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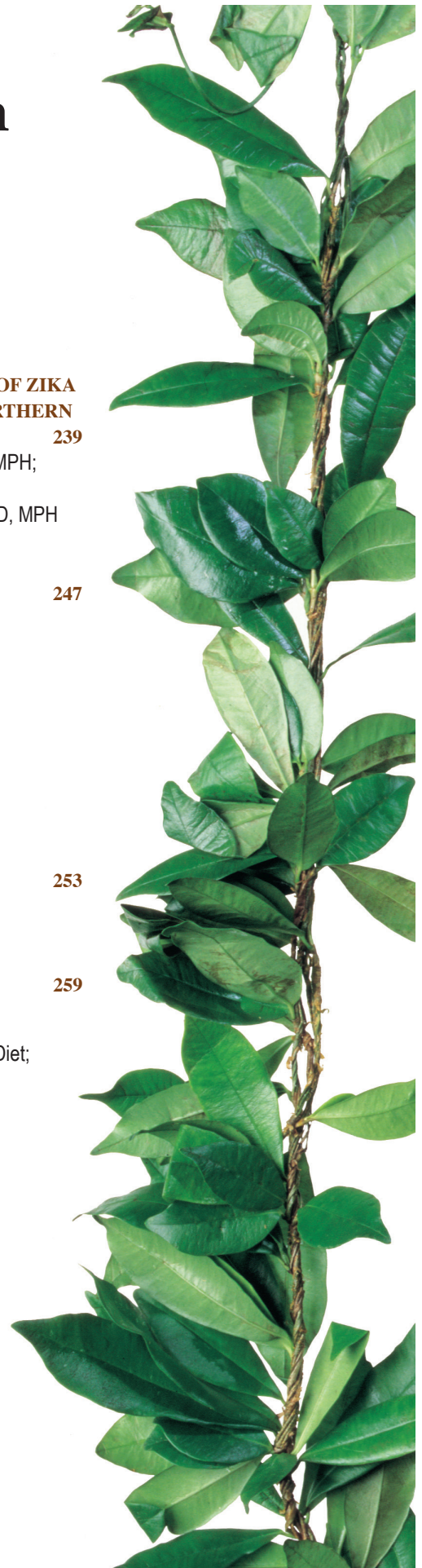
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Community Perspectives on Contraception in the Context of Zika Virus in American Samoa and the Commonwealth of the Northern Mariana Islands

Lisa Romero DrPH, MPH; Rachel Powell PhD; Charity Ntansah MPH; Hailey Bednar MPH; Caitlin Green MPH; Anna Brittain MHS; Ruben Torrez BS; Irene Barrineau MA; Heather S. Pangelinan MS; Ianeta Timoteo-Liaina MBBS; Luis Garcia, Eva Lathrop MD, MPH

Abstract

The prevention of unintended pregnancy was identified as a primary prevention strategy to reduce Zika-related adverse birth outcomes during the 2016-2017 Zika virus outbreak. The Centers for Disease Control and Prevention in partnership with local health agencies conducted formative research to guide the development of culturally appropriate messages and materials to increase awareness of the prevention of unintended pregnancy as a strategy to decrease Zika-related adverse outcomes in American Samoa and the Commonwealth of the Northern Mariana Islands (CNMI). Nine focus groups (N=71) were conducted with women and men aged 18-44 years living in American Samoa and CNMI. Semi-structured interview guides were used to explore participants' knowledge and perceptions of Zika, family planning, and contraception; barriers and facilitators to access contraception and use; and information sources and contraception decision-making. Trained staff from local organizations co-moderated each focus group. Thematic analysis was conducted with NVivo 10. Participants had mixed knowledge about Zika virus and its relation to pregnancy and birth defects. Women and men had varied knowledge of the full range of contraceptive methods available in their jurisdiction and identified barriers to contraceptive access. Social factors including stigma, gender roles, and religion often deterred participants from accessing contraceptive services. Participants highlighted the need for culturally appropriate and clear messaging about contraceptive methods. Results demonstrate the feasibility of conducting formative research as an effective strategy for understanding community perspectives on unintended pregnancy prevention in the context of the Zika virus outbreak to develop health communication materials.

Keywords

Zika, contraception, emergency preparedness, USAPI, American Samoa, Commonwealth of the Northern Mariana Islands

Abbreviations and Acronyms

CDC = Centers for Disease Control and Prevention
CNMI = Commonwealth of the Northern Mariana Islands
IUD = Intrauterine Device
STD = Sexually Transmitted Disease
USAPI = United States-Affiliated Pacific Islands

Introduction

Zika virus infection during pregnancy can cause severe brain and eye abnormalities.¹ While primary transmission occurs through the bite of *Aedes* species mosquitoes, Zika virus can also be transmitted through sexual transmission, and from

mother to baby during pregnancy or at birth.² The Centers for Disease Control and Prevention (CDC) identified the prevention of unintended pregnancy as a primary prevention strategy to reduce Zika-related adverse birth outcomes during the 2016-2017 Zika virus outbreak.³

The United States-Affiliated Pacific Islands (USAPI) includes 3 US territories (American Samoa, the Commonwealth of the Northern Mariana Islands (CNMI), and Guam) and 3 independent countries in free association with the US (the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau). In January 2016, American Samoa reported the first laboratory-confirmed cases of Zika virus infection in USAPI, and by May 2017 public health officials reported mosquito-borne transmission of Zika virus across the Pacific Islands.⁴ In December 2017, across all US territories, including Puerto Rico, US Virgin Islands, and USAPI, 4,690 pregnant women with laboratory evidence of Zika virus infection were reported,^{4,5} making contraceptive access a priority among women of reproductive potential (sexually active, fertile, not pregnant, and not using contraception).

As part of its Zika emergency response, CDC conducted a rapid assessment of reproductive health data and discussed access to contraception with family planning providers in the USAPI.⁶ In 2015, data from the United Nations on contraception prevalence reported about 34% of married women 15-49 years of age in CNMI used a modern method of contraception, including sterilization, an intrauterine device (IUD), an implant, injectable, oral contraceptive pills, male and female condoms, vaginal barrier methods, lactational amenorrhea method, and emergency contraception, compared to about 70% in the US.^{6,7} Data were unavailable for American Samoa. Data on unmet need for family planning, defined as the number of women of reproductive age who would like to prevent or delay pregnancy, but were not using any contraceptive method was about 22% among married women 15-49 years of age in CNMI compared to about 7% in the US.^{6,7} Similar data were not available for American Samoa. According to the 2015 National Title X Family Planning Annual Report, Title X funds supported family planning service delivery in all USAPI jurisdictions.⁸ Among Title X female family planning users at risk for unintended pregnancy, defined as women of reproductive age who are

sexually active with a male partner and not currently pregnant or seeking pregnancy, the reported rates of use of the most effective methods (ie, sterilization, implants, and IUDs) were 15% in American Samoa and 21% in CNMI; the reported rates for moderately effective methods (ie, injectables, vaginal rings, patches, pills, and diaphragms) were 85% in American Samoa and 75% in CNMI; the reported rates for less effective methods (ie, female and male condoms, sponges, withdrawal, lactational amenorrhea, and spermicides) were 0% in American Samoa and 2% in CNMI.⁸ Further, informational discussions with key informants (ie, family planning nurses, medical doctors, family planning managers, and program coordinators for Title X and other family planning programs or contraceptive service provision sites) from each USAPI jurisdiction reported on contraception methods available to women within their jurisdiction. CNMI and American Samoa were the only jurisdictions to report having the full range of contraceptive methods available.⁶ Key informants also identified barriers and facilitators to implement strategies to increase access contraceptive services in the context of Zika preparedness and response.⁶ The majority of key informants reported the need to remove logistic and administrative barriers for contraceptive services and supplies; train health care providers on current insertion and removal techniques for IUDs and implants using evidence-based guidance; and assess client satisfaction with service provision and increase consumer awareness.⁶

Following the assessment, the CDC convened key leadership, family planning providers, and clinical care organizations that provide contraception from each USAPI jurisdiction for a 3-day training session to educate and discuss the needs of women of reproductive potential and facilitators for increasing access to contraception during the Zika outbreak in USAPI.⁶ While these key informants emphasized the need for patient education, perspectives among women in the USAPI regarding the sociocultural norms surrounding pregnancy, contraceptive use, and contraceptive decision-making and barriers to accessing contraception were unknown.⁶ Following the training, American Samoa and CNMI requested technical assistance from the CDC to develop health messaging about contraception in the context of Zika. In response, the CDC, in partnership with local health agencies and community-based organizations, conducted formative research to guide the development of culturally appropriate messages and materials to increase awareness of the prevention of unintended pregnancy as a primary strategy to decrease Zika virus infection-related adverse outcomes in American Samoa and CNMI.

This study reports findings from focus groups centered around emerged themes of participants' knowledge and perceptions of Zika, family planning, and contraception; barriers and facilitators to access contraception and use; and information sources and contraception decision-making.

Methods

Data Collection

In January 2018, 9 focus groups were conducted during the Zika virus outbreak with women and men of reproductive age (aged 18 to 44 years) in American Samoa and CNMI to understand knowledge, attitudes, and beliefs about contraception within the context of Zika. The inclusion criteria included participants who resided in American Samoa or CNMI at the time of enrollment and who reported being heterosexual and sexually active within the past 3 months. To assess attitudes for whom contraception would be applicable, women who were pregnant or planning to conceive within the next 12 months were excluded.

In American Samoa, 5 focus groups were conducted: 3 with women and 2 with men. In CNMI, 4 focus groups were conducted with women; there were no focus groups with men in CNMI due to challenges in recruiting men to participate. The number of participants in each group ranged from 5 to 14, resulting in 71 participants. This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy and determined to be public health practice and therefore did not require additional review by CDC Institutional Review Board.

The local departments of health, family planning program, and community-based organizations that served women or promoted health in American Samoa or CNMI recruited participants. These local organizations used local networks, community venues (eg, laundromats), and social media (eg, Facebook) to identify participants. Interested participants completed an eligibility screening form.

CDC developed separate guides to facilitate discussions with women and men, informed by formative research conducted in Puerto Rico and the US Virgin Islands during the Zika virus outbreak.^{9,10} The guides included open-ended questions and probes to gather information on contraceptive access, method choice, and use, and perceptions about Zika virus transmission and pregnancy; and to inform the development of a comprehensive health communication strategy within the context of the Zika virus outbreak (**Table 1**). The guides were reviewed by the local staff to ensure the questions were culturally appropriate. CDC trained local staff on focus group facilitation, confidentiality, informed consent, and the data collection process. The trained staff co-moderated each focus group with CDC staff. Participant informed consent was obtained at the start of each session. The informed consent process included information on research procedure, purpose, risks, benefits, and alternatives; comprehension to ensure participants had thorough understanding of research, confidentiality, and recording for note taking purposes; and awareness that participation was voluntary. Focus group discussions were audio-recorded and transcribed. Participants received \$25 compensation for their time and transportation costs.

