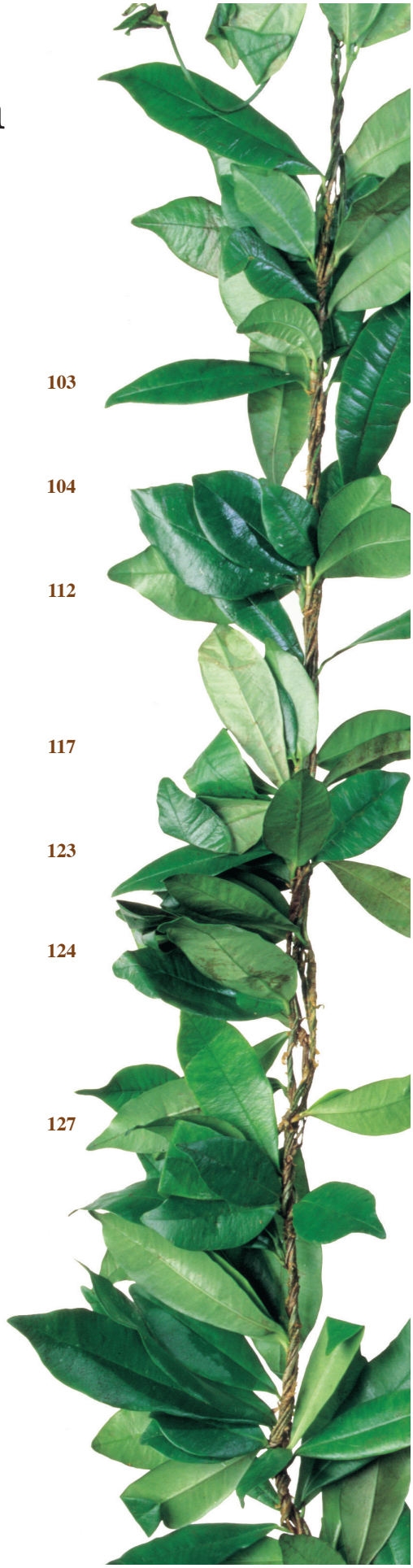
Hawai‘i Journal of Health & Social Welfare

A Journal of Pacific Health & Social Welfare

April 2020, Volume 79, No. 4, ISSN 2641-5216



Hawai‘i Journal of Health & Social Welfare

ISSN 2641-5216 (Print), ISSN 2641-5224 (Online)

Aim:
The aim of the Hawai‘i Journal of Health & Social Welfare is to advance knowledge about health and social welfare, with a focus on the diverse peoples and unique environments of Hawai‘i and the Pacific region.

History:
In 1941, a journal then called The Hawai‘i Medical Journal was founded by the Hawai‘i Medical Association (HMA). The HMA had been incorporated in 1856 under the Hawaiian monarchy. In 2008, a separate journal called the Hawai‘i Journal of Public Health was established by a collaborative effort between the Hawai‘i State Department of Health and the University of Hawai‘i at Mānoa Office of Public Health Studies. In 2012, these two journals merged to form the Hawai‘i Journal of Medicine & Public Health, and this journal continued to be supported by the Hawai‘i State Department of Health and the John A. Burns School of Medicine.

In 2018, the number of partners providing financial backing for the journal expanded, and to reflect this expansion the name of the journal was changed in 2019 to the Hawai‘i Journal of Health & Social Welfare. The lead academic partners are now the six units of the UH College of Health Sciences and Social Welfare, including the John A. Burns School of Medicine, UH Public Health, the Myron B. Thompson School of Social Work, the School of Nursing and Dental Hygiene, the UH Cancer Center, and the Daniel K. Inouye College of Pharmacy. Other partners are the Hawai‘i State Department of Health and the UH Office of the Vice Chancellor for Research. The journal is fiscally managed by University Health Partners of Hawai‘i.

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HAWAIʻI JOURNAL WATCH

KAREN ROWAN MS

Highlights of recent research from the University of Hawaiʻi and the Hawaiʻi State Department of Health

A Possible Genetic Link to Gout Risk in Filipinos

Filipinos may have a high prevalence of a gene variant linked with gout. Researchers including Maarit Tiirikainen PhD, of the UH Cancer Center, tested DNA samples from 190 pregnant young Filipino women in Hawaiʻi, looking for an allele called rs2231142 G>T. The allele occurs in the gene for the ABCG2 urate efflux transporter protein; a decrease in this protein's activity could increase blood uric acid levels. None of the participants had been diagnosed with gout at the time of the study, however, results showed that 46% of Filipinos in the study carried the gout-risk allele, while 29% of Han Chinese, 12% of Caucasians, and 3% of African Americans carried it. The researchers concluded that the higher prevalence of this allele may contribute to the higher rate of early-onset gout and reduced urinary excretion of urate reported in Filipino women and men, compared with Caucasians.

Roman Y, Tiirikainen M, Prom-Wormley E. The prevalence of the gout-associated polymorphism rs2231142 G>T in ABCG2 in a pregnant female Filipino cohort. *Clinical Rheumatology*. 2020. https://doi.org/10.1007/s10067-020-04994-9

Asian Americans Benefit from Culturally-Responsive Cancer Screening Interventions

Asian Americans may benefit from culturally-responsive interventions aimed at increasing their rates of colorectal cancer (CRC) screening. Researchers including Sophia Kim PhD, with the Myron B. Thompson School of Social Work conducted a meta-analysis, examining 14 studies that had aimed at increasing CRC screening rates among Asian Americans. The studies all used culturally-responsive interventions such as small group sessions or language-specific education. Results showed Asian Americans who received such interventions were 1.78 times more likely to undergo CRC screening compared to those in comparison groups. The researchers recommend the use of culturally-responsive interventions to reduce the burden of CRC on Asian Americans and to promote CRC screening in this population.

Kim S, Kang M, Kim S. What are the effects of colorectal cancer screening interventions among Asian Americans? A meta-analysis. *Ethnicity & Health*. 2020;25(1)1–19. https://doi.org/10.1080/13557858.2019.1711024

Box Jellyfish Compounds Isolated

Researchers led by Justin Reinicke MS, of the Daniel K. Inouye College of Pharmacy, have identified 3 small molecules (low molecular weight molecules) in the venom of box jellyfish. The authors examined venom from the Hawaiian box jellyfish (*Alatina alata*) and the Japanese box jellyfish (*Chironex yamaguchi*). Using a technique called liquid chromatography–mass spectrometry, they isolated and identified the 3 new compounds, called cnidarins 4A, 4B, and 4C. Further analysis showed that these molecules occur only in the nematocysts (stinging cells) of the jellyfish; however, their role in the jellyfish venom is not clear. These compounds are the first small molecules to be identified from Class Cubozoa, or box jellyfish.

Reinicke J, Kitatani R, Masoud SS, et al. Isolation, structure determination, and synthesis of cyclic tetraglutamic acids from box jellyfish species *Alatina alata* and *Chironex yamaguchii*. *Molecules*. 2020;25(4):E883. doi:10.3390/molecules25040883

High Prevalence of Urban Gardening in a Hawaiʻi Immigrant Community

The high prevalence of urban gardening in an immigrant community in Honolulu suggests that public health programs aimed at improving nutrition in urban areas should capitalize on the knowledge of community gardening experts. Researchers led by Opal Buchthal DrPH, of the UH Office of Public Health Studies, mapped out the census blocks in Kalihi, and then sent trained observers to collect data on food-growing prevalence and practices. Results showed that 93% of the census blocks contained at least 1 property that was growing food, fruit plantings were far more common than vegetable plantings, and that 78% of foods were culturally-valued foods in Filipino and Pacific Islander diets. The findings show that garden-based nutrition programs for urban immigrant populations should be culturally-tailored and should tap into the community's expertise.

Buchthal O, Nelson-Hurwitz D, Hsu L, et al. Identifying urban immigrant food-cultivation practices for culturally-tailored garden-based nutrition programs. *J Immigr Minor Health*. 2019;10.1007/s10903-019-00952-z. doi:10.1007/s10903-019-00952-z

Vector of the 2015-2016 Dengue Outbreak Found

The *Aedes albopictus* mosquito was the culprit in the dengue outbreak that struck Hawaiʻi Island from September 2015 to March 2016. The outbreak began with a case of dengue in a Hawaiʻi resident who had not traveled outside of the state, and spread in populated areas on the western coast of the island. Researchers led by Jeomhee M. Hasty PhD, of the Hawaiʻi State Department of Health, tested genetic material from 1501 mosquitoes, including *Aedes albopictus*, *Aedes aegypti*, and *Aedes japonicus*. Only *Ae. albopictus* tested positive for the dengue virus. The researchers concluded that to limit the occurrence and impact of future outbreaks of mosquito-borne infections, Hawaiʻi should expand vector surveillance programs and build vector control infrastructure to target *Ae. aegypti* and *Ae. Albopictus*. Extra attention should be given to targeting aquatic habitats of immature *Ae. albopictus*.

Hasty JM, Felix GE, Amador M, et al. Entomological investigation detects dengue virus type 1 in *Aedes* (*Stegomyia*) *albopictus* (*Skuse*) during the 2015-16 Outbreak in Hawaiʻi. *Am J Trop Med Hyg*. 2020;10.4269/ajtmh.19-0732. doi:10.4269/ajtmh.19-0732

Relationship Between Health Behaviors and Obesity in a Sample of Hawai'i's 4 Most Populous Ethnicities

Hiroko Yoshida PhD and Jay E. Maddock PhD

Abstract

Proactive health behavior change and maintenance are essential for preventing obesity and other lifestyle diseases. Few studies have examined the relationship between eating behavior and physical condition among multiethnic samples. In this study, ethnic differences were examined to obtain basic data on health education for improvement of obesity in Hawai'i. The intake of fruits and vegetables and exercise habits in each of the transtheoretical model stages of change were evaluated in the 4 most populous ethnic groups in Hawai'i in terms of how the participants' health behaviors were associated with obesity. The participants comprised 2795 white, Native Hawaiian, Filipino, and Japanese adults (age range, 18–55 years). There are 4 main findings of this study. First, there were differences in fruit and vegetable intake and exercise habits in each transtheoretical model stage among the ethnic groups. Second, there were differences in attitudes regarding nutrition and healthy food intake and self-efficacy regarding exercise in each ethnic group. Third, items that have the potential to improve obesity in the theory of planned behavior differed, particularly among men, in the 4 ethnic groups. Finally, a low percentage of participants recognized that the recommended number of servings of fruits and vegetables was 5 or more. Education for men may be particularly important. The findings indicate that modified health education approaches may be needed in accordance with the ethnicity of the population.

Keywords

obesity, health behavior, ethnic groups, Hawai'i

Abbreviations

BMI = body mass index
OR = odds ratio
TPB = theory of planned behavior
TTM = transtheoretical model

Introduction

Obesity is a chronic disease that is strongly associated with increased mortality and morbidities including certain types of cancers, cardiovascular disease, diabetes mellitus, hypertension, and stroke. The World Health Organization defines an overweight status in adults as a body mass index (BMI) of 25 to 29 kg/m^2 and obesity as a BMI of >30 kg/m^2,[1] and improvements in the proportions of individuals within these categories have been sought. Positive health behavior change and maintenance are essential for preventing obesity and other lifestyle diseases. When implementing health education in nutrition and exercise for improvement of obesity, it is important to understand the participants' health behavior. In Hawai'i, the characteristics of each ethnic group must be understood because the participants are composed of multiple ethnic groups. Previous studies of residents of Hawai'i have shown differences among multiethnic cohorts in dietary intake,[2,3] obesity,[2,4,5] and lifestyle diseases.[6,7] However, few studies have examined the relationship between eating behavior and exercise among multiethnic samples.

Food choices are reportedly influenced by biological factors; experiential factors; personal factors such as personal beliefs, attitudes, knowledge, and skills; social norms; and environmental factors.[8] The theory of planned behavior (TPB) and the transtheoretical model (TTM) are health behavior theories that are frequently used to explain health behaviors.[9,10] The TPB posits that attitudes, subjective norms, and perceived behavioral control influence intention. Therefore, an individual's attitude towards the behavior, the approval of the behavior by social contacts, and the individual's perceived ability to control the behavior are important in assessing how likely he or she is to perform the behavior.[9] The TTM integrates the stage of change, process of change, and self-efficacy.[10] The 5 stages of change are precontemplation (no intent to take action within the next 6 months), contemplation (intent to take action within the next 6 months), preparation (intent to take action within the next 30 days, with some behavioral steps in this direction already taken), action (overt change in behavior for ≤6 months), and maintenance (overt change in behavior for >6 months).[10] Identifying the participant's stage and taking an approach tailored to the situation are effective in health education.

