT, KC; All authors gave final approval for the manuscript to be published.

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Ethical Approval

The study and its procedures were approved by the University of Hawai'i's Office of Research Compliance's Institutional Review Board.

Ethical Declaration

The study and its procedures were approved by the University of Hawai'i's Office of Research Compliance's Institutional Review Board.

Conflict of Interest

No conflict of interests to declare from the authors.

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