Table 1. Selection of Questions from the Focus Group Guide for Formative Research Conducted to Understand Perspectives Regarding Contraception in the Context of the Zika Virus Outbreak in American Samoa and the Commonwealth of the Northern Mariana Islands
Pregnancy
· In what ways do women in your community talk about planning a family (reproductive life planning)?
· Do people generally discuss plans to have kids/delay having kids?
· Who do people generally discuss this with (their partner/spouse, family member, friend)?
· Do you think people are looking to delay/prevent pregnancy in the context of Zika?
· How does a woman prevent pregnancy in (American Samoa/ the Commonwealth of the Northern Mariana Islands (CNMI) if she wants to?
Contraception/Birth Control
· What are the types of birth control methods you are familiar with?
· How does a woman prevent pregnancy in (American Samoa/CNMI) if she wants to?
· Where do women in your community look for information about birth control?
· What are some of the things that make it <i>hard</i> for women in your community to get birth control if they wanted to prevent pregnancy? (<i>Probes</i> : religion, fear of side effects, limited access to health care, limited access to contraception, cost, discomfort talking with partner)
· What are some of the things that make it <i>easy</i> for women in your community to get birth control if they wanted to prevent pregnancy?
· When discussing birth control, who do you think should be involved in the decision-making process?
Zika Virus
· What have you heard about the Zika virus?
· Where are you getting information about Zika?
· What if anything are you doing to protect yourself from Zika?
Zika Virus and Pregnancy
· How has the Zika virus affected your thinking about pregnancy or pregnancy planning?
· What could motivate you to consider using birth control if you were interested in delaying or avoiding pregnancy, especially now with Zika being an issue?
Information-Seeking/Message Dissemination
· What types of information do you think women in (American Samoa/CNMI) would you like to receive about different types of birth control methods?
· Who do you think would be a good person (or people) to inform you and your friends about birth control options to delay or avoid a pregnancy? (<i>Probes</i> : a physician, celebrity, religious or spiritual leader, someone like you)
· Are there any organizations that are trusted as a reliable sources of information on birth control?
· What would be the best way to provide this information? (<i>Probes</i> : videos, educational pamphlets, community/public meetings, Internet, radio)

Data Analysis

All focus groups were transcribed verbatim and dissected with a thematic analysis framework in NVivo 10 (QSR International, LLC, Burlington, MA). A codebook was developed using a hybrid approach of a priori and inductive codes from the data. Two analysts independently coded each transcript using the codebook, met for consensus (percent agreement 78.27% to 99.9%; Cohen's Kappa scores 0.53 to 0.99), and discussed differences in coding to refine the codebook. This process of independent coding and consensus to gauge inter-rater reliability and refine codebook was repeated for all focus groups.

While coding the focus group data, the analysts developed analytical annotations for each coded segment across all 9 transcripts. Queries were run for American Samoa and CNMI separately, captured all codes in the codebook, and were organized into 4 domains: (1) Knowledge and perceptions of Zika virus; (2) Knowledge and perceptions of family planning and contraception; (3) Barriers and facilitators to access contraception and use; and (4) Information sources and contraception decision-making.

The 4 domains were consistent across American Samoa and CNMI; however, the themes varied based on the data analyzed from these 2 different geographic areas.

Results

Knowledge and Perceptions of Zika Virus

Female participants from American Samoa had mixed awareness of Zika virus and its transmission (**Table 2**). While few reported they understood its relation to pregnancy and birth defects, overall knowledge varied. Most reported that they had learned about prevention strategies from a health communication campaign, yet they did not have strong concerns. Those who reported concerns about Zika had personal connections to individuals affected by the virus. Participants reported health center outreach efforts positively changed prevention behaviors and increased awareness and concern of adverse effects of infection. When discussing Zika and its relation to family planning, few reported the virus motivated contraceptive use.

In American Samoa, male participants were aware of Zika virus, but most were unclear about transmission and relation to pregnancy (Table 2). Men reported that Zika did not affect their view on pregnancy but were interested in learning more. Men reported the use of prevention strategies (eg, eliminate mosquitos in the environment, prevent mosquito bites, and pregnancy prevention) by those with a personal connection to the disease or awareness from the health communication campaign.

CNMI participants (female only) also had a mixed understanding of Zika; many did not know about the virus, and others understood it as a mosquito-borne disease. Few understood the relation of Zika virus to birth defects or that it could be sexually transmitted (Table 2). Participants reported that learning about Zika made them concerned about mother-baby transmission, increased caution in getting pregnant, and increased desire for more information.

Knowledge and Perceptions of Family Planning and Contraception

Female participants from American Samoa were aware of condoms, pills, injectables, and the patch (Table 2). Most had a neutral view about these methods, but those who knew about potential side effects voiced concern. Participants had mixed knowledge about IUDs and implants and found the insertion requirements deterring. Women were aware of methods used

by friends and family and noted concerns of side effects that others had experienced. Women were also aware of where to access contraceptive services.

Male participants from American Samoa reported condoms as a male form of birth control but preferred not to use them because concerns of comfort or breakage (Table 2). Although Zika was not seen as a sexually transmitted disease (STD), it was reported that STD prevention efforts more likely encouraged men to use condoms than Zika prevention.

In CNMI, female participants reported knowledge about condoms, pills, injectables, patches, IUDs, and implants (Table 2). Women reported that condoms and the pill were favored, but the pill was sometimes avoided because of the necessity to take it daily. The IUD and implant were well-received by some women; however, others avoided these methods because the required insertion and potential side effects that they heard about from friends and family (eg, painful procedure and excessive bleeding). Women also reported knowledge about where to get contraception.

Barriers and Facilitators to Access Contraception and Use

Female participants in American Samoa reported barriers to contraceptive access (Table 2). Barriers included the perception of promiscuity and stigma associated with use of contraception.

Table 2. Focus Group Participant Perceptions of Contraception in the Context of the Zika Virus Outbreak, American Samoa and the Commonwealth of the Northern Mariana Islands, January 2018		
Focus Group Domain	American Samoa*	Commonwealth of the Northern Mariana Islands
Knowledge and Perceptions of Zika Virus	<p>Female group:</p> <p>"I didn't know that you can spread Zika through sex or pregnant women to their baby."</p> <p>"When I heard that Zika was actually present in Samoa and could affect me, I took steps to protect my family like use screens, nets, and sprays."</p> <p>Male group:</p> <p>"I was not concerned about Zika, but now that I know what it can do to a baby, I am concerned about my wife getting pregnant."</p> <p>"Zika doesn't affect how I think about pregnancy because it is the women's decision or responsibility to protect herself."</p>	<p>Female only group:</p> <p>"This is my first-time hearing of the Zika. I don't have a lot of information."</p> <p>"I have heard Zika virus can be transferred from the mom to the unborn baby and cause birth defects."</p> <p>"I am concerned about pregnant women. For the sake of the baby because it could cause a birth defect."</p> <p>"Honestly, I don't feel concerned. Maybe I should be, but I just don't know what it is. I just see that big poster in front of the hospital with the mosquito, but I don't understand."</p>
Knowledge and Perceptions of Family Planning and Contraception	<p>Female group:</p> <p>"I know about the pill, Depo, patch, and condoms."</p> <p>"I had an IUD for five years. It was good because it lasts really long, and it is safe. I had the shot before, but I stopped because I didn't have my period."</p> <p>"I have never heard of the implant. How does it get into your arm?"</p> <p>Male group:</p> <p>"The pill is for women. The condom is for men."</p> <p>"The other methods seem better than the IUD and implant. I have concerns about the methods that are inserted in her body."</p> <p>"I feel comfortable with condoms as a way to prevent STD and pregnancy."</p>	<p>Female only group:</p> <p>"I've heard about all the methods--the IUD, ring, Depo, pills, patch, condoms, implant, and abstinence."</p> <p>"I think the pill and condoms are preferred because they are easier. With pills, you're not putting in anything anywhere else but your mouth."</p> <p>"I heard the IUD lasts like 10 years, so I decided to get it."</p> <p>"I heard on the implant you do not menstruate. From my experience, every time you don't get your period and your sexually active, you're scared that your pregnant."</p> <p>"A lot of times, condoms, you can get them for free. Like from public health."</p> <p>"If women don't want to get pregnancy, most know they can go to family planning clinics, hospital, and pharmacies for birth control."</p>

Table 2. Focus Group Participant Perceptions of Contraception in the Context of the Zika Virus Outbreak, American Samoa and the Commonwealth of the Northern Mariana Islands, January 2018 (Continued)