The present study was performed to assess differences in ethnic groups by nutrition and physical activity behavior and related theoretical constructs. Questions and data were extracted from nutrition, exercise, and tobacco surveys administered to residents of Hawai'i. These data were (1) intake of fruits and vegetables and level of exercise in each TTM stage and (2) items related to eating behavior in the TPB. The relationship between these behaviors and obesity was compared among ethnic groups, and the characteristics of each ethnic group were identified.

Methods

Procedure and Sample

From January 2010 to January 2011, a survey of nutrition, exercise, and tobacco was conducted using a computer-aided, random-number-dial telephone interview survey of adults aged 18 to 55 years living in Hawai'i; the details of that survey have been described elsewhere.[11,12] Briefly: A professional survey firm in Honolulu generated simple random samples for the entire

household population of Hawai‘i or any segment of that population. The sample size of 3600 interviews in qualified households was stratified across the islands as follows: 1800 from O‘ahu, 600 from Hawai‘i, 600 from Kaua‘i, 500 from Maui, 75 from Moloka‘i, and 25 from Lana‘i. The survey response rate was 16.2%. All interviewers for this project were diligently trained, informed consent was obtained via telephone, and all responses were self-reported. Interviews and data entry were conducted with a computer-assisted telephone interview system using programmable software that included error-editing routines to protect against interviewer errors.

In the current study, a secondary analysis was conducted using data from that survey from members of the 4 most populous ethnic groups in Hawai‘i: white (n = 1111), Native Hawaiian (n = 584), Filipino (n = 508), and Japanese (n = 592). All procedures were approved by the University of Hawai‘i Committee on Human Subjects.

Demographics

Participants were asked a series of demographic-related questions regarding their age, sex, ethnicity, height, weight, education, and income. The ethnic groups were classified by confirming the participants' ethnicity. First, an interviewer asked about their ethnic group. If more than one ethnic group was reported, the interviewer asked with which ethnic group they most closely identified. If the participants could not answer, the ethnicity was classified as mixed and was not included in this analysis. Education was classified as ≤12th grade, 1 to 3 years of college, and ≥4 years of college. Income was assessed by the total annual household income before taxes for 2009 and was classified as ≤$24,999, $25,000 to $49,999, and ≥$50,000. Education and income were classified using the Behavioral Risk Factor Surveillance System and previous reports.[13-15]

Health Behaviors

Participants were asked questions about eating 5 or more servings of fruits and vegetables and engaging in regular physical activity in each TTM stage of change, knowledge of the health expert-recommended number of servings of fruits and vegetables (ie, 5 or more servings), and their current health behaviors. One serving was defined as 1/2 cup of cooked vegetables, 1 cup of salad, a piece of fruit, or 3/4 cup of 100% juice. Regular physical activity was defined as the performance of physical activity for ≥30 minutes per day on at least 5 days per week. This activity level is enough to increase a person's heart rate and/or respiratory rate. Items related to current health behaviors were their nutritional attitude, perceived behavioral control regarding nutrition, healthy eating behavior, and self-efficacy regarding exercise. Questions about their current health behaviors and knowledge of the recommended number of servings are shown in Table 1.

Table 1. Questions and Scales of Nutritional Attitude, Perceived Behavioral Control Regarding Nutrition, Healthy Eating Behaviors, Self-efficacy Regarding Exercise, and Knowledge of Recommended Number of Servings

Category	Questions	Scales
Nutritional attitude	1) Eating more fruits and vegetables would be expensive.	1 (strongly agree) to 5 (strongly disagree)
	2) Preparing and cooking vegetables is time-consuming.	
	3) Meal planning for my family is difficult if I try to prepare more vegetable dishes.	
Perceived behavioral control regarding nutrition	1) How much control do you have over the number of servings of fruits and vegetables you eat each day?	1 (very little control) to 5 (complete control)
Healthy eating behaviors	1) When I eat at restaurants, I choose healthy options.	1 (strongly disagree) to 5 (strongly agree)
	2) How often do you eat foods that are high in fiber?	1 (never) to 5 (always)
	3) How would you describe your intake of refined grains such as white rice, white bread, and pasta?	1 (very high) to 5 (very low)
	4) How often do you eat at fast food restaurants, drive-ins, or lunch wagons?	1 (almost every day) to 6 (almost never)
Self-efficacy regarding exercise	1) How confident are you that you can exercise even when it is raining?	1 (not at all confident) to 4 (very confident)
	2) How confident are you that you can exercise even when you are under a lot of stress?	
	3) How confident are you that you can exercise even when you feel you don't have time?	
Knowledge of recommended number of servings	1) How many servings of fruits and vegetables should be consumed each day?	Number of servings

Data Analysis

Differences in BMIs and health behaviors were compared using Tukey's multiple comparison test, and differences in the composition of participants, stage of change, and knowledge of recommended number of servings were compared using the χ^2 test. Multivariable logistic regression models were conducted in which the dependent variables were obesity (BMI of ≥30 kg/m^2) or non-obesity and the independent variables were health behaviors (i.e., nutritional attitude, perceived behavioral control, eating behavior, and self-efficacy regarding exercise). Age was controlled for as a confounder. Odds ratios (ORs) and 95% confidence intervals were also calculated. The internal consistency of the scales was analyzed using Cronbach's alpha. All data were analyzed using IBM SPSS Statistics software version 19 (IBM Corp., Armonk, NY, USA). Statistical significance was designated as $P < .05$.

Results

Participants' Demographic Characteristics and BMI

Table 2 shows the participants' demographics. There were significant differences in age, education, and income across the 4 ethnic groups ($P < .05$). Ages ranged from 18 to 55 years, with participants aged ≥40 years constituting a higher percentage among white and Japanese men and women than among Native Hawaiian and Filipino participants. Native Hawaiian men and women had a higher percentage of ≤12th grade and a lower percentage of >4 years of college than did the other ethnic groups. Conversely, white and Japanese men and women showed the opposite results. Native Hawaiian women had a higher percentage of income <$24,999 and Japanese men and women had a higher percentage of income >$50,000 than did the other ethnic groups. When the data in Table 2 were compared with the American Community Survey 2009 Hawai'i Selected Population Profiles (3-Year Estimates), comparison was not possible under the same conditions, and the trends were not aligned.[16]

Table 3 shows the BMIs for men and women. The BMIs of Native Hawaiian men and women were significantly higher than those of other ethnic groups.

Servings of Fruits and Vegetables and Regular Physical Activity

Table 4 shows the proportions of participants with 5 or more servings of fruits and vegetables in each TTM stage. There were significant differences in fruit and vegetable intake in each stage across the 4 ethnic groups ($P < .05$). The sum percentage of optimal intake in the action and maintenance stages were higher in white men and women than in other ethnic groups. However, the proportions of optimal intake in these stages were lower in Japanese men and women. The percentage of optimal intake in the precontemplation stage was higher in Japanese men and women than in other ethnic groups. The percentage of optimal intake in the preparation stage was higher in Filipino men and women.

Table 5 shows the performance of regular physical activity in each TTM stage. There were significant differences in regular physical activity in each TTM stage across the 4 ethnic groups ($P < .05$). The sum percentage of regular physical activity in the action and maintenance stages was higher in white, Native Hawaiian, and Filipino men than in Japanese men. Among women, the sum percentage of regular physical activity in the action and maintenance stages were highest for white participants, followed by Native Hawaiians, Filipino, and Japanese. In both men and women, regular physical activity in the precontemplation stage was higher in Japanese participants than in the other ethnic groups.

Table 6 shows the participants' knowledge of the recommended servings of fruits and vegetables. There were significant differences in this knowledge across the 4 ethnic groups ($P < .05$). The percentage of 5 or more servings was 54.6% in white men and 76.8% in white women, which were higher than in other ethnic groups. In men, the percentage of 5 or more servings in Native Hawaiian, Filipino, and Japanese was 37.9%, 37.0%, and 42.1%, respectively, and that in women was 57.3%, 52.3%, and 60.7%, respectively.

Health Behavior and Logistic Regression Models

Table 7 compares the nutritional attitudes, perceived behavioral control regarding nutrition, healthy eating behaviors, and self-efficacy regarding exercise among the ethnic groups. White men and women scored higher on most behavioral scales than did other ethnic groups. Filipino and Japanese men and women tended to score lower on most scales; particularly, Filipino participants scored significantly lower in perceived behavioral control regarding nutrition than did other ethnic groups ($P < .05$). Native Hawaiian men and women showed no difference in self-efficacy regarding exercise compared with white participants, and they scored significantly higher than Filipino and Japanese men and women ($P < .05$). The internal consistency for nutritional attitudes, healthy eating behavior, and self-efficacy regarding exercise was 0.56, 0.61, and 0.66, respectively.

Table 8 shows the results of the logistic regression analysis examining the relationship between healthy behavior and obesity. Among men, the OR of perceived behavior control regarding nutrition and self-efficacy regarding exercise in white participants was 0.75 and 0.70, respectively ($P < .05$). The OR of self-efficacy regarding exercise in Native Hawaiian men, healthy eating behavior in Filipino men, and perceived behavior control regarding nutrition in Japanese men was 0.62, 0.40, and 0.71, respectively ($P < .05$). Among women, the OR of healthy eating behavior in white, Native Hawaiian, and Japanese participants was 0.47, 0.63, and 0.51, respectively ($P < .05$). No significant differences were found for Filipino women.

Table 2. Demographic Characteristics of the Participants in Different Ethnic Groups										
	Men					Women				
	White	Native Hawaiian	Filipino	Japanese	*P*-Value	White	Native Hawaiian	Filipino	Japanese	*P*-Value
Participants (n)	441	206	197	251		670	378	311	341	
Age (years)										
18–29	23.6%	29.6%	33.5%	25.1%	< .05	14.0%	27.2%	26.0%	18.5%	< .05
30–39	17.2%	22.8%	22.8%	13.1%		16.9%	20.6%	23.5%	13.5%	
40–49	30.6%	30.1%	28.9%	27.9%		35.1%	30.2%	32.5%	35.5%	
50–55	28.6%	17.5%	14.7%	33.9%		34.0%	22.0%	18.0%	32.6%	
Education										
≤12th grade	24.1%	54.6%	43.1%	21.9%	< .05	18.8%	44.0%	32.5%	15.5%	< .05
1–3 years of college	28.2%	26.3%	29.4%	32.7%		31.1%	32.8%	30.9%	27.0%	
>4 years of college	47.6%	19.0%	27.4%	45.4%		50.1%	23.3%	36.7%	57.5%	
Income										
<$24,999	16.1%	17.6%	13.9%	8.8%	< .05	11.8%	23.6%	15.7%	5.5%	< .05
$25,000–$49,999	12.9%	14.2%	21.4%	15.3%		18.5%	20.2%	22.5%	14.0%	
>$50,000	71.1%	66.2%	64.8%	75.9%		67.9%	56.2%	61.8%	80.5%	

Table 3. Body Mass Index (kg/m^2) Among Different Ethnic Groups				
	White	Native Hawaiian	Filipino	Japanese
Men	26.7 ± 5.3^b	30.0 ± 6.8^a	27.5 ± 5.3^b	27.7 ± 5.2^b
Women	25.2 ± 5.1^b	28.9 ± 8.2^a	25.6 ± 5.1^b	24.6 ± 4.9^b

Values are presented as mean ± standard deviation. ^{a,b}Values with different superscript letters are significantly different at $P < .05$.

