Talking Story About Quitting Pugua - An Exploratory Study on Self-Driven Cessation of Betel Nut (Pugua) Chewing on Saipan

Samantha Birmingham-Babauta

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Public Health

University of Washington

2022

Committee:

James Pfeiffer

Holly Barker

Program Authorized to Offer Degree:

Global Health

University of Washington

Abstract

Talking Story About Quitting Pugua - An Exploratory Study on Self-Driven Cessation of Betel Nut (Pugua) Chewing on Saipan

Samantha Birmingham-Babauta

Chair of the Supervisory Committee:
James Pfeiffer
Department of Global Health

An estimated six hundred million people across the globe chew betel nut (areca nut). Additionally, betel nut chewing has strong cultural ties in the Pacific Islands and South and East Asia. Many believe it offers positive benefits like stimulating alertness, relaxation, and a way to manage stress. However, betel nut is a Group 1 carcinogen, and an estimated 43% of adults report chewing in the Commonwealth of the Northern Mariana Islands (CNMI). CNMI data shows that Non-communicable diseases (NCDs) are the leading cause of death, with cancers contributing to 18% of the deaths. Data from 2007 to 2016 shows that cancers of the oral cavity account for 13% of the cancer-related in the CNMI. Though we know that chewing betel nut (*pugua*) causes cancer, its addictive properties as a psychostimulant, cultural ties in Micronesia, and influences in social settings make giving up this habit a difficult feat. Minimal research is available on betel nut chewing in Micronesia, specifically in the CNMI, and existing research is focused mainly on Guam. Taking a closer look at the experiences people have had with self-driven betel nut cessation may offer insight into how local public health departments and partners can offer community-led and culturally adapted services to assist with quitting betel nut.

POSITIONALITY STATEMENT

The analysis team consists of just me. I am a full-time student earning my MPH in Global Health. I propose this research as a daughter of the Marianas who is witnessing the increasing incidence of oral cancer among my family, friends, and the community at large. I was born and raised on the island of Saipan with a mixed-ethnicities upbringing as my dad is Chamorro and my mom is White. I do not chew betel nut, so I cannot relate directly to the challenges chewers face, but I am a vaper and struggle with my cravings for nicotine. In the last five years, I have worked in the public health sector on Saipan to address NCDs in the CNMI. I have a passion for protecting our Pacific Islands and culture, and I've been given the privilege to attain higher education to pursue that passion. My axiology specific to my thesis research is to balance damage [1]. Academia regularly documents the experiences of Indigenous communities through a damage-centered lens. Though the losses to our community are the catalyst for this research, my axiology specific to my thesis research is to balance damage and offer community-driven and culturally-centered solutions [1]. They aim to change our island(s)' relationship with *pugua (*betel nut) without insinuating shame or guilt. The goal is to both respect the tradition of chewing and offer assistance to those asking for help to quit.

BACKGROUND

The CNMI is located in the Micronesian region of the Pacific. It encompasses 14 islands, with the islands of Saipan, Tinian, and Rota consistently inhabited. The Indigenous people of the CNMI are Chamorros and Refaluwasch (Carolinians); however, the population is diffused with many Pacific Island and Asian cultures, totaling around 54,000 [2][3]. Chewing betel nut (also known as areca nut) is considered a traditional practice among Chamorros, Refaluwasch, and

other Pacific Islanders. Betel nut, or its Chamorro name, *pugua*[1], is the fruit of a palm tree and is consumed as a psychostimulant. In the US-Affiliated Pacific Islands (USAPIs) – which includes the CNMI, American Samoa, the Federated States of Micronesia, Guam, Marshall Islands, and Palau – people mix *pugua* with slacked lime (*åfok)*, piper betle leaf (*pupulu),* and tobacco [4]. Tobacco is either in the form of cigarettes or smokeless tobacco. Many believe it offers positive benefits like stimulating alertness, relaxation, and a way to manage stress [5].

Globally, an estimated six hundred million people chew betel nut (areca nut) [6]. In the CNMI, about 43% of adults report chewing, with 88% adding tobacco to their chewing mix [7]. Chewing *pugua*, with or without tobacco, can lead to oral premalignant lesions and conditions, gum disease, and addiction [8]. Chewing is also linked to all-cause mortality, cardiovascular disease, diabetes, obesity, and hypertension [8]. The International Agency for Cancer Research (IACR) classifies *pugua* as a Group 1 carcinogen [4]. In 2012, the World Health Organization (WHO) identified chewing *pugua* as a public health threat in the Western Pacific. In the USAPIs, lung and oral cancer incidence is significantly higher than in the U.S. mainland [5].

The CNMI data shows that non-communicable diseases (NCDs) are the leading cause of death, with cancers contributing to 18% of the deaths [9]. Of those cancer-related deaths, 13% are attributed to cancers of the oral cavity [10]. Currently, the CNMI is seeing an increased incidence of oral cancer. In 2015, the incidence of malignant neoplasms of the lip, oral cavity, and pharynx was five people. In 2019, that number increased over five times to 26. Between

[1] Chamorro words are italicized and key Chamorro terms related to betel nut (*pugua*) chewing will be used throughout this paper.