Focus Group Domain	American Samoa*	Commonwealth of the Northern Mariana Islands
<p>Barriers and Facilitators to Access Contraception and Use</p>	<p>Female group:</p> <p>Barriers:</p> <p>"Women may not go to the family planning clinic because they are embarrassed, shy, not wanting people to know."</p> <p>"I feel like I am sinning. My pastor would not be supportive of using of birth control. You are supposed to accept a child."</p> <p>"In Samoan culture you are not supposed to have sex before marriage and once you are married you are not supposed to use birth control."</p> <p>"Men want women to have children year after year. When I was offered birth control and discussed with my husband, he disagreed so I don't use."</p> <p>"To get birth control requires transportation and babysitter."</p> <p>Facilitators:</p> <p>"There are special hours at the family planning clinic for teens."</p> <p>"The more information women have the better they will be able to choose a method and talk with their partner."</p> <p>Male group:</p> <p>"There is an expectation for women to not have sex until married or until they are older and wiser, but this does not reflect reality."</p> <p>"I have had friends and girlfriends try to get birth control. There is a cultural shame. You don't want people to know that you do that type of stuff."</p> <p>"Culturally the more children, the more blessings. Spiritually you're not supposed to start making babies until marriage."</p>	<p>Female only group:</p> <p>Barriers:</p> <p>"If you are single and getting birth control people will think you have several partners."</p> <p>"So cost is a big factor."</p> <p>"Lack of information is a barrier."</p> <p>"I don't have transportation to go to the clinic."</p> <p>"In our culture we do not discuss family planning. It's too personal."</p> <p>"When a man and woman get married, in our culture that the role of the woman is to have their children."</p> <p>"There is pressure to be a mother, including motherhood over school or career."</p> <p>Facilitators:</p> <p>"The family planning clinics, hospitals, and pharmacies are all options for women wanting birth control."</p> <p>"You can get condoms for free at public health."</p> <p>"It's important for women to be aware of the different types of birth control, pros and cons and side effects."</p> <p>"There has been a generational shift towards less children. My mom's generation there were seven or eight of them. And then our generation average three."</p> <p>"I think in practice, religion has minimal effect on birth control use. It's not a big factor for people I know."</p>
<p>Information Sources and Contraception Decision-Making</p>	<p>Female group:</p> <p>"In Samoan culture, you don't talk about sex. If you were to talk about it, it would be with your mom or your sisters and after you got married."</p> <p>"Your mom is always going to be the first one you go to if you are afraid to talk to your husband or partner."</p> <p>"I talk about birth control with my friends."</p> <p>"The only person I talk to is my husband. To plan how many kids"</p> <p>"I am not married but in a relationship. Family planning does not come up."</p> <p>"In school, we learned abstinence only. Birth control wasn't discussed."</p> <p>"If I need information on birth control, I feel I could trust my physician or nurse at the family planning clinic. I always prefer a female doctor"</p> <p>"Radio, TV, billboards, pamphlets, posters at hospital, market, and community board are good places to share information."</p> <p>Male group:</p> <p>"When you start talking about plans and goals for the future, it will some way lead to talking about when to have kids."</p> <p>"Most couples do not talk about family planning. That's why most pregnancies are accidental."</p> <p>"I want to know how safe a method is, how it works, and the cost."</p>	<p>Female only group:</p> <p>"I talk to my mom, sister, cousins, and female."</p> <p>"Culture plays a role in birth control decision-making. Before, 15 kids at one time and now there's a generational shift towards less kids. The ladies in my family actually said they really struggled, and they don't want us to struggle. Everything is so expensive you're not going to be able to afford to have as many kids as me. There is support for family planning."</p> <p>"I talk to my partner about birth control. I made it easy for him and explain the pros and cons of each option. He is supportive."</p> <p>"Women can get information about birth control from the hospital, public health, and private clinics."</p> <p>"Outreach may be a good source for sharing birth control information, at the places where women are like the beach, exercise at pathway, or Zumba."</p> <p>"Teachers and school counselors would be good sources of information."</p> <p>"Fliers, posters, health fairs, radio, TV, and any place women go are good places to share birth control information."</p> <p>"Colorful posters with women and families that represent CNMI could be useful to catch women's attention."</p> <p>"Posters that focus on women or partners supporting women using birth control and getting healthy to prepare for a child."</p>

*Male focus groups were only conducted in American Samoa and not in CNMI

Participants reported that in Samoan culture, women were not supposed to have sex before marriage, and, once they were married, they were not supposed to use contraception. Others reported that use of contraception would not be supported by their religious institutions because women were not supposed to prevent pregnancy. Women reported lack of partner support to use contraception because men want women to have children. Women also reported barriers related to distance, transportation, and childcare to access family planning clinics.

Male participants in American Samoa reported barriers including a cultural expectation for women to not have sex until marriage or not use contraception and noted this did not reflect reality. They reported shame women experience accessing contraception and the belief that large families are blessings. Participants reported women also want large families.

In terms of facilitators, most women reported the more they learned about each method, the more they felt encouraged to

visit family planning clinics. Women from American Samoa reported that knowledge about contraception empowered them to plan their future and have conversations with their partners. Participants also reported that confidential and teen friendly hours at family planning clinics were important, but awareness about these services in the community was needed.

Female participants in CNMI reported barriers to contraception access and use, including cost and insurance status (**Table 2**). Women reported lack of information, required parental consent for teens, and transportation as barriers. Participants reported that family planning was not typically discussed in their culture and that the role of the woman was to bear children and prioritize motherhood over school and career. Women also reported stigma and judgment towards unmarried women seeking contraception.

In terms of facilitators, women in CNMI were aware that contraception services were available for little or no cost at the hospital or public health clinics. Women reported that being informed about different types of contraception options, benefits, and side-effects were important. Women also reported a generational shift towards less children and more family planning and that in practice religion had minimal effect on contraception use.

Information Sources and Contraception Decision-Making

Women in American Samoa reported they typically refrained from talking about contraception or pregnancy; however, if they did, it would be with their mother or sisters (**Table 2**). Women also reported talking with close friends but noted privacy concerns when discussing with acquaintances. Some women reported they talk to their husbands; however, women not married often did not discuss family planning with partner.

Women in American Samoa reported the need for more information about the benefits of planning pregnancy, different contraceptive methods, costs, side effects, and effectiveness (**Table 2**). Information about contraception was often provided through a physician or nurse. Physicians were mentioned as trustworthy, but many women preferred female medical professionals. Women suggested integration of family planning education and services into other medical visits (eg, gestational diabetes and postpartum care). Outreach and education were reported as a potential channel to reach youth, discuss the high teen birth rates, and prevention efforts. Women also reported radio, TV, billboards, pamphlets, posters, market, and community boards as potential sources to disseminate information about family planning services.

For American Samoa men, most reported they do not talk about family planning with their partners and that most pregnancies are unintended (**Table 2**). Men reported they did not have enough information about contraception to talk with their partner. Men also reported they wanted to know how safe a method was, how it worked, and the cost. Other men reported that talking about

plans and goals for the future often lead to discussions about family planning. Men reported that pamphlets, posters, and TV were sources to get contraception information.

In CNMI, women reported talking to their mothers, sisters, cousins, and female friends about pregnancy and contraception (**Table 2**). Women reported a generational shift towards less children and that older women supported contraception because of their financial struggles with large families. Some women reported talking with their partners and felt that listing pros and cons of family planning was helpful to partners understanding. Often when partners were included in the conversation, they were supportive.

Women in CNMI reported public health as the main source of contraception information, followed by hospital, clinics, and pharmacy (**Table 2**). Women reported the hospital provides contraception information after birth and that providing this information before pregnancy would be helpful. Outreach efforts targeting places where women congregate were reported as a potential source to share contraception information. Women reported that school was the primary source of sex education and that teachers and school counselors were good sources of confidential information. Women reported a desire for accurate, science-based information. Information about family planning was obtained from pamphlets, posters, radio, TV, Google, and Facebook messenger. Key channels for disseminating information included WhatsApp and health fairs.

Women in CNMI reported the need for messaging for men to support women using contraception (**Table 2**). Women reported the need for culturally appropriate, up-to-date, and clear messaging. Women also wanted materials that included information on the different contraceptive methods, side effects, and cost to help them make their decision and recommended that messaging be colorful, represent CNMI families, and focus on partners getting healthy together.

Discussion

Our findings highlight that focus group participants in American Samoa and CNMI had mixed levels of knowledge about the association of pregnancy and birth defect outcomes with Zika virus infection and the use of contraception as a primary prevention strategy during the 2016-2017 Zika virus outbreak. Previous research also conducted during the 2016-2017 Zika virus outbreak reported limited awareness of Zika within local communities in Puerto Rico and the US Virgin Islands due to the asymptomatic nature of the majority of cases⁹ and limited personal knowledge of someone with the Zika virus infection or infants born with adverse outcomes.^{9,10} Together, these findings underscore the need for communications efforts to increase awareness of local Zika virus risks and of prevention of unintended pregnancy as a primary strategy to decrease Zika virus infection-related adverse outcomes.

Previous research conducted in the Pacific found that women of reproductive age had lower awareness of contraceptive methods and services even though they were easily available.¹¹⁻¹⁴ This research adds to the existing literature on perspectives among women of reproductive age in American Samoa and CNMI in regards to the sociocultural norms surrounding pregnancy, contraceptive use, and contraceptive decision-making and barriers to access contraception, including that gaps in knowledge and awareness of contraceptive methods, stigma of seeking contraceptive services, confidentiality concerns, and the perception of the role of motherhood often prevented women in American Samoa and CNMI from accessing contraceptive services. However, the complexity surrounding perceptions of sociocultural norms, contraceptive use, and contraceptive decision-making warrants further research to understand and address the needs of women. Efforts to provide comprehensive information about all contraceptive methods, including side effects and options for discontinuation or removal are important to improve contraceptive options for women and support method choice.^{15,16}

Previous research reported that men in the Pacific often had specific views on family planning based on their knowledge of why women use contraception and that while some men did have reservations, there was a positive response to discuss family planning and engage in related decision-making.¹⁷ Our male focus group findings add to the existing body of knowledge that men in American Samoa were often not engaged in discussions about family planning. However, men wanted information on contraception safety, efficacy, and cost and to discuss with their partners future goals, including when to have children. Contraceptive decision-making that involves the male partner can support increased use of effective contraceptive methods, including the use of dual protection (condoms plus a non-barrier method).¹⁸⁻²¹ Efforts to educate men about the health benefits of family planning, address men's concerns and misconceptions, and discuss their role in decision making, can facilitate communication with their partner and support a woman's choice of a method that meets her needs.

This study further highlights barriers to contraceptive access, including limited awareness, cost, confidentiality concerns, distance, transportation, and childcare. Providers trained in evidence-based guidance for contraceptive services can offer high-quality contraceptive services.²²⁻²⁴ Previous research reported that providing patient-centered contraceptive counseling through a shared decision-making approach can facilitate women finding a contraceptive method aligned with their needs and preferences.²⁵ Additionally, providing same-day initiation without unnecessary medical tests and exams can reduce women being lost to follow-up and placed at risk of an unintended pregnancy.^{22,23,26} To address cost concerns, patient information about cost and options for no or low-cost programs (eg, Title X, federally qualified health centers) for eligible participants can be provided. Further, upfront costs of IUDs and implants may be a barrier for some providers. Therefore, the risk for

absorbing the costs of unused devices may impede same-day initiation.²⁷ The use of reimbursement systems and purchasing strategies can reduce costs for providers and patients.²⁷⁻²⁹ To address confidentiality concerns, provider and staff training and policy and procedural approaches to improve the assurance of confidentiality in clinic settings may be considered.²⁴ Finally, to address barriers to seeking contraceptive services (eg, distance, transportation, and childcare), the use of mobile outreach services and community health workers, and integration with other important maternal and child health initiatives may improve accessibility of services.