Table 4. Proportions of Participants with Intake of 5 or More Servings of Fruits and Vegetables in Each Transtheoretical Model Stage Among Different Ethnic Groups					
	White	Native Hawaiian	Filipino	Japanese	*P*-Value
Men					
Precontemplation	29.9%	24.9%	17.1%	44.7%	< .05
Contemplation	5.6%	6.5%	6.4%	7.3%	
Preparation	14.6%	25.4%	36.4%	19.5%	
Action	12.1%	15.4%	15.5%	8.5%	
Maintenance	37.8%	27.9%	24.6%	19.9%	
Women					
Precontemplation	14.8%	17.5%	16.7%	32.7%	< .05
Contemplation	4.4%	7.0%	5.4%	5.4%	
Preparation	17.7%	27.2%	31.4%	24.7%	
Action	13.1%	17.7%	13.7%	9.5%	
Maintenance	50.0%	30.6%	32.8%	27.7%	

Table 5. Proportions of Participants with Regular Physical Activity in Each Transtheoretical Model Stage Among Different Ethnic Groups					
	White	**Native Hawaiian**	**Filipino**	**Japanese**	***P*-Value**
Men					
Precontemplation	12.3%	9.4%	8.2%	18.4%	< .05
Contemplation	10.2%	12.8%	13.4%	16.8%	
Preparation	11.6%	13.3%	12.4%	14.8%	
Action	6.5%	12.8%	22.2%	11.5%	
Maintenance	59.4%	51.7%	43.8%	38.5%	
Women					
Precontemplation	8.9%	9.2%	13.9%	21.3%	< .05
Contemplation	10.9%	16.6%	18.6%	21.9%	
Preparation	14.1%	17.9%	20.7%	17.7%	
Action	11.8%	19.3%	15.6%	10.5%	
Maintenance	54.2%	37.0%	31.2%	28.5%	

Table 6. Proportions of Participants with Knowledge of Recommended Number of Servings of Fruits and Vegetables Among Different Ethnic Groups					
	White	**Native Hawaiian**	**Filipino**	**Japanese**	***P*-Value**
Men					
0–4 servings	45.3%	62.1%	63.0%	57.9%	< .05
5 servings	30.1%	19.2%	19.3%	22.9%	
≥6 servings	24.5%	18.7%	17.7%	19.2%	
Women					
0–4 servings	23.1%	42.8%	47.7%	39.3%	< .05
5 servings	44.4%	32.2%	30.9%	39.6%	
≥6 servings	32.4%	25.1%	21.4%	21.1%	

Table 7. Attitude, Perceived Behavioral Control, Behavior, and Self-Efficacy Among Different Ethnic Groups				
	White	**Native Hawaiian**	**Filipino**	**Japanese**
Men				
Nutritional attitude	3.6 ± 1.0[a]	3.4 ± 1.0[ab]	3.3 ± 1.1[b]	3.4 ± 1.0[ab]
Perceived behavioral control regarding nutrition	4.5 ± 0.9[a]	4.3 ± 1.0[ab]	3.8 ± 1.2[c]	4.1 ± 1.1[b]
Healthy eating behavior	3.7 ± 0.7[a]	3.3 ± 0.7[b]	3.4 ± 0.6[b]	3.3 ± 0.6[b]
Self-efficacy regarding exercise	3.2 ± 0.7[a]	3.2 ± 0.7[a]	2.9 ± 0.7[b]	2.9 ± 0.7[b]
Women				
Nutritional attitude	3.5 ± 0.9[a]	3.4 ± 1.0[ab]	3.3 ± 1.1[b]	3.3 ± 1.0[b]
Perceived behavioral control regarding nutrition	4.7 ± 0.7[a]	4.4 ± 1.0[b]	4.1 ± 1.1[c]	4.5 ± 0.8[b]
Healthy eating behavior	4.1 ± 0.7[a]	3.6 ± 0.7[b]	3.7 ± 0.6[b]	3.5 ± 0.7[b]
Self-efficacy regarding exercise	3.1 ± 0.7[a]	2.9 ± 0.8[a]	2.7 ± 0.8[b]	2.7 ± 0.8[b]

Values are presented as mean ± standard deviation. [a–c]Values with different superscript letters are significantly different at $P < .05$. A higher value for nutritional attitude indicates greater support for intake of fruits and vegetables. A higher value for perceived behavioral control regarding nutrition indicates the ability to control intake of fruits and vegetables. A higher value for healthy eating behavior indicates healthier food and shopping choices. A higher value for self-efficacy regarding exercise indicates confidence in performing exercise. These scales are shown in Table 1.

Table 8. Association of Body Mass Index and Health Behavior After Adjustment for Age in Different Ethnic Groups												
	White			Native Hawaiian			Filipino			Japanese		
	OR	95% CI	*P*-Value	OR	95% CI	*P*-Value	OR	95% CI	*P*-Value	OR	95% CI	*P*-Value
Men												
Nutritional attitude	1.30	0.98–1.72	.065	0.86	0.63–1.17	.322	0.88	0.63–1.23	.446	1.11	0.81–1.54	.516
Perceived behavioral control regarding nutrition	0.75	0.58–0.99	.039	0.88	0.65–1.19	.395	1.07	0.78–1.46	.698	0.71	0.54–0.94	.018
Healthy eating behavior	0.73	0.51–1.03	.076	0.79	0.51–1.23	.297	0.40	0.21–0.77	.006	0.98	0.57–1.67	.927
Self-efficacy regarding exercise	0.70	0.50–0.99	.047	0.62	0.40–0.96	.034	1.60	0.92–2.81	.099	0.72	0.47–1.12	.143
Women												
Nutritional attitude	1.21	0.94–1.55	.132	0.88	0.70–1.10	.255	0.97	0.70–1.36	.867	1.13	0.81–1.58	.472
Perceived behavioral control regarding nutrition	0.79	0.61–1.02	.071	0.91	0.72–1.14	.403	0.83	0.60–1.14	.253	0.86	0.59–1.25	.428
Healthy eating behavior	0.47	0.34–0.65	0	0.63	0.44–0.92	.015	0.91	0.50–1.67	.767	0.51	0.30–0.85	.010
Self-efficacy regarding exercise	0.86	0.65–1.16	.326	0.82	0.61–1.10	.184	0.81	0.51–1.31	.394	0.78	0.51–1.19	.251

OR, odds ratio; CI, confidence interval

Discussion

In this study, ethnic features were examined to obtain basic data on health education for improvement of obesity in Hawai'i. The intake of fruits and vegetables and regular physical activity were evaluated in each TTM stage, as well as items related to health behaviors and obesity in the TPB in the 4 most populous ethnic groups. Several studies have shown that obesity rates are higher among Native Hawaiians than in other ethnic groups.[2,4,5] In this study, the BMIs of Native Hawaiian men and women were significantly higher than those of white, Filipino, and Japanese participants.

In a previous report, each stage was numerically coded, and the intake of 5 or more servings of fruits and vegetables in each TTM stage was evaluated using scores for each ethnic group.[3] In the present study, however, the percentage of participants with 5 or more servings of fruits and vegetables and regular physical activity in each TTM stage is shown to more comprehensively illustrate the situation of the participants. The ethnic groups showed significant differences in this study. The percentages of white men and women taking 5 or more servings of fruits and vegetables were higher in the action and maintenance stages than those in the other ethnic groups, but Japanese men and women showed opposite results. Furthermore, the percentages of Japanese men and women engaging in regular physical activity in the action and maintenance stages were also lower than those in the other ethnic groups.

Negative attitudes can reportedly be modified to positive through direct measure of the TPB on physical activity by giving participants effective health information.[17] In this study, health behaviors among ethnic groups were compared. The items differed among the ethnic groups, and the results of white participants were clearly differentiated. Additionally, men and women showed similar trends for TPB items in each ethnic group.

When the relationship between these items and BMI was analyzed by logistic regression, the results differed between men and women in each ethnic group. Among women, white, Native Hawaiian, and Japanese participants had similar results, and healthy eating behavior might help to improve obesity. Men showed different results depending on ethnicity.

A study that examined multi-ethnic diets using a quantitative food frequency survey suggested that healthy diets were associated with reduced all-cause mortality in men and women as well as reduced cardiovascular disease and cancer risk.[18] Healthy eating choices, such as eating fruits and vegetables, choosing healthy foods, and eating foods with high fiber content, have the potential to prevent diseases as well as obesity. However, another study showed that healthy or unhealthy dietary intake patterns were not significantly associated with the BMI or diabetes mellitus.[19] A specific amount of dietary intake was not investigated here, and so a definitive conclusion cannot be given. Future studies should examine the relationship between health behaviors and actual nutrient intake.

In the questionnaire in this study, it was initially assumed that fruit and vegetable intake would be low if participants agreed that the price of fruits and vegetables is high, that it takes time to prepare vegetable dishes, and that meal planning is difficult. However, if the participants understood the value of fruit and vegetable intake, it may be considered that the intake did not decrease. For this reason, future studies should also examine items such as attitude and actual intake. Cronbach's alpha was inadequate, resulting in unreliability. Questions with a high Cronbach's alpha could give more reliable results.

With respect to the characteristics of each ethnic group, in white men and women, the sum percentages of white men and women taking 5 or more servings of fruits and vegetables in the action and maintenance stages were higher than those of other ethnic groups, and all TPB items also showed higher scores. Perceived behavior control regarding nutrition and self-efficacy regarding exercise among white men and healthy eating behavior among white women might help to improve obesity. Native Hawaiian men and women had higher values for self-efficacy regarding exercise. Self-efficacy regarding exercise in Native Hawaiian men and healthy eating behavior in Native Hawaiian women might also help to improve obesity. Conversely, the BMI of Filipino and Japanese participants was not different from that of white participants. However, Filipino men and women had significantly lower values of perceived behavior control regarding nutrition than did other ethnic groups. Additionally, healthy eating behavior in Filipino men might help to improve obesity. Japanese and Filipino men and women tended to have lower TPB values than white and Native Hawaiian men and women. Thus, it is necessary to understand that differences exist among ethnic groups and to conduct health education tailored to individual ethnic groups.

Five or more servings of fruits and vegetables per day have been recommended.[20] In the present study, the percentage of white men and women taking the recommended 5 or more servings of fruits and vegetables per day was high (>50% of men and >70% of women). In other ethnic groups, however, this percentage was lower (about 40% of men and 50%–60% of women). Specific education on how much should be taken is necessary, and this seems to be especially important in men.

A limitation of this research is that income and educational background were not examined in relation to BMI. Obesity is reportedly associated with a low income and educational background, and health literacy scores are associated with a high income and higher education.[21,22] In this study, the examination including income and educational background clarified the factor for obesity improvement. Moreover, the questionnaire of this study was not able to grasp the detailed nutrient quantity. A previous study of the ethnic differences in nutritional levels showed that the average energy intake of Native Hawaiians was about 1.2 times higher for men and about 1.3 times higher for women compared with Japanese Americans and Caucasians.[2] Nutrient levels were not examined in the present study, preventing definitive conclusions from being drawn. However, examination of nutrient levels will clarify what types of health behaviors are associated with the BMI, enabling the establishment of a specific approach to improvement of obesity. Data was also collected from 2010-2011 and these findings may be different in the current population.

There are 4 main findings of this study. First, there were differences in fruit and vegetable intake and exercise habits in each TTM stage among the ethnic groups. Second, there were differences in attitudes regarding nutrition and healthy food intake and self-efficacy regarding exercise in each ethnic group. Third, items that have the potential to improve obesity in the TPB differed particularly among men in the 4 ethnic groups. Finally, a low percentage of participants recognized that the recommended number of servings of fruits and vegetables was 5 or more. Education for men may be particularly important. The findings indicate that modified health education approaches may be needed in accordance with the ethnicity of the population.

Conflict of Interest

Neither of the authors identifies any conflict of interest.

Acknowledgments

Funding for this project was provided by the State of Hawai'i Department of Health, Healthy Hawai'i Initiative.