The findings in this report are subject to several limitations. First, given the urgency of the emergency response, a purposive sampling approach to recruit participants was used. Given the wide age range in the focus groups, participants may have had different perspectives, opinions, and experiences on these topics. Thus, these findings are not generalizable to all individuals of reproductive age in American Samoa and CNMI. Second, only adult participants were recruited; therefore, the needs of women younger than 18 years who may experience additional challenges were not assessed. Third, with only 4 focus groups in American Samoa and 5 in CNMI, thematic saturation may have not been achieved. Consequently, the study's ability to gather enough data to inform the tailoring of messages for certain subgroups was limited. Nevertheless, this assessment provided useful data to inform the development of a communication strategy as a part of an emergency response.

Conclusion

The use of formative research was an effective strategy to understand community perspectives on contraceptive access and provided valuable information for rapid development of culturally appropriate health communication messages and materials in the context of Zika. Similar assessments can be used to understand community perspectives in other emergency response efforts that pose a risk to pregnant women and their infants, or in nonemergency settings in which the goal is to increase access to contraception or reduce unintended pregnancy.

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Conflict of Interest

None of the authors identify a conflict of interest.

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Exploring Foods of the Pacific: Cultural Food Identity in the US Affiliated Pacific Region

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Abstract

Indigenous peoples of the Pacific have seen major shifts in dietary patterns due to foreign colonization, which introduced an array of new foods. Today, foods considered traditional and acculturated are consumed in various extents. However, the definitions and identity of traditional versus acculturated foods has become unclear as many introduced foods have been incorporated into Pacific cultures. The purpose of this study was to capture culturally relevant definitions of traditional, acculturated, and locally grown foods among 10 jurisdictions of the US-Affiliated Pacific (USAP) region with a focus on fruits and vegetables. Questionnaires were used to capture definitions of these terms, and to identify a list of foods (n=121) as traditional, acculturated, and/or locally grown in addition to classify them into food groups (ie, fruit, vegetable, starch, and/or grain). For the most part, definitions of traditional, acculturated, and locally grown were agreed upon by participating USAP jurisdictions, with some supplementary caveats presented by different jurisdictions. More foods were identified as acculturated (n=75) than traditional (n=37). Fruits (n=55) were the most frequent designation and about a third were vegetables (n=44). The majority of the jurisdictions reported growing at least half of the food items. This is the first study to identify and classify foods of the Pacific from the perspective of those indigenous to the USAP region. Understanding these similarities and differences in how food is classified and identified, through the lens of those from the Pacific, is crucial for nutrition education, and understanding what foods are locally grown is important for future sustainability.

Keywords

Nutrition, Diet, Food, Pacific Islands, Indigenous Peoples

Abbreviations

CHL = Children's Healthy Living Program for Remote Underserved Minority Populations of the Pacific Region

CNMI = Commonwealth of the Northern Mariana Islands

RMI = Republic of the Marshall Islands

USAP = US-Affiliated Pacific

Background

Humans have experienced major shifts in dietary patterns since the emergence of Paleolithic man. Popkin¹ describes these changes as the nutrition transition, which he defines as a concept focusing on large shifts in dietary patterns, especially of

their overall structure, that are reflected in nutritional outcomes such as changes in average stature and body composition. The nutrition transition described by Popkin is made up of 5 distinct patterns: (1) collecting food, (2) famine, (3) receding famine, (4) degenerative disease, and (5) behavioral change.¹ These shifts in dietary patterns have been influenced by changes in food sources, modes of processing and distribution of food, physical activity, and socioeconomic status.¹

Over the past several centuries, the pace of dietary change has accelerated to varying degrees around the world.² One of the most recent rapid changes of dietary patterns can be seen among indigenous peoples in the Pacific.^{3,4} Indigenous groups have seen major shifts in dietary patterns in more recent years relative to non-indigenous groups due to foreign colonization that occurred just within the past few centuries.⁵ The nutrition transition can explain much of the dietary shifts seen among Pacific Islanders. Prior to Western contact, indigenous people of the Pacific led lifestyles similar to Paleolithic hunter-gatherers collecting food (pattern 1 described by Popkin¹) and experiencing periods of famine (pattern 2 described by Popkin¹).⁵ Since the introduction of Western culture, Pacific Islanders have seen a major shift in diet patterns in which an abundance of food is conveniently available resulting in reduced famine (pattern 3 described by Popkin¹). However, many of these foods are imported or processed which has led to the emergence of obesity and diet related non-communicable diseases in the Pacific (pattern 4 described by Popkin¹).

Colonization in the Pacific, a concept not included in the Popkin model, introduced an array of new foods, including various new sources of meats, fruits, and vegetables.⁵ Although these acculturated foods have become highly prevalent in the Pacific region, traditional foods are still consumed today to various extents.⁵⁻⁷ Traditional diets and practices have been shown to protect health,⁸⁻¹⁰ and the traditional food system and cultural practices of Pacific peoples can create opportunities for exposure and intake of healthful foods, most notably fruits and vegetables.^{8,11,12} However, in the past few decades, the definitions and identity of traditional versus acculturated foods has

become unclear as many introduced foods have been incorporated into Pacific cultures. Understanding food identity in terms of traditional or acculturated^{8,13} and classification in terms of food groups are important to better understand current dietary patterns and support a transition towards healthful behavioral change, Popkin's final pattern of the nutrition transition.¹

The purpose of this study was to capture culturally relevant definitions of traditional, acculturated, and locally grown foods among 10 jurisdictions of the US-Affiliated Pacific (USAP) region with a focus on foods considered as fruits and vegetables. In addition, food group classification (fruit, vegetable, starch, and/or grain) was addressed via the perspective of people from each jurisdiction. These concepts are important to better understand identity and classification in terms of food groups and dietary patterns. To the authors' knowledge, no other studies have comprehensively identified the designation of traditional and acculturated fruits and vegetables in this Pacific region, nor their food group classifications.

Methods

The Children's Healthy Living Program for Remote Underserved Minority Populations of the Pacific Region (CHL) is a partnership among universities, local organizations, and stakeholders across the USAP region, comprised of American Samoa, Alaska, the Commonwealth of the Northern Mariana Islands (CNMI), the Federated States of Micronesia (including island states of Chuuk, Kosrae, Pohnpei, and Yap), Guam, Hawai'i, the Republic of the Marshall Islands (RMI), and the Republic of Palau.¹⁴ The Exploring Foods of the Pacific study was initiated among CHL staff and partners to capture culturally relevant definitions of traditional, acculturated and locally grown foods in the USAP. This analysis focused on the 10 island jurisdictions (American Samoa, CNMI, Chuuk, Kosrae, Pohnpei, Yap, Guam, Hawai'i, RMI, and Palau). Due to the emphasis on tropical foods of the Pacific, Alaska was not included.

Two questionnaires were constructed for this study: (1) a Food Identity Questionnaire captured culturally relevant definitions of traditional, acculturated, and locally grown foods and (2) a Food Classification Form identified foods in the USAP as traditional, acculturated, and locally grown and also classified the foods into food groups (ie, fruit, vegetable, starch, and/or grain). The Food Identity Questionnaire provided definitions based on the literature documenting Pacific foods^{6,15} and consultation with nutritionists affiliated with the CHL program. This questionnaire was designed to retrieve respective jurisdiction's definition(s) of traditional, acculturated, or locally grown. CHL staff, indigenous to each USAP island jurisdiction (n=10), were tasked with completing the questionnaires. Participating staff from each jurisdiction were asked to assess the provided definition, and then to edit and record in their own words the concepts of traditional, acculturated, and locally grown foods based on their individual perspectives (see **Table 1**).

The foods listed on the Food Classification Form were ascertained from the Pacific Tracker 3 (PacTrac3) dietary database^{16,17} (University of Hawai'i Cancer Center, Honolulu, HI) and focused on fruits and vegetables, which aligned with one of CHL's goals to increase consumption of fruits and vegetables. CHL staff were tasked to complete the Food Classification Form, which consisted of 121 food items commonly classified as fruits and vegetables. On the form, the translated name of each food item, specific to each jurisdiction, was included when known. CHL staff were asked to correct or add an appropriate translation, if needed. Then, the CHL staff marked whether the listed food item was considered to be (1) a fruit, vegetable, starch, and/or grain, and (2) traditional, acculturated, and/or locally grown (some fruits and vegetables throughout the Pacific are also considered starch and/or grain; thus, the inclusion of these choices). Food items not pertaining to a jurisdiction could be marked "not applicable". Lastly, jurisdiction staff were instructed to include additional fruits and vegetables not listed and then categorize them as described above.

Once the information was collected from all jurisdictions, food items were summarized into the food classification or identity category that received the most counts among all the jurisdictions (see **Table 2**, [https://hawaiijournalhealth.org/docs/DelaCruz_table2.pdf] and **Table 3**, [https://hawaiijournalhealth.org/docs/DelaCruz_table3.pdf] column "Summary"). If the counts were even among 2 or more categories and at least 1 jurisdiction classified the food as both categories, then the food was summarized as both categories ("and"). If the counts were even among 2 or more categories, but each jurisdiction classified the food as only 1 of those categories, then the food was summarized as either category ("or"). If the food item was not categorized by any jurisdiction, then the food was summarized as not applicable ("n/a").

Institutional review board (IRB) approval was obtained from the University of Hawai'i at Mānoa (Honolulu), University of Guam (Mangilao), and the Republic of Palau. All other jurisdiction institutions ceded to the University of Hawai'i at Mānoa.

Results

Food Identity Definitions

The provided definitions of traditional, acculturated, and locally grown were accepted by the designated staff members of each USAP jurisdiction; no jurisdiction rejected the provided definitions or made comments about the inaccuracy of these definitions. However, the majority of the jurisdiction representatives edited the language to add descriptions to the provided definitions (**Table 1**).