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A Survey of Areca (Betel) Nut Use and Oral Cancer in the Commonwealth of the Northern Mariana Islands

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Abstract

Areca nut use is a cause of higher rates of oral cavity cancer in the Commonwealth of the Northern Mariana Islands (CNMI). Little is known about patient insights into the risks of areca nut use worldwide. The purpose of this study is to evaluate perceptions of areca nut use and oral cancer among chewers in the CNMI. This is a survey study undertaken at the CNMI's only regional health center—300 adult participants completed a 21-question survey that assessed demographics, chewing behaviors, perceptions of areca nut use and oral cancer, and the willingness to participate in cessation and screening programs. Data was analyzed using chi-squared tests, at a significance value of P < *.05. The participant average age was 38, and 41% were male. Almost all (92%) knew that chewing areca nut causes oral cancer, but only 13% correctly identified the actual areca nut as a carcinogen. About half (59%) believed that oral cancer could be treated. Most people (74%) were willing to participate in screening programs for oral cancer. Those who chewed areca nut daily were more likely to be interested in medicated replacement products relative to those who chewed less frequently (*P = *.048). In conclusion, there are drastic misperceptions about areca nut and oral cancer in the CNMI. Efforts should be made towards promoting awareness of the carcinogenicity of the actual areca nut, and the treatability of oral cancer. Mandated educational warnings should be required with areca nut sales. Further research evaluating substitution methods and screening programs is indicated.*

Keywords

survey, perception, areca nut, oral cancer, Micronesia

Introduction

Areca nut is the commonly chewed fruit of the betel palm (*Areca catechu*), widely cultivated in Asia and the Pacific Islands.[1] There are many documented reasons for chewing, including sympathetically-mediated feelings of increased alertness, stamina, and hunger-suppression, which have contributed to the popularity of areca nut in many cultures throughout the Asia-Pacific region.[2] Now classified as a Group 1 carcinogen by the International Agency for Research on Cancer, areca nut contributes to the elevated rates of oral cancer throughout this region.[3-5] Of particular interest is areca nut use in the Pacific Islands, as regions in Micronesia have been shown to have a potentially increasing incidence of oral cancers.[6-8]

The Commonwealth of the Northern Mariana Islands (CNMI) is a group of islands in the western Pacific Ocean that are inhabited by a population predominantly of Asian Pacific Islander (API - Chamorro, Carolinian, or Other Pacific Islander) or other Asian heritage.[9] Saipan, the capital of the CNMI, represents the largest of these islands and has a population of roughly 50,000 people.[10] Prior studies from this region have explored chewing behaviors in various regards.[11,12] For example, the nut may be chewed ripe or unripe, by itself, or in a combination with tobacco and/or lime.[13] Differences in chewing habits vary geographically throughout Micronesia and are thought to be due in part to acculturation as a result of variable migration patterns throughout the years.[14] Awareness of the carcinogenicity of areca nut among chewers has been minimally evaluated. The task of diagnosing and treating oral cancer at its early stages has proven to be a challenge worldwide.[15,16] Research in Saipan has shown that 43% of API adults chew areca nut, and cancers of the oral cavity contributed to 13% of cancer-related mortalities in the last decade.[17] As such, patient awareness of the causes, signs and symptoms of oral cancer is crucial to improving outcomes. The purpose of this survey study is to further evaluate these topics in Saipan, the capital of the CNMI.

Methods

Survey

This is a survey study that was undertaken at the Commonwealth Healthcare Corporation (CHC), the only regional hospital complex in the CNMI. From February to March 2019, a 21-question survey instrument regarding areca nut and oral cancer was distributed to 300 participants aged 18 years or older who chewed areca nut. Participants consisted of outpatients and their family members. Inpatients and former, but not active chewers, were excluded from participation. Participants were recruited via written advertisements placed throughout the outpatient waiting area. Current betel nut use, verification of no prior survey completion, and literacy was determined via verbal questioning. If a participant was unable to read the survey, the questions were read to them by one of the authors. Attached to the survey was an information sheet describing the purpose of the survey, assuring participants that their participation was voluntary and that their responses would be kept anonymous, not affecting their relationship with CHC staff or their quality of care. The survey collected exclusively de-identified data. In exchange for their time, participants were compensated with one United States dollar. This project was performed in conjunction with the University of Texas Southwestern and was approved by the Institutional Review Board (IRB# STU-2018-0221).

Statistical Analysis

Completed questionnaires were entered into a Microsoft Excel Version 16.24 (Microsoft, Seattle, WA) spreadsheet. Data were compiled, manipulated, and analyzed using Microsoft Excel. Statistical analysis was performed using Chi-squared tests, at a significance value of $P < .05$. Survey non-responses were noted and appropriately removed from calculations.

Results

The average age of the participants was 38 years, and 41.0% were male. A vast majority of participants identified as being of API heritage (92.3%) (Table 1). Roughly ninety percent reported chewing every day (87.5%) and 72.3% reported chewing 4 or more times per day (Table 2). The average, median, and range of age at first chew were 16.5 years, 15.5 years, and (4, 52 years), respectively. Over half (56.3%) added a plant leaf (*Piper betle*), 89.3% added lime, and 84.7% added tobacco to their chew. Of those that mixed tobacco into their chew, nearly two-thirds added tobacco 76%-100% of the time (62.3%, data not shown). Cigarette tobacco was the most popular type of added tobacco (75.0%). Those who added tobacco to their chew were more likely to also add lime compared to those who did not add tobacco ($P < .001$). The most common reason for chewing was "It keeps me awake" (45.7%). Nine of 10 participants knew that chewing areca nut causes oral cancer (92.3%) (Table 3). However, only thirteen percent of participants identified the actual areca nut as a carcinogen (13.0%). Roughly two-thirds correctly identified all three images of a small tongue tumor, large tongue tumor and a neck mass as potential cancers (71.6%) (Figure 1). Over

Table 1. Age, Ethnicity, and Sex of Areca Nut Chewer Participants in the CNMI, N=300

	n	%
Age (in years)[a]		
18-29	95	31.7
30-39	89	29.7
40-49	61	20.3
50-59	33	11.0
60+	22	7.3
Ethnicity[b]		
Chamorro	131	43.7
Carolinian	114	38.0
OPI[c]	60	20.0
FCA[d]	12	4.0
Other	22	7.3
Sex		
Male	123	41.0
Female	177	59.0

[a] Mean age was 38.0 years; [b] Participants were asked to "Choose all that apply";
[c] OPI: Other Pacific Islander; [d] FCA: Filipino, Chinese or other Asian

Table 2. Areca Nut Chewing Behaviors among Participants in the CNMI, N=300

	n	%
At what age did you start chewing? (MR=10)[a]		
< 10	36	12.4
10-19	192	66.2
20-29	38	13.1
30-39	14	4.8
40-49	7	2.4
50-59	3	1.0
How often do you chew? Choose one: (MR=3)[a]		
Every day	260	87.5
Every week	24	8.1
Every month	13	4.4
On days that you chew, how many chews per day do you usually have? Choose one: (MR=4)[a]		
1	17	5.7
2-3	65	22.0
4 or more	214	72.3
How often do you add tobacco to your chew? Choose one: (MR=1)[a]		
Never	26	8.7
1%-25% of the time	71	23.7
26%-50% of the time	15	5.0
51%-75% of the time	17	5.7
76%-100% of the time	170	56.9
When you chew betel nut, do you add any of the following? Circle all that apply:		
Plant leaf	169	56.3
Lime[b]	268	89.3
Tobacco[b]	254	84.7
Other	21	7.0
Why do you chew betel nut? Circle all that apply:		
It keeps me awake	137	45.7
It makes me feel good	112	37.3
I like the taste	86	28.7
It's a part of my culture	85	28.3
I like the act of chewing	43	14.3
What type of tobacco do you add to your chew? Choose one:		
Cigarette tobacco	225	75.0
Chewing tobacco	38	12.7
Other tobacco	10	3.3
Not applicable – I don't add tobacco	27	9.0

[a] Number of missing responses (MR) for each question are indicated
[b] Participants who added tobacco to their chew were also more likely to add lime, $P < .001$

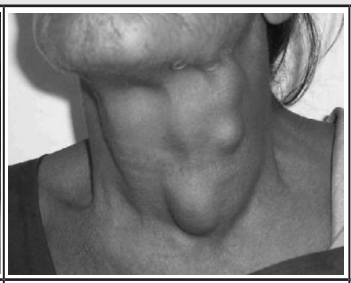
half believed that oral cancer could be treated (59.2%); a larger percentage believed that seeking medical care early would improve survival chances (85.2%). Nearly two-thirds personally knew someone who had or has mouth cancer (64.0%). A slight majority was interested in participating in programs to help them quit (63.0%). Approximately three-quarters were willing to try medicated products such as gums or candies to help them quit (79.5%), and a similar proportion was willing to participate in a screening program for oral cancer (74.0%). Those who chewed areca nut daily were more willing to try medicated products such as gums or candies than those who chewed less frequently ($P=.048$). No significant associations were found between knowledge of areca nut carcinogenicity and sex ($P=.727$), age ≤35 ($P=.328$), ethnicity ($P=.197$) or willingness to participate in cessation programs ($P=.325$) or screening programs ($P=.179$) (Table 4).

Table 3. Perceptions of Areca Nut Use and Oral Cancer Among Participants in the CNMI, N=300

	N	%
Do you think chewing betel nut causes deadly mouth cancer? (MR=2)[a]	275	92.3[b]
What part of the betel nut chew do you think causes cancer? Circle all that apply:		
The leaf	14	4.7
The tobacco	229	76.3
The actual betel nut	39	13.0
The lime	208	69.3
Do you think that mouth cancers can be treated? (MR=18)[a]	167	59.2[b]
For people with a mouth cancer, do you think it matters when they seek medical care? (MR=3)[a]	253	85.2[b]
Do you personally have a family member, close friend or community member who had or has mouth cancer? (MR=0)[a]	192	64.0[b]
Would you be interested in participating in a program to help you quit betel nut? (MR=11)[a]	182	63.0[b]
Would you be willing to try chewing medicated gum, using medicated candies or patches to help reduce your betel nut use? (MR=8)[a]	232	79.5[b]
Would you be willing to participate in a program where a medical provider examines your mouth to see if you have a mouth cancer or pre-cancer? (MR=11)[a]	214	74.0[b]

[a] Number of missing responses (MR) for each question are indicated
[b] This was a "Yes or No" question. Percentages were calculated by dividing number of "Yes" responses by number of valid responses.

Figure 1. Ability of CNMI Areca Nut Chewers to Identify a Small Tongue Lesion, Large Tongue Lesion, and Neck Mass as Potential Malignancies, N=300

"Do you think the following lesion could be cancer? Choose one:"[a]				
Yes	224 (78.0%)	269 (93.4%)	251 (86.9%)	199 (71.6%)[b]
No	33 (11.5%)	13 (4.5%)	34 (11.8%)	
Only if it bleeds, causes pain, or other symptoms	30 (10.5%)	6 (2.1%)	4 (1.4%)	
Missing responses	13	12	11	22

[a] Pictures indicate from left to right: small tongue lesion, large tongue lesion, and neck mass; [b] Number of participants that responded "Yes" to all 3 questions

Table 4. Chi-squared Likelihood of Knowing that the Actual Areca Nut Was a Carcinogen, N=300

Variable	*P*-value
Male sex	.73
Age ≤ 35	.33
API ethnicity	.197
Willingness to participate in quitting programs[a]	.32
Willingness to participate in screening programs[a]	.179

[a] N=289 for these associations, due to missing responses

Discussion

This survey supports prior studies from Micronesia demonstrating that areca nut is used by a diverse population of APIs, with high rates of tobacco and lime additives.[6,11-14] The majority of chewers do so habitually on a daily basis, and with 4 or more chews per day. These concerning trends are not characteristic of all areca nut regions and may be contributing to an increased oral cavity cancer burden in the Pacific islands.

Few studies have evaluated patient insights into the dangers of areca nut and the signs and symptoms of oral cancer. One study that qualitatively evaluated beliefs towards carcinogenicity in Micronesia showed that the link between areca nut and oral cancer was generally condemned among certain ethnic groups.[12] Another study that evaluated Bangladeshi adult patients in a London general practice showed that over 80% of both men and women were aware of the dangers of smoking tobacco, but only 24% of men and 36% of women were aware of the carcinogenicity of areca nut chewing.[18] This is congruent with the findings from our survey, which revealed considerable misperceptions regarding areca nut and oral cancer in the CNMI. Although a majority of chewers were aware that chewing causes oral cancer (92.3%), a staggering 87.0% did not know that the actual areca nut is a carcinogen. The concept that an organic plant product can cause cancer may be a source of significant confusion. A majority (76.3%) were aware that the tobacco part of a betel nut chew causes oral cancer but 69.3% believed that lime is a causative agent. The practice of adding lime to the chew is thought to be an enhancer of the areca nut effect via gamma-aminobutyric acid (GABA) uptake inhibition, but there is no data to suggest that lime is a carcinogen.[19,20] Although a majority were able to identify presenting signs of oral cancer, over half of the participants (59.2%) believed that oral cancers are treatable. Patients who do not believe oral cancer to be treatable may be more likely to delay seeking medical attention, or avoid it entirely. Fatalistic beliefs about cancer have historically been associated with ethnic minorities and lower socioeconomic status.[21] A study by Beeken found that cancer fatalism was also associated with a lower perceived value of early detection and fear of seeking medical consultation for possibly-cancerous symptoms.[22] Though nearly half of the participants did not believe that oral cancer could be treated, over four-fifths (85.2%) believed that seeking medical care early would improve survival chances, indicating that beliefs about cancer fatalism are not absolute, and most patients perceive some value from seeking medical care early.

Some of the survey results were very encouraging, and supported interest in cessation, treatment and screening programs. Eighty percent of respondents were amenable to trying replacement products and 74% were open to participating in oral screening programs. Regarding replacement products, nicotine gum is a promising consideration for multiple reasons. Many of the reasons for chewing areca nut in our study (stimulant effects, like the taste, act of chewing) would be addressed by nicotine gum.[13] Furthermore, with nearly 85% adding tobacco to the chew, a concurrent nicotine addiction may be present.[23]

Studies have shown the effectiveness of placing warning labels on cigarette packages for increasing health knowledge and smoking cessation, with pictorial warnings being especially useful for populations of lower educational levels.[24,25] Areca nut can currently be bought throughout the CNMI without any health warning labels. The results of this survey suggest that implementation of areca nut warning labels might help with chewing cessation via increased knowledge of carcinogenicity of areca nut. Such an intervention could directly educate an at-risk population of chewers about the dangers of areca nut and its relationship to oral cancers. Previous research in Asia and Micronesia has proven both the utility and cost-effectiveness of screening high-risk individuals for oral cancer.[11,26] With 74% of survey respondents reporting being interested in being screened, a commonwealth-wide effort in this regard should be seriously considered.

This study is limited by the use of exclusively self-reported, survey-based data and the associated risk of biases. Despite explicit assurance of patient confidentiality, the responses are at risk of a reporting bias. Similarly, as participants were recruited from in and around the hospital environment, our results might not be perfectly representative of the entire API population as a whole, as some might avoid the healthcare system. A power analysis was not performed to determine the number of surveys to administer. Instead, this value was based on prior survey studies regarding areca nut usage in Micronesia.[6] Verbal confirmation of active areca nut chewing status and verification of prior survey completion are inherently subject to imprecisions. Furthermore, as this was a new survey made to address highly relevant topics that have been minimally evaluated, there was no pilot study. As such, this survey has yet to be validated outside of the authors' personal experiences. Not all of the participants completed the survey in its entirety – this limitation is thought to have minimal impact on the data presented, as no individual question in the survey received less than 280 responses. Lastly, the study is fairly limited as surveys were distributed only on the island of Saipan. These findings can likely be generalized to other culturally similar islands of Micronesia but may not be reflective of patient perceptions in other areca nut regions such as those in Asia.

Conclusion

A majority (87%) of areca nut chewers in the CNMI have considerable misperceptions regarding the dangers of chewing and the nature of oral cancer. Educational warning labels should be distributed with areca nut sales to address these deficiencies and promote informed decisions. Nicotine replacement products, educational programs and commonwealth-wide oral screening efforts should be seriously considered.

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Impact of Insurance Coverage for Abortion in Hawai'i on Gestational Age at Presentation and Type of Abortion, 2010-2013

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Abstract

Insurance coverage for abortion varies between states, and in Hawai'i most private insurance companies and state Medicaid provide coverage for abortion. Very few patients pay out-of-pocket for an abortion. Hawai'i presents a unique opportunity to describe the sociodemographic differences between women seeking an abortion based on type of insurance coverage or who self-pay, and how this coverage impacts their care. Examined here were the differences in gestational age at time of presentation for abortion and type of abortion (medical, in-office procedure, or hospital facility procedure) chosen by 1803 patients presenting to a major abortion provider in Hawai'i from 2010 to 2013 based on payment method: private insurance, state Medicaid, and self-pay. Self-pay patients were demographically similar to those using private insurance with respect to age, race, and gestational age at time of presentation. Medicaid patients were distinct. They presented for care at a gestational age 13.3 days later than private insurance or self-pay patients even when controlling for age, race, prior parity, and prior abortion. Overall, 45.3% of Medicaid patients presented at greater than 14 weeks. Types of abortion differed between the insurance category groups, however these differences were no longer significant when stratified by gestational age. State Medicaid patients present for abortion care almost 2 weeks later than those with private insurance or who pay out of pocket, increasing personal and healthcare system costs associated with the procedure. The factors that contribute to this difference should be elucidated as they have important public health implications regarding timely access to care.

Keywords

abortion, insurance, Hawai'i, Medicaid

Introduction

Approximately 1 in 4 women in the United States will have an abortion by the age of 45.[1] While abortion is a common experience for women in the United States, access to timely care is often challenging. Financial barriers are some of the most significant reasons that women experience delays in obtaining abortion care or are unable to obtain one altogether.[2] Delays in accessing abortion result in a more advanced gestational age, which affects the type of abortion a woman can have, the number of visits to a provider required to complete the procedure, and the type of anesthesia used, all of which can result in increased costs and greater risks for the patient.

Abortion procedures vary based on gestational age, and the cost increases with increasing gestational age. At 10 weeks gestation or less, most patients have an option of a medical abortion or a uterine aspiration with minimal anesthesia. Uterine aspiration in the first trimester is typically done in an outpatient setting with local anesthesia or minimal sedation. A second trimester abortion, or uterine evacuation, requires cervical preparation that can take several hours or several days. Though it may be done in an outpatient setting with minimal anesthesia, a uterine evacuation is often performed in a surgical center or hospital facility under moderate sedation or general anesthesia. The additional cost of anesthesia, equipment, and services contributes to the higher cost for a second trimester abortion compared to a first trimester abortion.[3,4] A first trimester abortion in the United States costs approximately $470 overall, but by 20 weeks gestation it may cost up to $1500.[5] An abortion in a hospital, including anesthesia and facility costs, may be as much as several thousand dollars. Although some states permit insurance coverage for abortion, the majority of women in the United States do not have insurance coverage and pay these costs out-of-pocket for their abortions. A recent publication found the average out-of-pocket cost of an abortion for a woman who did not have insurance coverage to be $575, which comprised a significant portion of most women's monthly incomes.[6]

Insurance coverage for abortion varies greatly across the United States. The Hyde Amendment is a federal legislative provision that bars the use of federal funds, including Medicaid funds, for abortion with few exceptions.[7] The Hyde Amendment disproportionately affects women of color and women of lower socioeconomic status who are more likely to be covered by Medicaid and have limited access to abortion as a result.[7] Seventeen states currently permit the use of state Medicaid funds for abortion care, although enrollment delays and low reimbursement rates can result in Medicaid-eligible women having to pay out-of-pocket for abortion care.[2,8] Seventeen states permit the use of private insurance funds for abortion, although coverage may be limited by similar factors as well as restrictions imposed by specific insurance plans.[9]

An assessment of women's use of insurance coverage for abortion in Massachusetts, where both state Medicaid and private insurance cover abortion services, demonstrated that most women have affordable and accessible abortion care, although significant delays in insurance enrollment contributed to some women paying out of pocket despite being eligible for coverage.[10] Financial strain was reported as the most common obstacle by women obtaining an abortion in South Carolina, a state in which neither public nor private insurance coverage

for abortion is available except in cases of rape, incest, and life-endangering medical conditions.[4] In the state of Hawai'i, both state Medicaid and private insurance provide coverage for abortion care with few exceptions. As a result, only women who have a federal insurance plan or no insurance need to self-pay for their abortions.

This study aims to describe how variations in insurance type impact gestational age at time of presentation for abortion and type of procedure chosen in Hawai'i, a state with broad public and private insurance coverage for these services.

Methods

A retrospective analysis of all patients seen for abortion care at the Women's Options Center, one of the major abortion providers in Hawai'i, from October 2010 to May 2013 was conducted. The Women's Options Center has 2 clinical sites where patients are referred. Approximately half of first trimester abortions and the majority of second trimester abortions in the state of Hawai'i are done through the Women's Options Center. Administrative data were manually extracted from electronic medical records. Only those patients who had a termination for an undesired pregnancy were included; those who decided to terminate for a maternal health condition, fetal condition, or other indications were excluded.

Patients were grouped into 3 categories regarding payment for abortion: "private" for those using a commercial plan; "public" for those who used Medicaid; and "self-pay" for those who paid out-of-pocket without using any form of insurance. The type of abortion that can be done varies based on gestational age, and gestational age was categorized based on these cutoffs based on the Women's Options Center practice: up to 10 weeks, during which a woman may choose a medical abortion or in-office procedure; 10 to 14 weeks, during which a woman may choose a procedure either in-office or in a hospital setting; and greater than 14 weeks, during which a woman will have a procedure in a hospital setting.

Descriptive statistics were calculated for age and race. Associations between payment type and prior parity, prior abortion, gestational age at presentation, and type of abortion were analyzed using chi-squared tests for categorical variables and ANOVA for continuous variables. Factors that were identified in univariate analysis to be significantly associated with a difference in insurance payment type were included in a linear regression to predict gestational age at time of presentation. Women reported their reasons for self-paying for their abortion, and these were recorded when available. Statistical analysis was performed using SPSS (version 24.0, SPSS, Chicago, IL). This research was conducted in accordance with the prevailing ethical principles and approved by the Western Institutional Review Board (WIRB #1143885).

Results

Of the 2003 records in the database, 1815 met criteria for study inclusion. Twelve of these were excluded due to incomplete data regarding gestational age at time of presentation. The remaining 1803 patients were included in this study. Of these, 773 (42.9%) used a private form of insurance to pay for their abortion, 929 (51.5%) used Medicaid, and 101 (5.6%) were self-pay.

Differences in demographic characteristics between the 3 groups are noted in Table 1. Patients who used a private form of insurance for abortion coverage had a higher mean age (26.8 ± 7.2 years) than those using Medicaid (25.5 ± 5.9 years) or self-pay patients (25.4 ± 6.2 years, $P < .001$). Almost half of the patients (49.1%) who used Medicaid coverage for abortion identified as Native Hawaiian/Pacific Islander, which was higher than those using private insurance (25.2%) or self-pay patients, (28.4%, $P < .001$). More than half of the patients using private insurance identified as Asian (52.9%) compared to 30.0% of Medicaid patients and 38.9% of self-pay patients ($P < .001$).

Patients using Medicaid had a significantly higher mean prior parity (1.7 ± 1.5) compared to private insurance patients (1.0 ± 1.3) and self-pay patients (0.7 ± 1.0, $P < .001$). In the private insurance and Medicaid groups, 43.2% and 54.3% of patients, respectively, had a history of at least one prior abortion, compared to only 23.8% of the self-pay group ($P < .001$).

Mean gestational age at time of presentation for abortion varied significantly between the groups. Patients who used Medicaid for insurance coverage for abortion presented at a mean gestational age of 89.7 ± 35.2 days compared to 73.8 ± 32.2 days for patients using private insurance and 74.9 ± 33.8 days for self-pay patients ($P < .001$). When stratified by gestational age categories (≤10 weeks, 10-14 weeks, and ≥14 weeks) based on eligibility for different types of abortion, 62.5% of private insurance patients and 60.4% of self-pay patients presented at ten weeks or less, compared to 40.8% of Medicaid patients ($P < .001$).

Results of the linear regression analysis to determine if payment method remained significant in predicting gestational age at time of presentation for abortion after controlling for other relevant factors, specifically age, race, prior parity, and prior abortion status are noted in Table 2. The dependent variable was gestational age measured in days. After controlling for these other variables, Medicaid insurance remained significantly associated with later gestational age at time of presentation for abortion (β = 13.79 days; 95% CI = 10.40, 17.17). Patient age, prior parity, and prior abortion were also significantly associated with an increase in gestational age at time of presentation. Neither race nor self-pay status were predictive of gestational age at time of presentation. Patient age and gestational age were negatively correlated, with a reduction of approximately one day of gestational age with each increasing year of patient age (95%

CI = -1.29, -0.72). Prior parity was associated with an increase in gestational age of 2.48 days (95% CI = 1.16, 3.81), and prior abortion with an increase of 3.12 days (95% CI: 0.99, 5.24).

Differences in type of abortion chosen are noted in Table 3. Almost half of patients using Medicaid for payment (49.9%) underwent a procedure in a hospital facility compared to 27.7% of private insurance and 20.8% of self-pay patients ($P < .001$). Self-pay patients were most likely to choose an in-office abortion procedure (48.5%) compared to 31.1% of patients using Medicaid and 42.7% of those using private insurance ($P < .001$). When stratified by gestational age categories, however, there was no significant difference noted in type of abortion based on insurance or self-pay status.

Patients' reasons for self-pay are noted in Table 4. Of these patients, 55 (54.5%) of were uninsured, 26 (25.7%) did not have insurance coverage specifically for abortion and 2 (2.0%) did not want their insurance subscriber to know about their abortion.