Based on the edits of the jurisdiction representatives, a theme of traditional foods that emerged was the importance of the timing of a food's availability within the region. Some jurisdictions

Table 1. Definitions of Traditional, Acculturated, and Locally Grown Foods with Additional Definition Descriptions by Island Jurisdiction			
	Traditional	Acculturated	Locally Grown
Definition Provided	<ul style="list-style-type: none"> Foods that sustained the culture a very long time ago (keep in mind modes of preparation, eg, poi versus taro chips). 	<ul style="list-style-type: none"> Possesses cultural meaning. Foods that have been acculturated "... refers to the changes in attitudes, behaviors, beliefs and values for an individual of one culture with a new culture..." (Williams & Berry, 1991).¹⁵ Foods that are not considered traditional but have been adopted into the everyday eating habits of many individuals. 	<ul style="list-style-type: none"> Foods grown at specific jurisdictions.
Additional Definition Descriptions by Island Jurisdiction			
American Samoa	<ul style="list-style-type: none"> <i>Umu</i> (Samoan oven) versus baking in the electric oven. 	<ul style="list-style-type: none"> eg, McDonalds/Carl's Jr/KFC 	<ul style="list-style-type: none"> Locally grown on Island. – in different seasons.
Chuuk	none	none	none
CNMI	<ul style="list-style-type: none"> Foods that are consumed in the way our ancestors ate them. Foods that have been consumed over a long-term duration of people through generations. 	none	
Guam	<ul style="list-style-type: none"> Foods endemic or introduced to Guam that are prepared in the same manner as our ancestors prior to World War II. 	none	none
Hawai'i	<ul style="list-style-type: none"> Foods that sustained indigenous or native culture/people...before Western contact. 	none	none
Kosrae	none	<ul style="list-style-type: none"> Foods especially introduced to the islands and been long used as part of the diet. 	none
Marshall Islands	<ul style="list-style-type: none"> Foods that sustained the culture a very long time ago and continue to do so today (eg, <i>ma kwanjin</i> – breadfruit cooked/baked over an open fire pit called <i>um</i>). 	none	<ul style="list-style-type: none"> Foods that were not local a long time ago but were at some point successfully introduced to the local soil and now grow in the jurisdiction (eg, cucumbers, eggplants).
Palau	none	none	none
Pohnpei	<ul style="list-style-type: none"> Does not include processed foods, such as breadfruit flour to cook pancakes. 	<ul style="list-style-type: none"> Processed foods (giant swamp taro into flour into pastries). 	none
Yap	<ul style="list-style-type: none"> Foods that have a significant meaning in the culture practices and been sustained throughout each generation. 	none	none

added that traditional foods are those that were available prior to a certain time, such as “prior to World War II” (Guam) or “before Western contact” (Hawai‘i). Similarly, another theme of traditional foods was the endurance of food over time. Jurisdictions emphasized traditional as foods consumed or sustained over many generations (CNMI and Yap). The final theme of traditional foods included food preparation practices. For some jurisdictions, traditional foods are also still prepared in a specific, perhaps traditional, manner such as in an “*umu* (earth oven) versus baking in the electric oven” (American Samoa), “cooked/baked over an open fire pit called *um*” (Marshall Islands), preparing or consuming “in the way our ancestors ate them” (CNMI), and not processing the foods “from its original form...such as into flour...” (Pohnpei).

Additional descriptions for the definition of acculturated were identified by 3 jurisdictions. One description emphasized that acculturated foods were those introduced to the island (Kos-

rae). Another included American fast food chains (American Samoa). Finally, another described acculturated foods as those processed from their original form (Pohnpei).

The definition of locally grown was edited by 2 jurisdictions. These added descriptions of locally grown highlighted seasonal growth (American Samoa) and successful introduction and growth of non-local foods (RMI).

Food Classification

Jurisdictions agreed on most of the classifications of foods being a fruit, vegetable, starch, and/or grain (**Table 2**, [https://hawaiijournalhealth.org/docs/DelaCruz_table2.pdf]). Based on the methods used to summarize the food group classifications of the 121 food items, food items were most frequently counted as fruits (n=55), about a third were counted as vegetables (n=44), a few were considered a starch (n=12), and only 1 (rice) was

counted as a grain. A few foods had an even classification distribution among the jurisdictions where 2 (pepper corn and red bean) were counted as either a fruit or vegetable and 1 (sweet potato) was counted as both a vegetable and a starch. Foods not classified by any jurisdiction (n=6) were mountain palm, native cinnamon, native fig, oil palm, sakau as a beverage, and water dropwort.

Although the majority of the foods were categorized as a single food group, there were several food items that had close to an even distribution of classification between 2 of the food groups. These foods included banana, betel nut, breadfruit, coconut cream, coconut sprout, jackfruit, pumpkin, rice, sugar cane, and turmeric. Interestingly, 1 or more jurisdictions classified these food items as more than 1 food group. For example, banana was classified as both a fruit and a vegetable by 4 of the 10 jurisdictions (Guam, Hawai‘i, Palau, and Pohnpei). Similarly, breadfruit was classified as both a fruit and a vegetable by the same 4 jurisdictions and also as a starch by Pohnpei. Palau, Pohnpei, and RMI classified jackfruit as both a fruit and starch. Pumpkin was classified both as a fruit and vegetable by Guam and Pohnpei. Sweet Potato was classified as both a vegetable and starch by Hawai‘i, Palau, and Yap. Similarly, turmeric was classified as both a vegetable and starch by Hawai‘i and Yap.

There were several fruits and vegetables that one or all jurisdictions chose not to classify. Less than half of the jurisdictions classified canistel, false durian, garlic pear, garlic vine, giant passion fruit, kumquat, nightshade, palm, or red bean.

Three jurisdictions added foods to the list. Pohnpei added banana sprout, coconut sap or tuba (fermented sap), and coconut embryo to the list. Hawai‘i added prickly pear. American Samoa added green banana.

Food Identity

More food items were designated as acculturated (n=75) than traditional (n=37) (**Table 3**, [https://hawaiijournalhealth.org/docs/DelaCruz_table3.pdf]). Five food items had an even amount of labeling and were summarized as either traditional or acculturated (amaranth, jackfruit, kavika, oil palm, and water spinach). Four food items (garlic vine, kumquat, sweetleaf bush, and water dropwort) were not identified by any jurisdiction.

Despite having been identified as either traditional or acculturated, 15 food items had a near-equal categorization among the jurisdictions. These included arrowroot, bitter melon, cassava, citrus fruit, kangkong, kava, lemon, lemon grass, lime, mango, passion fruit, pumpkin, tangerine, tapioca, and turmeric. Some jurisdictions identified several of these foods as both traditional and acculturated. Notably, Pohnpei identified 23 food items as being both traditional and acculturated (arrowroot, banana, bird’s nest fern, breadfruit, coconut cream, coconut meat, coconut milk, coconut sprout, coconut water, giant swamp taro,

hibiscus, Indian mulberry, kava, pandanus, papaya, plantain, sakau (drink), soft taro, sugar cane, yam, banana sprout, coconut tuba or sap, and coconut embryo).

Table 4 [https://hawaiijournalhealth.org/docs/DelaCruz_table4.pdf] presents the local names of each fruit and vegetable by jurisdiction.

Most jurisdictions reported at least half of the food items as locally grown. In contrast, RMI identified the least amount of locally grown foods of all the jurisdictions, growing only 37 of the 121 foods listed. American Samoa had the next least amount of locally grown foods reported (n=43).

Discussion

The majority of the USAP jurisdictions reported growing at least half of the 121 food items and most of these foods were classified as fruits and vegetables, which is expected since this study focused on fruits and vegetables. The provided definitions of traditional and acculturated were agreed on with some supplementary caveats provided by various jurisdictions. These jurisdiction perspectives on traditional and acculturated reflect the identities of the foods. Most foods were identified as acculturated.

Despite diverse identities, some jurisdictions identified various food items as both traditional and acculturated. Jurisdictions may have been drawing upon their perspectives on the definitions of acculturated, which includes how food is prepared and if the food is processed from its raw state. Many of the foods found to be identified as both traditional and acculturated can indeed be prepared in less traditional ways and be further processed. For example, giant swamp taro can be eaten in a traditional manner and cooked using traditional practices such as in an *umu*, and can also be further milled into flour to bake taro bread or be sliced and fried to make chips.¹⁸ Thus, one food item may indeed be both traditional and acculturated.

Another reason food items may be considered traditional and acculturated is that a single fruit or vegetable can have multiple varieties.¹⁹ For example, avocados that grow locally in the islands may be considered traditional whereas avocados that are imported from other countries may be considered acculturated. Similar to modern day, crops were historically carried during navigational voyages between the island jurisdictions.⁶ Therefore, the distinction between traditional and acculturated may have become unclear over time when these crops were grown and thrived locally for many years.

Jurisdictions also classified certain foods into multiple food groups. Many jurisdictions classified certain food items as both a fruit and a vegetable or both a vegetable and a starch. One reason for this may be due to how different parts of the food’s plant may be viewed. For example, different parts of a pumpkin

vine such as the pumpkin fruit as well as the pumpkin leaves can be consumed and may be viewed as different food groups. The pumpkin may be considered a fruit while the leaves considered a vegetable. A reason for the lack of distinction between vegetable and starch may be due to the overlapping characteristics of these food groups and indeed nutrition scientists have classified certain vegetables as “starchy vegetables”.²⁰ Unique to this process emphasizing the local terms appeared to reduce terminology used by Federal Nutrition Programs, which are influential. However, the CHL staff across the jurisdictions remained focused on local perspectives. Despite these double classifications adding a layer of complexity, this approach highlights the unique perspectives of each jurisdiction and their views on each food. Furthermore, food classifications vary among different countries and culture, and Western ways of grouping foods may not always fit classifications for Pacific foods. The long-standing organization, the Secretariat of the Pacific Community, has classified Pacific foods using a different grouping system: classifying foods as energy foods (starchy staples), protective foods (fresh locally grown foods), or body-building foods (protein rich foods) and providing nutrition recommendations based on these unique food groups.^{6,21}

These perceptions of food classifications and identities also stem from prior knowledge that was passed down through cultural understanding or education and vary by jurisdiction. The results of this study demonstrate that food identity and classification is still somewhat variable among the jurisdictions. As similar as the jurisdictions are when compared to other regions of the world, they vary in language, topography, cultural tradition, history, and political status.²² These differences likely influence how food is identified and classified. The variation found in food identity among Guam and CNMI is particularly interesting as these 2 jurisdictions are of the same archipelago, the Mariana Islands, with the same indigenous people, language, and culture.²³ The slight differences found between these 2 jurisdictions show how even recent changes in history and governance influence ideology and language regarding food. For example, custard apple was identified as traditional in Guam, but acculturated in the CNMI (**Table 3**, [https://hawaiijournalhealth.org/docs/DelaCruz_table3.pdf]).

Jurisdiction indigenous languages could have also influenced how foods and the various terms used in this study were understood. Because the terms were defined in English, this may have affected how jurisdictions thought about cultural identity of foods from their indigenous language since some words do not always directly translate. Thus, the understanding of cultural identity may not be fully captured.

Understanding how populations classify and identify foods is important as this can influence how dietary guidelines and nutrition education may be perceived. Although the foods included in this study already have scientific classifications, they may not align with the results presented in this study. Cultural

perspectives of foods differ from botanical perspectives. This discrepancy may be a reason people believe they are consuming the recommended amounts of fruits and vegetables when they may not be, and this could be due to differing perceptions of what is a fruit or a vegetable. Furthermore, certain foods in the Pacific have become so integrated into the culture that it may potentially be considered traditional even though the food had been introduced from colonization and other foreign intervention. Some introduced foods may not be as healthy as locally grown traditional foods, although people may think they are. People’s health may be at stake when the definition of foods is viewed only through one cultural lens, such as the Western lens which food has usually been viewed.^{21,24} These concepts are important for nutrition researchers and educators to consider so that information, such as the dietary guidelines, can be best presented and communicated to diverse populations, including those in the USAP, using familiar and available foods that have cultural significance.