Table 1. Demographics and Pregnancy History for Women Receiving an Abortion at Major Provider in Hawai'i between October 2010 and May 2013

	Private (n=773)	Medicaid (n=929)	Self-Pay (n=101)	*P*-value
Demographics	**mean+SD**	**mean+SD**	**mean+SD**	
Age (years)	26.8±7.2	25.5±5.9	25.4±6.2	<.001
Race	**n (%)**	**n (%)**	**n (%)**	<.001
White	122 (16.6)	115 (12.8)	19 (20.0)	.04
American Indian/Alaskan Native	2 (0.3)	4 (0.4)	0	.70
Asian	390 (52.9)	270 (30.0)	37 (38.9)	<.001
Native Hawaiian/Pacific Islander	186 (25.2)	441 (49.1)	27 (28.4)	<.001
Black/African-American	2 (0.3)	17 (1.9)	7 (7.4)	<.001
Mixed (2 or more races)	35 (4.7)	52 (5.8)	5 (5.3)	.65
Unknown/Not reported	36	30	6	
Pregnancy Characteristics	**mean+SD**	**mean+SD**	**mean+SD**	
Prior parity	1.0±1.3	1.7±1.5	0.7±1.0	<.001
Gestational age at time of presentation for abortion (days)	73.8±32.2	89.7±35.2	74.9±33.8	<.001
Prior abortion	**n (%)**	**n (%)**	**n (%)**	<.001
Yes	334 (43.2)	504 (54.3)	24 (23.8)	
No	192 (24.8)	272 (29.3)	30 (29.7)	
Unknown	247	153	47	
Gestational Age Categories (based on eligibility for abortion type)	**n (%)**	**n (%)**	**n (%)**	<.001
≤10 weeks	483 (62.5)	379 (40.8)	61 (60.4)	
10-14 weeks	110 (14.2)	131 (14.1)	20 (19.8)	
>14 weeks	180 (23.3)	419 (45.1)	20 (19.8)	

Table 2. Linear Regression Model Predicting Gestational Age (in days) at Time of Presentation for Abortion

	Unstandardized Coefficient	95% CI	*P*-value
Constant (Intercept)	93.02		
Age	-1.01	-1.29, -0.72	<.001
Race	-0.32	-1.40, 0.77	.57
Prior parity	2.48	1.16, 3.81	<.001
Prior abortion	3.12	0.99, 5.24	.004
Insurance Status			
Private	Reference		
Public	13.79	10.40, 17.17	<.001
Self-Pay	-0.46	-7.40, 6.48	.90

CI: Confidence Interval

Table 3. Type of Abortion: Medical Abortion vs. In-Office Abortion vs Hospital Facility Abortion[a]				
	Private (n=773)	**Medicaid (n=929)**	**Self-Pay (n=101)**	***P*-value**
	n (%)	**n (%)**	**n (%)**	
Overall				
Medical Abortion	229 (29.6)	176 (18.9)	31 (30.7)	<.001
In-Office Abortion	330 (42.7)	289 (31.1)	49 (48.5)	<.001
Hospital Abortion	214 (27.7)	464 (49.9)	21 (20.8)	<.001
≤10 Weeks				
	Private (n=483)	Medicaid (n=379)	Self-Pay (n=61)	*P*=.845
Medical Abortion	228 (47.2)	176 (46.4)	31 (50.8)	
In-Office Abortion	248 (51.3)	200 (52.8)	29 (47.5)	
Hospital Abortion	7 (1.4)	3 (0.8)	1 (1.6)	
10-14 Weeks				
	Private (n=110)	Medicaid (n=131)	Self-Pay (n=20)	*P*=.081
Medical Abortion	1 (0.9)	0	0	
In-Office Abortion	82 (74.5)	89 (67.9)	19 (95)	
Hospital Abortion	27 (24.5)	42 (32.1)	1 (5)	
>14 Weeks[a]				
	Private (n=180)	Public (n=419)	Self-Pay (n=20)	N/A

[a] All abortions ≥14 weeks were hospital facility abortions, consistent with clinical practice at the Women's Options Center

Table 4. Reasons for Self-Pay Among Women Who Paid Out-Of-Pocket for Abortion (n=101)	
Reason	**n (%)**
No insurance	55 (54.5)
No insurance coverage for abortion	26 (25.7)
Patient did not want insurance subscriber to know about abortion	2 (2.0)
Unknown	16 (15.8)
Other	2 (2.0)

Discussion

This retrospective cohort study demonstrated that patients who self-pay for their abortion care were similar to patients who used private insurance for abortion coverage with respect to prior parity and gestational age at time of presentation, but that these 2 groups were different from patients who used Medicaid for abortion coverage. Women with Medicaid presented almost 2 weeks (13.79 days) later for abortion compared to the other 2 groups even after controlling for other factors. Patient age, prior parity, and having had a prior abortion were significantly associated with a difference in gestational age at time of presentation, although Medicaid insurance status accounted for the largest difference in gestational age.

Prior studies have demonstrated that more than half of women who self-pay for their abortion cite cost as a significant factor in delay to obtaining an abortion[6] and that other costs such as travel, transportation, and childcare contribute to overall financial considerations.[2] The wait time for an appointment in the Women's Options Center is typically less than 1 week, so it is unlikely that appointment scheduling contributed to this delay. In this study population where only 5.6% of patients self-paid for their abortion and where patients with Medicaid insurance have coverage for both the abortion and some associated transportation costs, it is unclear what factors contribute to the almost 2-week difference in timing of presentation for women with Medicaid.

Our findings of prior parity among women with private insurance and women with Medicaid are consistent with the fact that 59% of women in the United States who have an abortion have had at least 1 prior birth.[11] Prior parity was significantly associated with a 2.48 day increase in gestational age at time of abortion in a linear regression model, which may support our hypothesis that cost or coordination of childcare contributes to

a delay in presentation for abortion. More than half (54.3%) of the women who used Medicaid for coverage and 43.2% of women who used private insurance had a history of at least 1 prior abortion compared to 24.0% of women who self-pay, which may indicate a difference in contraceptive use or pregnancy planning between these groups. History of a prior abortion was associated with an increase of 3.12 days in gestational age at time of presentation in the linear regression model, which may be associated with negative societal attitudes towards multiple abortions and abortion patients' internalized stigma associated with multiple abortions.[12]

Self-pay patients accounted for only 5.6% of the total study population. It is notable that 44.6% of self-pay patients had some form of health insurance. Two women reported that they chose to self-pay because they did not want their insurance subscriber provider to know about their abortion, indicating that abortion stigma or privacy concerns contribute to financial decision-making about abortion.

Although type of abortion was significantly different between the groups overall, these differences were no longer significant when stratified by gestational age categories. This overall difference can be attributed to the fact that, in unadjusted analyses, patients who used Medicaid to pay presented at a gestational age 15.6 days more advanced than those using private insurance and 14.5 days more advanced than self-pay patients. The largest proportion of Medicaid patients, 45.3%, presented in the second trimester and therefore were only eligible for a uterine evacuation in a hospital facility. This later gestational age at presentation for an abortion, particularly in the second trimester, requires more healthcare and hospital resources than a first trimester abortion and contributes to higher healthcare system costs as a result.

Although these data are useful to elucidate the differences between groups of women with different types of insurance coverage, women's decision-making considerations about when to seek an abortion and the choice of type of abortion specifically in relation to finances and insurance coverage are multifactorial. Women who live in states similar to Hawai'i with state Medicaid coverage for abortion have reported that enrollment delays and concerns about privacy present additional barriers to seeking timely abortion care.[13] It is possible that the increased gestational age noted among Medicaid patients in this study population can be attributed, at least in part, to a delay in Medicaid enrollment. Additional factors other than insurance coverage likely also contribute to this delay. These include health literacy or cultural and language barriers that impact a woman's understanding of her risk for pregnancy,[14] access to abortion facilities and providers,[15] and ability to coordinate timely care. In a qualitative study of pregnancy attitudes among Native Hawaiians, who comprised 47.3% of Medicaid patients, it was noted that pregnancies are considered valuable regardless of intention or planning, and that families play an important role in supporting women through pregnancy and parenting.[16] This may contribute to the delay in timing of presentation as women consider their pregnancy options with the guidance of other family members.

This study is limited in its retrospective nature, and by the fact that data are not available about patients' socioeconomic status or income level. Data on contraceptive use prior to abortion are also limited, and this may be a useful factor in understanding risk for pregnancy and pregnancy prevention prior to an abortion. This cohort of patients was also seen at a single abortion provider group, and the patient population at this institution may be different from the patient population seen by the other abortion providers in the state of Hawai'i. Hawai'i also has a uniquely diverse racial and ethnic composition that may not be generalizable to the United States population. The distinct insurance coverage landscape present in Hawai'i also may not be generalizable but may allow us to see patterns hidden in states with more limited insurance coverage landscapes for abortion.

Abortion is an essential component of reproductive health, and it is necessary to ensure that women who need abortions do not face financial barriers that result in delays in accessing timely care. Although widespread and consistent public and private insurance coverage is necessary to improve timely abortion access, it does not entirely account for all potential differences or disparities. Identifying the reasons for delays in presentation for care for patients with public insurance coverage for abortion as well as addressing the reasons why women who do have insurance coverage for abortion may choose not to use it and self-pay instead are important components in improving access to abortion.

Conflict of Interest

None of the authors identify a conflict of interest.

Disclosures

Dr. Kaneshiro receives funding from Mithra Pharmaceuticals and ContraMed for industry-sponsored clinical trials, but has no financial conflicts of interest related to this manuscript's subject.

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SOCIAL WORK IN ACTION

The Educational Legacy of Dr. Colette V. Browne

Noreen Mokuau DSW

Social Work in Action is a solicited column from the social work community in Hawai'i. It is edited by HJMPH Contributing Editor Sophia Kim PhD, of the Myron B. Thompson School of Social Work at the University of Hawai'i at Mānoa.

The educational legacy of Dr. Colette V. Browne with the Myron B. Thompson School of Social Work is reflected in her longevity of excellence in teaching, research and service. Dr. Browne retired on December 31, 2019, and is in a select group of social work educators at the University of Hawai'i at Mānoa who have invested over 35 years to education. Her work will forever enrich the profession and the social work *'ohana* because of its prodigious focus on improving lives through practice, policy and research.

Highlights of her accomplishments include her steadfast commitment to gerontology earning her numerous awards and international, national, and island-wide recognition; her stalwart dedication to policy as evidenced by her US Presidential and Hawai'i gubernatorial appointments to federal and state initiatives, and most recently, her work as the inaugural holder of the Takasaki Endowed Professorship; and her research acumen as indicated in her role as co-founder and Principal Investigator of social work's longest lasting federal grant — *Hā Kūpuna* — National Resource Center for Native Hawaiian Elders.

In her role as teacher, she has a reputation of being a gifted mentor and teacher to students, generously extending herself fully to empower their success. For these efforts, she earned the UH Board of Regents Medal for Teaching Excellence. In her role as a scholar, she contributes significantly to knowledge that improves the lives of elders, women, and the community-at-large. In her service to the community, she has invested selfless hours to develop and reinforce social work and public health services for our state, nation, and world. Recognition of her service contributions earned her the UH Robert Clopton Award for Exemplary Community Service and the Na Lima Kōkua Award from the Hawai'i Pacific Gerontological Society.

With a lifetime full of accomplishments, Dr. Browne has inspired a new generation of social workers to reach for a vision of social justice and health equity for our global community. We offer her our deepest aloha and gratitude for the kuleana she has assumed as a leader in the Myron B. Thompson School of Social Work.

He pua no ka wēkiu. (A blossom on the topmost branch). (Pukui, p. 99, 1983).

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Ambulatory Care Clinical Pharmacy Services Through the Daniel K. Inouye College of Pharmacy Faculty

Jarred Prudencio PharmD, BCACP, BC-ADM; Michelle Kim PharmD; Camlyn Masuda PharmD, CDE, BCACP; Bryce Fukunaga PharmD; and Wesley Sumida PharmD, BCPS

HJH&SW contributing editor of the Daniel K. Inouye College of Pharmacy (DKICP) Scripts column is Jarred Prudencio PharmD, BCACP, BC-ADM. Dr. Prudencio is currently Assistant Professor of Pharmacy Practice, and is a Board Certified Ambulatory Care Pharmacy Specialist with experience in outpatient family medicine and specialty clinics.

Background

Clinical faculty members at the Daniel K. Inouye College of Pharmacy (DKICP) work as educators for pharmacy students in both the didactic and experiential settings. Experiential education at the DKICP provides pharmacy students direct experiences in various patient care settings through shorter introductory rotations in the first three years of schooling, and full-time advanced rotations in the fourth year.

Ambulatory Care is a field of clinical pharmacy in which pharmacists, in collaboration with clinicians such as physicians and nurses, work with patients in an outpatient clinic setting to optimize medication regimens. Currently, there are 5 faculty who practice as ambulatory care clinical pharmacists at 4 clinic sites which provide students with hands-on learning experiences in this field of pharmacy.

Ambulatory Care is a broad and growing field of clinical pharmacy.[1] An ambulatory care pharmacist starts with assessing a patient's medical needs and identifying any medication-related problems. The pharmacist then works with the patient and other clinicians to develop a patient-specific care plan focused on optimizing medication regimens. The pharmacist will then work with the interdisciplinary team to follow-up with patients and continually reassess the patient to improve outcomes.[2] Although the general responsibilities are common among all types of ambulatory care pharmacists, each clinical service may have different foci. For example, some ambulatory care pharmacists focus on a specific condition such as diabetes, anticoagulation, or transplant, while others may have a more comprehensive focus. Additionally, some services may leverage various types of collaborative practice agreements or therapeutic protocols for the pharmacist to implement the medication plans with patients.

This article highlights 4 of the clinics in Hawai'i where DKICP ambulatory care faculty practice. These clinics provide students with valuable hands on experience, and improve the health care services available in the community.

Hawai'i Island Family Health Center

The Hawai'i Island Family Health Center (HIFHC) is an interdisciplinary family medicine clinic located in Hilo. The clinic is a primary care training site, where various healthcare learners are trained, including family medicine residents, pharmacy students, clinical psychology fellows, as well as medical and nursing students. Two pharmacy faculty members, Dr. Michelle Kim and Dr. Jarred Prudencio, serve as the clinical pharmacists at HIFHC.

The clinical pharmacy service at HIFHC focuses on comprehensive medication management (CMM), in which pharmacists work directly with patients to optimize medication regimens. Patients are scheduled on the pharmacist's independent patient panel for an in-clinic visit to discuss their medications and chronic disease states. With a progressive collaborative practice agreement, these pharmacists are able to make adjustments including initiating, discontinuing, or adjusting any non-controlled substance on a patient's medication regimen. These pharmacists also place orders for laboratory tests that may be necessary to ensure the medications are safe and effective for patients. Patients are often referred to this service for assistance in improving chronic disease state control. The most common conditions these pharmacists manage are cardiovascular diseases, diabetes, and respiratory diseases, but the focus is comprehensive. The pharmacists also work with patients who may need help understanding the purpose of their medications, improving medication adherence, or with polypharmacy concerns.

As the primary outpatient facility of the Hawai‘i Island Family Medical Residency Program, the pharmacists at this clinic are also relied on to help with making medication recommendations and answering drug information questions from other clinicians. The pharmacists work with educating family medicine residents on pharmacotherapy issues. Third-year and fourth-year pharmacy students rotate through HIFHC to gain introductory and advanced experiences in the ambulatory care setting. This also allows students to gain exposure to working in a well-integrated interdisciplinary healthcare setting.

The Physician Center of Mililani

Similar to the Hawai‘i Island Family Health Center, the Physician Center at Mililani (PCM) is a family medicine clinic that provides interdisciplinary management of patients in central O‘ahu, (Mililani, Wahiawa and neighboring areas), and is staffed by Dr. Camlyn Masuda. PCM is also a training site for the John A. Burns School of Medicine (JABSOM) Family Medicine residency program and works collaboratively with a pharmacist and psychologists to provide integrated care. PCM is a site for medical students and pharmacy students to achieve their advanced practice experiences. In partnership with the psychiatric residency program, psychiatric residents fulfill their primary care visits at PCM.

Dr. Masuda's interest and expertise is in diabetes. She provides individual office visits with patients for diabetes education and management. With a collaborative agreement with the physicians, she is able to make medication dosing changes, start and discontinue medication and order labs to monitor medications ordered. Dr. Masuda also assists with addressing health maintenance for patients with diabetes such as performing monofilament exams, reminding patients to schedule dilated eye exams, and ordering immunizations. This helps with preventing patient complications but also helps fulfill quality metrics for the clinic, which can increase revenue from certain insurance companies. Although her interest is in diabetes management, she also provides management of asthma, chronic obstructive pulmonary disease, hypertension, hyperlipidemia, smoking cessation and comprehensive medication management, as any ambulatory pharmacist is able to.

As an ambulatory care pharmacist in the clinic, Dr. Masuda also assists the providers with medication therapy selection by answering drug information questions, solving issues from retail pharmacies, obtaining prior authorizations for medications, and researching preferred formulary medications. Fourth-year pharmacy students rotate with Dr. Masuda at PCM to gain experience in an ambulatory care setting.

Kea‘au Bay Clinic

Dr. Bryce Fukunaga practices ambulatory care pharmacy at the Bay Clinic in Kea‘au on the island of Hawai‘i. Bay Clinic is a federally qualified health center with multiple locations across the island. The Kea‘au location opened an outpatient pharmacy in April 2019. This pharmacy greatly benefits the underserved patients of Bay Clinic by dispensing medication prescriptions at a lower cost. Dr. Fukunaga's primary role is to handle primary care provider referrals for patients with chronic conditions such as diabetes, hypertension, and hyperlipidemia. He counsels these patients and makes recommendations to the other providers for medications, monitoring, and lifestyle interventions. His area of focus is diabetes treatment and besides having face to face appointments, he gets a weekly list of patients who visited the clinic with uncontrolled diabetes. He calls the listed patients to provide diabetes phone counseling then makes recommendations to their providers. The pharmacists in the outpatient pharmacy perform medication therapy management and refer complicated patient cases to Dr. Fukunaga for assistance.

Dr. Fukunaga is involved in non-pharmacy related services as well. He is 1 of 3 certified lifestyle coaches who lead a weekly Diabetes Prevention Program (DPP) for prediabetes patients where they follow a set curriculum approved by the Centers for Disease Control and Prevention (CDC) to help prevent diabetes through lifestyle interventions. Bay Clinic also has Diabetes Self-Management and Education (DSME) classes and the pharmacist teaches some of the didactic portions including medications, complications, monitoring, and physical activity. Currently third-year and fourth-year pharmacy students may go to Bay Clinic to gain hands-on experience and learn in the experiential setting with Dr. Fukunaga.

The Queen's Physician's Office Building III

The University Health Partners of Hawai‘i Department of Medicine Faculty Practice clinic is located on the island of O‘ahu at The Queen's Medical Center, Physicians Office Building III, where Dr. Wes Sumida practices. This outpatient ambulatory clinic is comprised of internal medicine primary care physicians and board certified sub-specialists in pulmonology medicine, rheumatology, allergy and immunology, cardiology, and infectious disease. This practice also serves as the clinical learning environment for UH JABSOM medical students, Hawai‘i Residency Program medical residents, and DKICP pharmacy students and residents.

Pharmacy services began at the University of Health Partners of Hawai‘i Department of Medicine Faculty Practice clinic during the fall of 2017. Currently, pharmacy patient service activities involve internal medicine patients with medication reconciliation, drug information, patient and medication education, post-hospital discharge transitions of care medication reviews, medication monitoring and follow-up, medication refills, and prior authorization with insurance support. Additional pharmacy related services to the practice include medication inventory supply storage audits, and research and support for medication guidelines and policies.

This pharmacy academic teaching experience originated at the Lau Ola clinic which was an extension of JABSOM Department of Native Hawaiian Health. Since then, this site has continued its relationship with the Department of Native Hawaiian Health in pursuit of professional cultural education activities and community outreach such as *Papakolea lomilomi* health screening. Fourth-year pharmacy students may rotate with Dr. Sumida in this setting to gain experience in ambulatory care.

Benefits of Ambulatory Care Pharmacists

There is a plethora of evidence that supports the implementation of ambulatory care clinical pharmacists into healthcare teams. One large systematic review found that the addition of a pharmacist in a multidisciplinary team had favorable outcomes on hemoglobin A1c, cholesterol, blood pressure, and adverse drug events.[3] Pharmacists are the medication experts in health care, therefore, having a clinical pharmacist working with other clinicians such as physicians, nurses, and psychologists can make for an ideal, team-based approach to patient-centered care.

The incorporation and use of ambulatory care pharmacists can also financially benefit medical clinics, both in terms of revenue enhancement and cost control. Proper adherence to medication schedules results in improved quality metrics and ultimately improved third-party payments. In addition, ambulatory care pharmacists may participate in chronic disease management, which is a billable visit with appropriate documentation. Ambulatory care pharmacists are also able to perform Medicare Wellness visits (after the patient has their initial wellness visit) which is a reimbursable visit by Medicare.

Conclusion

As noted in these 4 different clinic settings in Hawai‘i, ambulatory care pharmacists can be implemented in a diverse range of outpatient clinics. The primary similarity between these clinical pharmacy services is that the pharmacists work in direct patient care roles to help optimize medication regimens, with the goal of improving long-term patient outcomes. Logistics and focuses of each service can vary and be adapted depending on the needs of the clinic and patient population. Pharmacists working in clinical roles alongside other clinicians in this setting is a great way to provide patient-centered team-based healthcare.

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The Cognitive Health of Older Adults in Hawai‘i: Implications for Social Work

Yeonjung Jane Lee PhD, MA

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Background

In 2019, the number of older adults ages 65 years and older represented 18.4% of the population in Hawai‘i.[1] Hawai‘i’s older adult population is expected to continue growing.[1,2] In 2015, Alzheimer disease (AD) ranked as the sixth leading cause of death in Hawai‘i. By 2025, there will be 35,000 individuals ages 65 and older with AD. This leads to high caregiving burdens and healthcare costs.[3] The mean annual per-person Medicare spending for older adults without AD and other dementias is $7,561, whereas spending for those with AD and other dementias is more than triple ($24,598).[4]

Why is cognitive impairment a critical issue to the state of Hawai‘i? At an individual level, older adults are at risk of losing independence and quality of life. At a societal level, caregiving and economic burdens challenge us to identify the protective and risk factors of cognition. For instance, medical care costs for AD and other dementias are expected to exceed $1.1 trillion in 30 years (2050).[5]

Current Efforts in Hawai‘i

Responding to the societal impact of cognitive impairment in old age, stakeholders in Hawai‘i endeavor to promote cognitive health (eg, the ability to think, judge, learn, and remember)[6] through initiatives in the following areas: education/research, community programs, and policies.

Interdisciplinary collaboration on campus is burgeoning and an exemplar is the Pacific Islands Geriatrics Workforce Enhancement Program (PI-GWEP), funded by the Health Resources and Services Administration (HRSA), led by investigators Dr. Aida Wen and Dr. Kamal Masaki, from the John A. Burns School of Medicine (JABSOM) at the University of Hawai‘i at Mānoa, PI-GWEP offers a unique educational experience training healthcare leaders from disciplines including medicine, nursing, pharmacy, and social work.[7] Interdisciplinary assessment and didactic sessions are conducted to develop comprehensive care plans for older adults with dementia and other conditions. Gerontologists from MBTSSW at UH Mānoa continue to collaborate to improve the health and quality of life for Native Hawaiian older adults. As part of the Myron B. Thompson School of Social Work (MBTSSW) at UH Mānoa, the Center on Aging is leading the Hawai‘i Alzheimer’s Disease Initiative (HADI). This initiative strengthens the capacity of Hawaii’s community to support older adults with dementia and their caregivers through various activities. HADI offers online resources such as a dementia care coordination practice tool, a clinical provider practice tool, and a memory care navigator roadmap. The center is also working on expanding the number of memory care navigators and Staff Training in Assisted-living Residences - Caregivers (STAR-C; ie, intervention for caregivers and dementia-capable memory clinics).[8]

Hā Kūpuna is a National Resource Center for Native Hawaiian Elders, established in 2006, at UH Mānoa. One example of their innovative work related to cognitive health is the development of a short storybook, “Pomai and Her Papa.” This storybook provides reader-friendly information about the signs of dementia. Through visual illustrations and easy-to-understand language, the storybook offers a guide to support both older adults and young caregivers.[9,10] This storybook is a unique resource for families in Hawai‘i, as there are a good number of intergenerational families in the state.[9,10] Young caregivers may be the first to observe dementia symptoms in their older family members. Hā Kūpuna’s work demonstrates educational and research efforts to disseminate cognitive health-related knowledge to the general public.