Understanding which foods are locally grown in these islands is also crucial for future sustainability.²⁵ The majority of jurisdictions reported growing many of the listed foods. Interestingly, however, RMI reported growing only about a third of the foods listed. Unlike most of the other island jurisdictions, the islands of RMI are coral atolls.²⁶ Thus, they have limited land area with less sources of fresh water and different climate and soil, which has further been exacerbated by sea levels rising due to climate change.^{27,28} As a result, several crops are not able to thrive as well on these islands. These observations are important because they can also inform agriculture capability and needs of atolls found in the outer islands of the other island jurisdictions.²⁹

Lower availability of locally grown and traditional foods can further be explained by the Pacific’s colonial past and westernization. USAP jurisdictions lost control of their lands during colonial occupation resulting in the loss of traditional culture practices and diet.⁵ For example, in Hawai’i, the Hawaiian Kingdom was annexed and land was seized by colonialists for plantations and now for development.³⁰ Similarly, transition to modern lifestyle and economic development also influences local governments in other USAP jurisdictions and how resources may be used, despite some islands having recently obtained independence or autonomy over their lands. Thus, emphasizing the value of local land ownership and support for sustainability are important in increasing availability of locally grown and traditional foods.³¹

There are several limitations of this study. First, only certain food groups (fruits, vegetables, starches, and grains) were classified and identified as traditional or acculturated, and locally sourced. This was a result of the identified priorities of the CHL intervention to improve consumption of fruits and vegetables.³² Proteins, grains, and dairy may be identified in a future study as dietary records collected in CHL assessed dietary intake of all foods and beverages consumed.⁶ A second limitation is that

a set list of food items was provided, which may have limited responses. Although jurisdictions were asked to add to the list, this could have still limited identification and classification to only these provided food items, or the expression of those food items. Third, the summaries of classification and identity were based only on counts from respondents. Also, a select group of people from the participating jurisdictions were asked to provide definitions and to identify and classify the food items. Although these select participants are nutrition experts in their respective jurisdictions, there may be variation in perspectives among local community members on how to classify and identify foods. For this project, there was no emphasis made regarding the Federal Nutrition Programs, thus we cannot rule out that perhaps some of the results could be due to influence from the Federal Nutrition Programs.

Conclusion

To the authors' knowledge, this is the first study to identify and classify foods of the Pacific from the perspective of those from the region. The study identified some differences in definitions, classification, and identity of foods among the jurisdictions. However, there was consensus with regard to the importance of these foods. Understanding these similarities and differences in how food is classified and identified is crucial for nutrition education, and learning what foods are locally grown is important for future sustainability.

Conflict of Interest

None of the authors identify a conflict of interest.

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Characterization of Otolaryngology Referrals among Pacific Islanders in the Commonwealth of the Northern Mariana Islands

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Abstract

The burden of otolaryngology disease in Pacific Islander populations is relatively uncharacterized. A single-institution retrospective review was undertaken at the Commonwealth Healthcare Corporation in Saipan, the only hospital in the Commonwealth of the Northern Mariana Islands. Demographic, diagnostic, and treatment data were compiled from the clinical charts of all patients seen by an otolaryngologist between January 2015 and April 2020. For all Pacific Islanders in the sample (N=674), the average age was 40.2 (SD 22.4) years and ages ranged from 10 months to 89 years. Patients were 50.7% male and 49.3% female. The most common diagnoses affected the ear (40.8%), followed by the oral cavity/pharynx (23.2%), and nose (14.0%). Middle ear disease comprised 41.7% of reported ear disorders; the most common problem was otitis media (19.4%, n=68) followed by tympanic membrane perforation (14.0%, n=49). Head and neck cancers comprised 8.6% of all diagnoses. Most (77.8%) malignant neoplasms were oral cavity carcinomas. The average age at diagnosis for oral cancer was 46.6 years with a 1.8:1 male-to-female predominance. Patients with cancer of the oral cavity (n=56) chewed betel nut at higher rates (94.6%) compared with other adults in the sample (P<.001). Adult patients reported alcohol use, smoking, and chewing betel nut at rates of 26.5%, 39.9%, and 52.2% respectively. Otolaryngology referrals among Pacific Islanders in this sample were dominated by ear disease and included betel nut-related oral cavity disease.

Keywords

betel nut, chronic ear disease, oral cavity cancer, Pacific Islanders

Abbreviations

CSOM = chronic suppurative otitis media

Introduction

Otolaryngology complaints make up roughly 25% of adult and 50% of pediatric primary care visits, representing a large proportion of health care delivered worldwide.¹ Around 14-20% of such patients are referred to otolaryngologists for management.¹⁻² While the epidemiology of otolaryngologic disorders is well established in the continental United States, other areas of the world have no published data on the topic.

Saipan is an island commonwealth of the United States in the Pacific Ocean. The territory belongs to the Northern Marianas, an archipelago of small islands neighboring Guam. The population of Saipan is approximately 50 000 people, most (85%) of

whom are of Asian or Pacific Islander decent.³ Pacific Islanders are defined as individuals whose origin is among the original peoples of the Pacific islands, which does not include Filipino or East Asian ancestry. The largest ethnic group on Saipan represented among Pacific Islanders is the Chamorro (24%) who are indigenous to the island.⁴ Sociocultural, political, and geographic factors contribute to a unique set of conditions that may produce significant differences in the burden of otolaryngologic disease in Saipan compared to the continental United States.⁵

One such cultural factor is the practice of chewing betel nut (also called areca nut). This psychoactive plant is often chewed as betel quid, which contains a combination of the raw nut, betel leaf, slaked lime to improve chemical availability of the alkaloid stimulant, and crushed tobacco from a cigarette.⁶⁻⁷ Betel nut is classified as a definite (Group 1) carcinogen by the World Health Organization and has been known to cause oral and esophageal cancer as well as exert effects on vital organ systems and the microbiome.⁸⁻⁹ The great majority (88%) of Pacific Islanders who use betel nut add tobacco to their chew, which may increase dependence and could synergistically amplify the risk of oral cancer.¹⁰

Otolaryngology disorders have been reported at a higher prevalence in tropical climates.¹¹ In addition to the widespread use of betel nut, the island setting of Saipan confers other potential risks. Swimmers and divers may be exposed to barotrauma and aquatic bacteria that colonize the ear.¹²⁻¹⁴ Frequent beach going may increase exposure to ultraviolet radiation leading to the development of cancerous and precancerous skin lesions on the head and neck.¹⁵ Proximity to the ocean and related dietary habits may predispose to foreign bodies such as retained fish bones, which can become lodged in the esophagus.¹⁶

A general survey of the epidemiology of ear, nose, and throat disorders in the Northern Mariana Islands has not been reported in any available research literature. The purpose of this study is to characterize the overall burden of otolaryngologic disease for Pacific Islanders in the Commonwealth of the Northern Mariana Islands. This information will provide insight into the unique distribution of health challenges experienced by the Saipanese, which may contribute to general knowledge of otolaryngology disorders for Pacific Islanders within Oceania.

Methods

This study is a retrospective chart review of all Pacific Islander patients seen by an otolaryngologist from January 2015 to April 2020 at the Commonwealth Healthcare Corporation, including both outpatient referrals and inpatient consultations. The Commonwealth Healthcare Corporation functions as the only hospital on Saipan, as well as a primary care and imaging center. The facility also provides care to individuals referred from neighboring islands in the Commonwealth including Tinian and Rota where there is no hospital. Patients were excluded on the basis of insufficient or absent chart information. Data from non-Pacific Islander patients were excluded.

All patient charts were accessed securely through the electronic medical record system maintained by the hospital. This sample effectively represents all otolaryngology patients recorded in the electronic medical record system since it was introduced. Assessed data included age, sex, race, health risk factors (drinking, smoking, and chewing history), insurance coverage, all assigned diagnoses with associated International Classification of Disease codes, and treatment plans. Diagnostic modifiers (eg, acute, chronic, and recurrent) were noted along with relevant labs, imaging studies, culture results, and pathology reports.

All data were collected into a spreadsheet and frequencies were calculated using Microsoft Excel for Office 365 (Microsoft Corporation, Redmond, WA). Additional statistical analysis of the data was performed using GNU PSPP software version 1.2.0-g0fb4db (Free Software Foundation, Boston, MA). Chi-square tests and bivariate correlations were used to evaluate associations between demographic characteristics and risk factors drawn from the recorded social history.

The study was approved by the Internal Review Board at the University of Texas Southwestern Medical Center in Dallas, Texas under IRB#STU-2018-0220.

Results

A total of 1110 patients were seen by an otolaryngologist from 2015 through 2020, with recorded visits comprising approximately 2150 individual appointments. Sixty of those patients were excluded for missing or insufficient chart information. A total of 674 patients identified as Pacific Islanders (65.3%) and were included for analysis, while the remaining 376 were excluded (287 Asian, 38 White, 24 Native American or Alaskan, 1 Black or African American, 8 mixed race, and 18 without racial information). For the included population, 859 diagnoses were recorded. Twenty-one percent or 143 Pacific Islander patients were seen for multiple diagnoses. Eighteen diagnoses were not related to otolaryngology and were not included in the presented tables.

The sample was balanced by sex with 342 males (50.7%) and 332 females (49.3%). The average age was 40.2 (SD 22.4) years and ages ranged from 10 months to 89 years. There were 518 adult patients (76.9%) ages 18 and up and 156 pediatric patients (23.2%). Of those 18 year and up, there were 243 men (46.9%) and 275 women (53.1%).

While most patients in the sample had some form of insurance, 183 patients were uninsured (27.2%). A total of 239 patients had private insurance (35.5%), 143 patients had Medicaid (21.2%), 27 patients had Medicare (4.0%), and 82 patients had multiple insurance plans (12.2%). Older age was positively correlated with having insurance ($r=0.2$, $P<.001$). Demographic information is presented in **Table 1**.