Community organizations in Hawai‘i provide resources not only for older adults with cognitive impairment but also for dementia caregivers. For instance, Catholic Charities Hawai‘i offers various workshops and coaching programs. The organization offers caregivers a workshop to train them in the Rosalynn Carter Institute for Caregiving (RCI) Resources for Enhancing Alzheimer’s Caregivers Health (REACH) Program. This program is known to benefit the psychological well-being and quality of life of dementia caregivers by offering self-care and self-efficacy techniques. Starting in the summer of 2020,

Catholic Charities Hawai‘i will offer a series of workshops in O‘ahu that focus on a positive approach to dementia care.[11]

The Executive Office on Aging (EOA) of the Hawai‘i State Department of Health (DOH) continues to support and fund programs and services to improve the health and well-being of older adults in Hawai‘i.[2] The EOA of the DOH indicated that it is the state's priority to address cognitive health issues in the following areas by 2025: AD prevention and treatment, quality of care, support for older adults and caregivers, public awareness, and data tracking.[12]

In addition to current efforts to address cognitive health issues in Hawai‘i, there is an innovative theoretical framework that can inform cognitive health research, programs, and policies. Gerontologists utilize the productive aging framework to promote health in later life.

Definition

Understanding the productive aging framework provides strategies to promote healthy cognition in later life. According to gerontologists, productive activities are defined as paid or non-paid activities performed by older adults that contribute to the greater society. Productive activities include work, volunteering, and caregiving.[13,14] Due to the mixed findings on the caregiving-health association,[15,16] the following sections focus on work and volunteering, and its implications for healthy cognitive aging.[13,14]

Work and Cognition

Previous studies found that work provides an opportunity for cognitive stimulation, resulting in better cognitive health outcomes.[17,18] Moreover, work that involves interaction with others, such as taking instructions or helping, is associated with reduced risk of AD.[19] Despite the positive impact of work on cognitive health, not everyone has an equal opportunity to be engaged in the labor force. Thus, programs such as the Senior Community Service Employment Program (SCSEP), funded by the US Department of Labor, increase work opportunities for vulnerable older adults. The SCSEP started in 1965 and is an employment program for low-income older adults ages 55 and older. The program trains eligible older adults to develop the skills necessary for permanent employment.[20,21] The State of Hawai‘i Workforce Development Division (WDD) provides detailed information on the benefits of SCSEP and participant eligibility. The information is available at https://labor.hawaii.gov/wdd/home/job-seekers/scsep/benefitseligibility/.[22] Promoting employment programs, offering resources, and options for flexible work can not only benefit society but also provide cognitive stimulation for older adults.

Volunteering and Cognition

Engagement in volunteering can promote cognitive health in later life.[23-26] When older adults engage in a community-based intergenerational volunteering program, there are positive health consequences. For instance, the Baltimore Experience Corps involved older volunteers in teaching and working with elementary school students. As a result of this program, the students benefited academically, while the older adults had positive health outcomes. The older adults experienced better cognitive health outcomes such as improved executive function, increased brain activity, and increased brain volume.[23-26]

In Hawai‘i, there is an intergenerational program called Ka ‘Aha. It is an online-based program connecting and increasing bonding across different generations. For 8 weeks, a team of 2 to 4 from at least 2 different generations participate in activities provided by the program website. The activities include spending time together, using technology to communicate with each other, eating together, and participating in community events. The intention of this program is to facilitate intergenerational interactions and to share culture/traditions passing from older adults to children.[27] Similar to the Experience Corps model, the Ka ‘Aha program incorporates intergenerational activity with cognitive stimulation. The state of Hawai‘i can utilize the productive aging framework to develop more intergenerational volunteering programs for cognitive health promotion initiatives.

Social Work Implications

Social work as a profession strives to improve the lives of vulnerable populations and promote social justice. The employment of social workers is expected to rapidly increase 11%between 2018 and 2028, in part due to increased demand for healthcare.[28] Social workers are involved in various areas of social issues and there is a growing need for geriatric social workers due to the rapidly increasing number of older adults. Geriatric social workers work with individual clients and they also engage in policy-making.[29,30] They can also promote healthy aging for older adults with cognitive impairments. Addressing cognitive health issues can improve the quality of life of older adults and their families. According to the American Academy of Social Work and Social Welfare, one of the 12 social work grand challenges is to "advance long and productive lives."[31]

MBTSSW at UH Mānoa offers training opportunities for geriatric social workers to serve older adults. For instance, MBTSSW offers courses on the topics of aging. The MBTSSW gerontology specialization is one of the first in the nation and remains the only advanced degree program in the state for social workers. For undergraduate students, "SW 477 Social Welfare Concepts and Issues in Gerontology" is offered to educate on aging issues

at the micro, mezzo, and macro levels and the role of social work. For master's students, the program offers a gerontology specialization that was directed by Dr. Colette V. Browne. Social work students can take the following courses to enrich their experience and understanding of aging and society: "SW 639 Social and Cultural Aspects of Aging", "SW 727 Seminar in Social Work with the Aged" and "SW 797 Advanced Social Welfare Policy and Change." Additionally, at MBTSSW, social workers have the opportunity to leverage aging-related resources at the Center on Aging. There is a growing interest in productive and healthy aging among faculty and students.

Conclusion

One of the priorities in Hawai'i is to address cognitive impairment in later life, especially with the demographic phenomenon of population aging. In addition to the ongoing initiatives, future research, intervention, and policy efforts can utilize productive activities to improve cognitive health. The application of a strength-based perspective on productive aging to promote cognitive health can enhance the state's ability to support our older adults. Additionally, educational efforts to train future geriatric social work leaders can prepare them to serve the needs of the individual, the family, and the community.

Acknowledgements

The author is deeply appreciative of Dr. Colette V. Browne's contributions in the area of gerontology and for her inspiring the next generations of social work gerontologists. The author recognizes Dean Noreen Mokuau for her leadership, support, and scholarship in aging, social justice, and health disparities. The author would like to thank Dr. Kathryn L. Braun for her helpful advice and comments. The author would also like to thank Dr. Sophia Kim and the editor for their suggestions.

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Hawai‘i Journal of Health & Social Welfare (HJH&SW)

Style Guide for the Use of Native Hawaiian Words and Diacritical Markings

The HJH&SW encourages authors to use the appropriate diacritical markings (the ‘okina and the kahakō) for all Hawaiian words. We recommend verifying words with the Hawaiian Language Dictionary (http://www.wehewehe.org/) or with the University of Hawai‘i Hawaiian Language Online (http://www.hawaii.edu/site/info/diacritics.php).

Authors should also note that Hawaiian refers to people of Native Hawaiian descent. People who live in Hawai‘i are referred to as Hawai‘i residents.

Hawaiian words that are not proper nouns (such as *keiki* and *kūpuna*) should be written in italics throughout the manuscript, and a definition should be provided in parentheses the first time the word is used in the manuscript.

Examples of Hawaiian words that may appear in the HJH&SW:

‘āina	***Mānoa***
ali‘i	***Māori***
Hawai‘i	***Moloka‘i***
kūpuna	***O‘ahu***
Kaua‘i	***‘ohana***
Lāna‘i	***Wai‘anae***

General Recommendations on Data Presentation and Statistical Reporting (Biostatistical Guideline for HJH&SW)
[Adapted from Annals of Internal Medicine & American Journal of Public Health]

The following guidelines are developed based on many common errors we see in manuscripts submitted to HJH&SW. They are not meant to be all encompassing, or be restrictive to authors who feel that their data must be presented differently for legitimate reasons. We hope they are helpful to you; in turn, following these guidelines will reduce or eliminate the common errors we address with authors later in the publication process.

Percentages: Report percentages to one decimal place (eg, 26.7%) when sample size is >=200. For smaller samples (<200), do not use decimal places (eg, 27%, not 26.7%), to avoid the appearance of a level of precision that is not present.

Standard deviations (SD)/standard errors (SE): Please specify the measures used: using "mean (SD)" for data summary and description; to show sampling variability, consider reporting confidence intervals, rather than standard errors, when possible to avoid confusion.

Population parameters versus sample statistics: Using Greek letters to represent population parameters and Roman letters to represent estimates of those parameters in tables and text. For example, when reporting regression analysis results, Greek symbol (β), or Beta (b) should only be used in the text when describing the equations or parameters being estimated, never in reference to the results based on sample data. Instead, one can use "b" or β for unstandardized regression parameter estimates, and "B" or β for standardized regression parameter estimates.

***P* values:** Using *P* values to present statistical significance, the actual observed *P* value should be presented. For *P* values between .001 and .20, please report the value to the nearest thousandth (eg, *P*=.123). For *P* values greater than .20, please report the value to the nearest hundredth (eg, *P*=.34). If the observed *P* value is great than *.999*, it should be expressed as "*P*>*.99*". For a *P* value less than .001, report as "*P*<.001". Under no circumstance should the symbol "NS" or "ns" (for not significant) be used in place of actual *P* values.

"Trend": Use the word trend when describing a test for trend or dose-response. Avoid using it to refer to *P* values near but not below .05. In such instances, simply report a difference and the confidence interval of the difference (if appropriate), with or without the *P* value.

One-sided tests: There are very rare circumstances where a "one-sided" significance test is appropriate, eg, non-inferiority trials. Therefore, "two-sided" significance tests are the rule, not the exception. Do not report one-sided significance test unless it can be justified and presented in the experimental design section.

Statistical software: Specify in the statistical analysis section the statistical software used for analysis (version, manufacturer, and manufacturer's location), eg, SAS software, version 9.2 (SAS Institute Inc., Cary, NC).

Comparisons of interventions: Focus on between-group differences, with 95% confidence intervals of the differences, and not on within-group differences.

***Post-hoc* pairwise comparisons**: It is important to first test the overall hypothesis. One should conduct *post-hoc* analysis if and only if the overall hypothesis is rejected.

Clinically meaningful estimates: Report results using meaningful metrics rather than reporting raw results. For example, instead of the log odds ratio from a logistic regression, authors should transform coefficients into the appropriate measure of effect size, eg, odds ratio. Avoid using an estimate, such as an odds ratio or relative risk, for a one unit change in the factor of interest when a 1-unit change lacks clinical meaning (age, mm Hg of blood pressure, or any other continuous or interval measurement with small units). Instead, reporting effort for a clinically meaningful change (eg, for every 10 years of increase of age, for an increase of one standard deviation (or interquartile range) of blood pressure), along with 95% confidence intervals.

Risk ratios: Describe the risk ratio accurately. For instance, an odds ratio of 3.94 indicates that the outcome is almost 4 times as likely to occur, compared with the reference group, and indicates a nearly 3-fold increase in risk, not a nearly 4-fold increase in risk.

Longitudinal data: Consider appropriate longitudinal data analyses if the outcome variables were measured at multiple time points, such as mixed-effects models or generalized estimating equation approaches, which can address the within-subject variability.

Sample size, response rate, attrition rate: Please clearly indicate in the methods section: the total number of participants, the time period of the study, response rate (if any), and attrition rate (if any).

Tables (general): Avoid the presentation of raw parameter estimates, if such parameters have no clear interpretation. For instance, the results from Cox proportional hazard models should be presented as the exponentiated parameter estimates, (ie, the hazard ratios) and their corresponding 95% confidence intervals, rather than the raw estimates. The inclusion of *P*-values in tables is unnecessary in the presence of 95% confidence intervals.

Descriptive tables: In tables that simply describe characteristics of 2 or more groups (eg, Table 1 of a clinical trial), report averages with standard deviations, not standard errors, when data are normally distributed. Report median (minimum, maximum) or median (25th, 75th percentile [interquartile range, or IQR]) when data are not normally distributed.

Figures (general): Avoid using pie charts; avoid using simple bar plots or histograms without measures of variability; provide raw data (numerators and denominators) in the margins of meta-analysis forest plots; provide numbers of subjects at risk at different times in survival plots.

Missing values: Always report the frequency of missing variables and how missing data was handled in the analysis. Consider adding a column to tables or a footnote that makes clear the amount of missing data.

Removal of data points: Unless fully justifiable, all subjects included in the study should be analyzed. Any exclusion of values or subjects should be reported and justified. When influential observations exist, it is suggested that the data is analyzed both with and without such influential observations, and the difference in results discussed.

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