Among adult patients with recorded social history, alcohol use was disclosed by 126 patients (26.5%). Current or former smoking was recorded for 201 patients (39.9% ever, 23.8% current). Betel nut chewing with or without smokeless tobacco and slaked lime/crushed coral was practiced by 252 patients (52.2% ever, 34.8% current). Men were significantly more likely to engage with all 3 risk factors ($P<.001$). More men reported smoking (48.9%) and chewing betel nut and (64.0%) compared to only 32.1% and 41.9% of women respectively. Patients engaged in 1 risk behavior (drinking, chewing, or smoking) were more likely to be engaged in all others ($P<.001$). Among pediatric patients, 54 children (39.7% of those with available data, $n=136$) had a smoker in their home or another source of regular exposure to second-hand smoke.

The relative distribution of all patient diagnoses within the sample is represented in **Figure 1**. Patients most commonly sought care for ear disease, followed by disorders of the oral cavity. A complete breakdown of disorders by anatomic region is provided in **Table 2**.

Demographic Characteristic	Number (n)	Percentage (%)
Gender		
Male	342	50.7
Female	332	49.3
Age		
< 18 years	156	23.2
> 18 years	518	76.9
Insurance		
Private	239	35.5
Medicaid	143	21.2
Medicare	27	4.0
Multiple	82	12.2
Uninsured	183	27.12

A total of 303 patients were diagnosed with a disorder of the ear (87 pediatric and 216 adult patients, see **Figure 1**). The average age at diagnosis for pediatric and adult patients with ear disorders was 6.7 (SD 4.2) and 47.1 (SD 17.9) years, respectively (35.6 [SD 23.8] years overall). Forty-seven (15.5%) of these patients were assessed for more than one ear-related diagnosis. The most frequent complaint was hearing loss (n=69). Otitis media was the most common diagnosis (n=68) and 63.2% of cases were classified as chronic or recurrent. Forty-nine patients were evaluated for a diagnosis of tympanic membrane perforation. Ear complaints represented 51.0% of all pediatric complaints.

A total of 72 head and neck cancers were found (8.6% of all diagnoses). Most of these were localized to the oral cavity region (77.8% of cancers found in the sampled population) and 36 (64.3%) of these occurred in men which yielded a 1.8:1 male-to-female predominance. The average age at diagnosis for oral cancer was 46.6 years (95% CI, 43.4 to 49.7) and ranged from 28 and 78 years. Patients with oral cavity carcinomas

(n=56) were found to have a higher rate of smoking (52.7%) and chewing betel nut (92.9%) compared with other adults in the sample ($P<.001$). There was a non-significant trend toward higher rates of drinking in this sub-group (32.1%). Twenty-nine of 30 patients with non-cancerous leukoplakia of the oral cavity (96.7%) reported chewing betel quid.

Cases of oral cavity carcinoma were most commonly diagnosed at an advanced stage. For those cases with staging available (n=42), 9 (21.4%) were diagnosed at stage I, 6 (14.3%) at stage II, 7 (16.7%) at stage III, and 20 (47.6%) at stage IV. Of the most advanced cases, 11 patients were categorized as stage IVA and 3 patients were categorized as stage IVB; 6 patients were not assigned a letter designation. For the 38 patients that had a documented oral cavity subsite, the most common site was the tongue (n=17), followed by the buccal mucosa (n=13), lip or oral commissure (n=5), floor of the mouth (n=2), and hard palate (n=1).

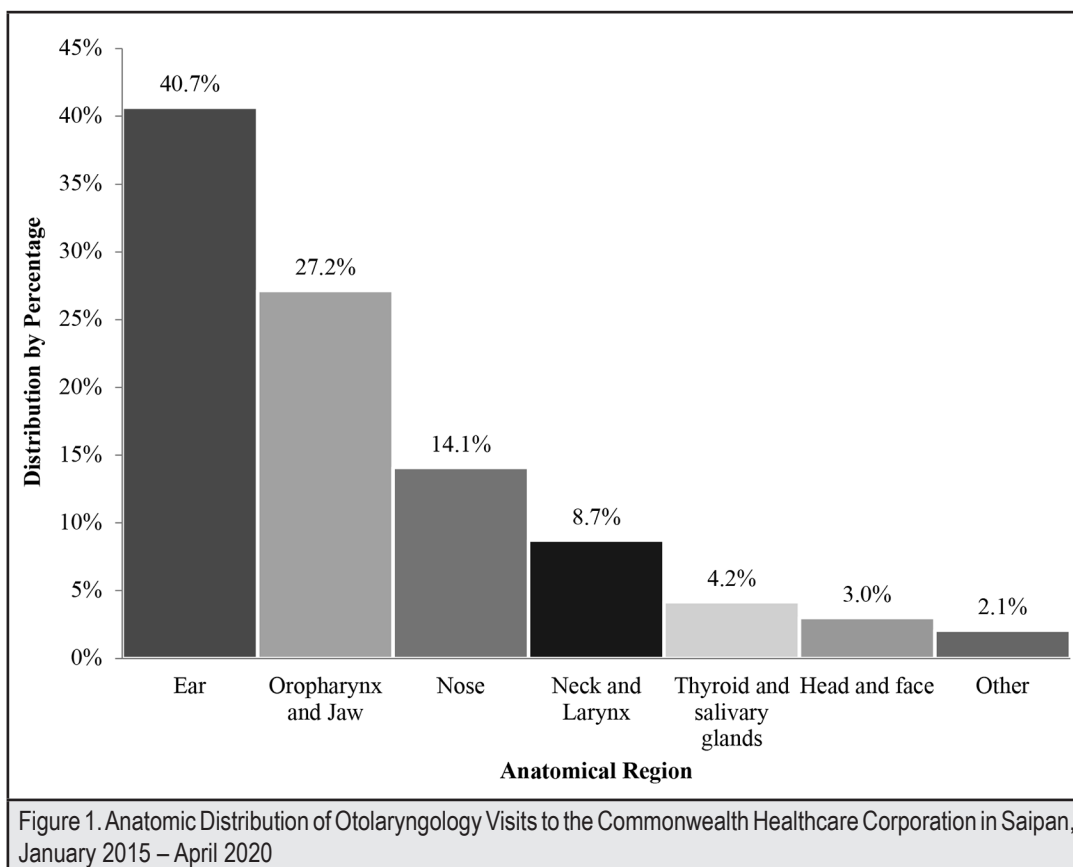


Table 2. Classification of Otolaryngologic Diagnoses by Anatomic Region in Saipan, January 2015 – April 2020			
Disease	Number (n)	Category Percent (%)	Total Percent (%)
Disorders of the Ear	350		41.6
Mass lesions	14	4.0	
Otitis externa	35	10.0	
Otitis media	68	19.4	
Cerumen impaction	13	3.7	
Tympanic membrane perforation	49	14.0	
Otalgia	8	2.3	
Dysfunction of eustachian tube	16	4.6	
Dizziness and vertigo	35	10.0	
Hearing loss	69	19.7	
Tinnitus and hyperacusis	12	3.4	
Mastoiditis/mastoidectomy cavity	4	1.1	
Foreign body in ear	12	3.4	
Other disorders of the ear	15	4.3	
Disorders of the Nose and Sinonasal Cavity	120		14.3
Mass lesions	21	17.5	
Malignant tumors	6	5.0	
Allergic rhinitis	33	27.5	
Sinusitis	18	15.0	
Epistaxis	19	15.8	
Other disorders of the nose	29	24.2	
Disorders of the Oral Cavity, Oropharynx, Esophagus and Jaw	235		27.9
Oral mass lesions	117	49.8	
Squamous cell carcinoma	47	20.0	
Other malignant tumors	10	4.3	
Pharyngitis	11	4.7	
Tonsillitis	11	4.7	
Oral or peritonsillar abscess	6	2.6	
Hypertrophic tonsils and adenoids	24	10.2	
Dysphagia	19	8.1	
Odynophagia	4	1.7	
Globus or other sensation	13	55.3	
Other disorders of oral cavity/oropharynx/jaw	30	25.0	
Disorders of the Neck, Larynx, and Accessory Glands	109		13.0
Laryngeal mass	9	8.3	
Neck mass	16	14.7	
Thyroid neoplasm	24	22.0	
Parotid neoplasm	4	3.7	
Dysphonia and vocal cord dysfunction	15	13.8	
Sleep apnea and snoring	21	19.3	
Other disorders of the neck region	20	18.4	

Disease	Number (n)	Category Percent (%)	Total Percent (%)
Disorders of the Face, Head, and Orbital Region	27		3.2
Facial mass	8	29.6	
Malignant tumors	2	7.4	
Headache	4	14.8	
Trigeminal neuralgia, atypical facial pain	2	7.4	
Abscess and cellulitis	6	22.2	
Epiphora	1	3.7	
Orbital bone fracture	1	3.7	
Other disorders of the head	5	18.5	

Discussion

Otolaryngologic diseases in the Asia-Pacific region are known to differ by location and by ethnicity, highlighting a need for disease prevalence studies to characterize the burden of disease within diverse ethnic populations.¹⁷ Pacific Islanders in the Northern Mariana Islands appear to have higher rates of oral cavity cancer and chronic ear disease when compared to other regions in the world.¹⁸⁻¹⁹ Ethnocultural and racial disparities in conjunction with an increased prevalence of risk factor behaviors (eg, alcohol, tobacco, and betel quid use) are possible mediators of these encountered differences. While every region cannot be presented herein, specific comparisons can provide context and highlight unique features of the otolaryngology burden of disease on Saipan.

The high burden of ear disease in Saipan is dissimilar to epidemiological studies conducted in Malaysia and Nigeria where nasal complaints (especially allergic rhinitis and sinusitis) dominated over all other otolaryngologic complaints.²⁰⁻²¹ An emergency otolaryngology clinic in Brazil had a higher rate of otologic complaints than Saipan: 62.3% overall (n=26,584).²² These numbers are helpful for comparison, although they may represent unequal management of diseases by primary care physicians rather than a difference in the true prevalence of conditions.

In Saipan, men were more likely to chew betel nut than women. Chewing habits consistently vary by sex in other regions; in east Asia, men are more likely to chew, but in southeast Asia the practice is more common among women. The sex-independent prevalence of current betel nut chewing in Saipan's Pacific Islander population (34.8%) was found to be higher than in Taiwan, mainland China, Sri Lanka, Malaysia, and Indonesia, and was exceeded only by Nepal (40.7%).²³

In Taiwan, an East Asian island nation in the West Pacific, most cases of oral cancer were diagnosed in the sixth decade of life and were associated with betel nut chewing. Although this population had a slightly younger age distribution, the most common subsites within the oral cavity were the same: tongue and buccal mucosa.²⁴ Squamous cell carcinoma of the buccal mucosa is rare in North America, suggesting that oral cancer may have a unique predilection for the tongue and buccal mucosa in betel nut chewers who damage these areas where corrosive quid rests within the oral cavity.²⁵ A study of head and neck cancers in Europe showed laryngeal carcinoma to be most common, which was heavily outweighed by oral cavity carcinoma in this population. The percentage of patients presenting with stage IV disease on Saipan was also twice that of Europe.²⁶

The global annual incidence of chronic suppurative otitis media (CSOM) is 4.8%, and an estimated half of cases cause preventable hearing impairment.¹⁹ The prevalence of CSOM has been previously reported as relatively high in the Pacific Islands: 4% in Micronesia compared to <1% in the continental United States.²⁷ This population of otolaryngology patients seems to fit expected trends; otologic diseases were the most prevalent condition that was managed by an otolaryngologist. Chronic and recurrent otitis media were frequently encountered (63.2% of otitis media, 5.1% of all diagnoses), which falls roughly in line with outside estimates.

Limitations

This study was limited by use of retrospective data and associated biases. Certain data points were not always recorded for every patient, such as substance-related risk factors in the social history. Because the Commonwealth Healthcare Corporation is the only hospital complex in the Northern Mariana Islands, the results are likely very representative of otolaryngologic complaints among Pacific Islanders in the region. However, the possibility remains that some patients were seen at other clinics.

Conclusion

The otolaryngology burden of disease on the island of Saipan is unique from other areas in the world. Among Pacific Islanders, the rate of oral cavity carcinoma is far higher than in the general population of the United States. Ethnocultural factors likely mediate this difference, especially the practice of chewing betel quid. Patients frequently suffer from clinically advanced disease at presentation, and subsites within the oral cavity are similar to those found in regions where betel nut is chewed. Chronic middle ear disease and associated hearing impairment are also highly prevalent on the island. This study lends support to the growing body of literature characterizing exceptionally high rates of ear disease in Oceania.¹⁹ More studies are needed to determine which specific variables (geographic, genetic, behavioral, social, etc) underpin the pervasiveness of ear disease among Pacific Islanders and to what extent. A robust understanding of the epidemiological distribution of disease among minority populations is essential to guide health care planning and public health interventions. The Pacific Islander population of Saipan may benefit from campaigns aimed at instituting health screening and betel quid cessation.

Conflict of Interest

None of the authors identify a conflict of interest.

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Scaling up Non-Communicable Diseases Prevention and Control Actions: The Need for Empowering Youth in the Pacific Region

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Keywords

non-communicable diseases, youth, empowerment, Pacific

Introduction

It is well recognized that youth have the potential to take a leadership role in promoting health and population wellbeing.¹ Empowering youth to advocate for practicing healthy lifestyles is key to prevention and control of non-communicable diseases (NCDs) such as heart disease, diabetes, cancer, and chronic lung disease, as youth have significant potential to reach and influence their peers and wider populations through their networks and creativity. This article highlights the Pacific youth's engagement in raising awareness on the growing burden of NCDs and the call for more targeted investment to empower youth's capacity to scale up NCDs prevention and control actions.

NCDs in the Pacific Region

In the Pacific Island countries and territories (PICTs), NCDs cause approximately 75% of deaths and majority are premature.² Most NCD risk factors including poor eating habits, lack of physical activity, tobacco use, and alcohol consumption begin in childhood. Globally, the majority of premature NCD deaths are associated with childhood behaviors that are exacerbated in adulthood.³ Over 20% of students aged 13-15 years in the Cook Islands, French Polynesia, Niue, Tonga, Tuvalu, and Wallis and Futuna are obese; approximately 25-35% of youth aged 13-35 years in Samoa, Wallis and Futuna and Kiribati are current smokers; and around 80-90% of youth in Samoa and Niue have their first alcoholic drink by age 14.⁴ In the adult population aged 20-79 years, PICTs are among the top 10 countries with the highest rate of diabetes in the world.⁵ This poses a considerable challenge to achieving the United Nations Sustainable Development Goals (SDGs) 3: Good health and well-being.⁶

Youth in the Pacific Region

Across the 22 PICTs in the region with a total population of 10 million people, more than half of the population are under the age of 25 with 18% of them aged between 15 and 24 years.⁷ By 2050, the 15–24 year old population will reach middle age or older and be 3 times as likely than younger age groups to be at risk for NCDs.⁷ Unless urgent action is taken, this large young population will be burdened by NCDs from preventable lifestyle behaviors that are on the rise. The youth in the Pacific region have the potential to curb the rise in NCDs by positioning themselves at the forefront of the NCDs prevention and control with opportunities to advocate for and become ambassadors for healthy change in their communities.

Regional Effort in Empowering Youth to Address NCDs

Evidence has shown the success of engaging youth in addressing NCDs. For example, study in Indonesia demonstrated that a community program can be improved by empowering school students towards better healthy habits to prevent NCDs,⁸ and a Canadian study showed that increasing knowledge of diabetes risk factors in South Asian population improved health behaviors.⁹ Recognizing the role of youth, the Pacific Community (SPC – the principal scientific and technical organization in the Pacific region) has been leading in implementing the “Wake Up: Engaging Youth to address NCDs” regional initiative in collaboration with PICTs.¹⁰ This initiative engages and trains youth to improve knowledge on NCDs prevention and control, and communication techniques to raise NCDs awareness through the creative arts. These arts provide a platform for new perspectives expressed through different mediums such as film, painting, mural, freehand drawing, photography, and lyrical composition. This initiative has been implemented since 2017 and engages hundreds of youth from PICTs. It was adapted

from the peer-to-peer education principle, evidence based NCD behavior change interventions, and global NCD best buys (ie, proven NCD interventions that are most cost effective).¹¹ Based on the preliminary findings of the evaluation of effectiveness, this initiative has resulted in improved understanding of NCD risk factors in the Pacific region and empowering youth to address them; strengthened skills in both public health and media communication using creative arts; and enhanced awareness of the influence and attractiveness of social media to promote population health.

Regional Effort to Local Actions

This regional initiative enables trained young individuals to design local NCD awareness campaigns. For example, in 2020, trained youth groups from Fiji, Vanuatu, and Tonga designed and implemented innovative NCD awareness and health promotion campaigns using multimedia technology and artworks in their home countries. Fiji and Tonga youth groups led a series of practical training workshops using different artworks (ie, drawing, painting, filming, etc) to raise awareness on NCDs in different communities. Approximately 80 community members of different age groups participated. Vanuatu trained youth partnered with a grassroot civil society group and organized an “NCDs Mural and Fun Day” through a week-long training workshop using mural arts to raise NCDs awareness. Hundreds of high school students and community members participated in this event.

These local actions promoted community engagement across lifespan. The impact on health outcome takes time to observe change; however, these initiatives demonstrated successful community outreach, improved knowledge, and increased awareness on NCDs. This has also enabled the trained youth to strengthen their own skills and abilities in taking on a lead role in community health promotion campaigns. The enthusiastic involvement of youth has been a major contributor to its success in community outreach.

The Need for Expanding Youth Empowerment

Addressing NCDs through the government and society has been advocated through high-level declarations;¹² however, actions have been slow at the national and community levels. Government ministries are now focused on the impacts and demands of COVID-19 using existing limited resources especially human resources. This highlights the value of having a well-coordinated support system to fully utilize the capacity that exists with youth to greatly contribute to achieving the region’s health goals.¹³

Although some youth in PICTs have started to engage in raising NCDs awareness through regional and national initiatives in the past 5 years, many still have limited leadership, capacity, and resources to effectively combat NCDs in their communities. There is a need to empower and amplify youth engagement in the effort to halt and reverse the Pacific NCDs crisis,¹⁴ by investing additional resources to build up their capacity and motivating them to lead in NCD awareness and health promoting campaigns. It is of utmost importance to ensure young people acquire skills in the field of health promotion, and to provide future employment opportunities through learned art skills.

Conclusion

Today’s youth are enthused to lead on issues that affect their communities and countries. The Pacific youth have demonstrated new perspectives through their innovative approaches in addressing NCDs to other youth and the wider community. To sustain youth engagement in the Pacific, commitment from political leaders and development partners to invest in empowering youth is crucial. Engaging youth and mobilizing them in a collaborative approach is vital to tackle the growing burden of NCDs in a whole of society approach to achieving the United Nations SDGs 3: Good health and well-being, target 3.4: By 2030, reduce by one third premature mortality from NCDs.⁶

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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.

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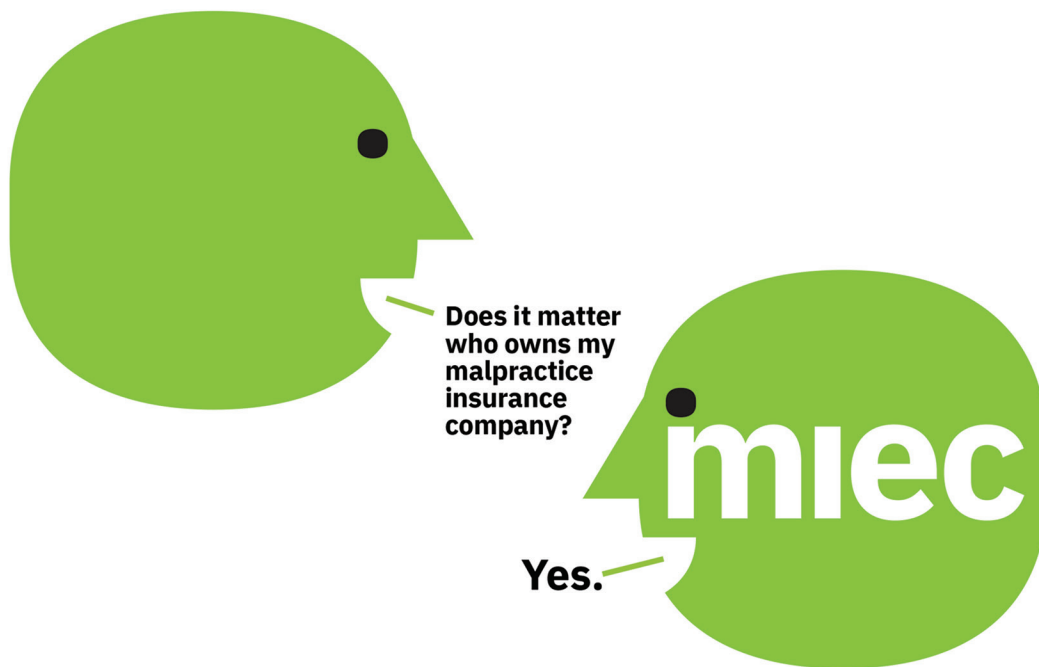
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