2015-2016, less than eight people were screened for oral cancer. However, after eight oral cancer-related deaths in 2016, a total of 135 people were screened for oral cancer between 2017-2020 [11]. (See Table 1)

Table 1 - CNMI Health and Vital Statistics Office Report: Malignant Neoplasm of Lips, Oral Cavity, & Pharynx Statistics 2015-2020

Year	**# of pts seen** at CHCC due to malignant neoplasm of lips, oral cavity, & pharynx (total visit count)	**# of pts screened** for malignant neoplasm of lips, oral cavity, & pharynx	**Incidence of pts diagnosed** with malignant neoplasm of lips, oral cavity, & pharynx	**# of deaths** due to malignant neoplasm of lips, oral cavity, & pharynx
2015	92	--	5	--
2016	117	--	11	8
2017	71	22	7	--
2018	162	34	14	--
2019	330	58	26	5
2020*	651	21	20	9

"--" value less than 5 is suppressed by the CNMI HVSO for patient confidentiality.
**Many health services in the CNMI were restricted/limited by the COVID-19 response efforts in 2020.*

The 2016 CNMI Non-Communicable Disease (NCD) & Risk Factors Hybrid Survey found that 1 in 5 adults self-reported chewing *pugua* in the last 30 days. The survey also reports that 2 out of 3 chewers would like to quit [12]. The CNMI Department of Public Health does not offer a cessation program designed specifically for chewing *pugua*. The Department of Public Health's Non-Communicable Disease Bureau (NCDB) does offer a smoking cessation program where they also include the cessation of chewing of tobacco in *pugua* mixes in their counseling and program efforts [13]. The University of Guam, in partnership with the National Cancer Institute and the University of Hawai'i Cancer Research Center, conducted clinical trials to test the

effectiveness of a betel nut cessation program, but those results have yet to be published [14] [15]. The existing literature on *pugua* chewing emphasizes the experiences of communities on the island of Guam with limited information on self-driven cessation.

Current Study Aims. For a long time, health measures concerning *pugua* were avoided because of the sensitivity of our Indigenous culture. However, as the CNMI experiences continuous loss of family and friends to oral cancer, attitudes about chewing practices are changing. In my personal experience, the desire to quit chewing is a topic of conversation at family gatherings and other social events. Since cessation services are wanting, most people in the CNMI who have given up chewing did so through self-driven cessation. This exploratory study asked, what are the experiences of self-driven *pugua* cessation in individuals on Saipan? Understanding the victories and barriers of self-driven cessation is vital to understanding ways the CNMI can offer culturally adapted public health interventions for *pugua* chewing that are successful and address the barriers that have been experienced.

METHODS

Study Participation and Recruitment

Participants had to be residents of the CNMI, at least 18 years of age, have no history of an oral cancer diagnosis, and be a self-reported habitual chewer with experience with self-driven cessation. These criteria were set to capture the lived experiences of self-driven cessation in the socio-cultural context of Saipan. Due to the specificity of the sampling frame, inclusion criteria that may be deemed private information, and the likelihood of a small sampling pool, snowball sampling through social media (Facebook and Instagram) and word of mouth was used to

recruit 22 participants [16]. This sampling method also offered a foundation of trust between myself and the participant because of the connections made by someone they trusted [16].

Materials and Procedures

Sample Description. Participants' demographics were collected at the start of the interview regarding ethnicity, age, the gender they identify with, and the island they grew up on. Five participants identified as female, and 17 identified as male. Seventeen participants identified as Pacific Islander, with Chamorro being the primary ethnicity. Four participants were Filipino, and one was Chinese, but all grew up on Saipan. Participants are current residents of Saipan. The ages ranged from the eldest participant being 56 and the youngest being 19. Cessation length ranged from 2 weeks to 14 years. No one had a history of oral cancer. All participants have roots in the CNMI and were raised in or around the Chamorro and Refaluwasch cultures and around *pugua* chewing. This sampling methodology sought to produce a socially and demographically diverse sample that broadly represents community experiences on Saipan. (See Table 2)

Data Collection. Twenty-two interviews were conducted, lasting an average of 27 minutes, with the shortest interview being 12 minutes and the longest being almost an hour. Though most interviews were individual, one was conducted with two friends. Another included their spouse, who also participated in the conversation though was not a study participant. I would then receive the contact information to inform them about the study goals and schedule an interview date and location. Consent forms were signed at the start of each interview either in-person, over Zoom, or on the phone. Interviews were semi-structured with a Talanoa approach [17]. Talanoa is a Pacific Island way of conducting research by respecting existing relationships

and talk story. Talanoa "allows people to engage in social conversation which may lead to critical discussions or knowledge creation that allows rich contextual and inter-related information to surface as co-constructed stories." Talk story is a popular phrase in the Pacific Islands that describes an informal conversation that engages one another [18]. No interviews were repeated. All interviews were in English; however, keywords and phrases related to betel nut chewing or culture were spoken in Chamorro and retained in the transcripts.

Data Management and Analysis Plan

The interview guide was developed based on the research question and evolved with each interview. Still, primary questions asked about their first experience with chewing betel nut, when it became habitual, when and why they decided to quit, and if there were any services they wish(ed) were available to make their experience easier. Interviews were transcribed using Otter.ai and then edited to capture Chamorro accurately. Transcripts were not returned to participants for comment or correction. No participants have asked to withdraw their interviews. Inductive coding was done through Atlas.ti. A thematic analysis was used to interpret the data. I served as the only coder due to the cultural context of the interviews.

RESULTS

There were 22 participants in the final sample. (See table 2) Six were currently chewing, and of those six, three people wanted to quit, two were indifferent, and one had no desire to try again. Quitting attempts were often linked to lent season (Catholic), a New Year resolution, or after a dental cleaning; however, the final (successful) attempt was largely in part because of a significant event. For some, this was an oral cancer diagnosis in someone close to them, causing

the fear of cancer to intensify. For others, it was an oral cancer scare or other health issues that they believed were resolved by quitting chewing. In both of these experiences, those who were parents were also motivated to quit by the drive to be alive for their children. Participants who stopped chewing because of moving off-island attributed that to lack of access and do not consider it a quitting attempt. Four major themes for *pugua* cessation were uncovered through *talking story* with the individuals from Saipan

Table 2 – Characteristics of the Sample

Demographics of Participants		
		(N=22)
Ethnicity	Chamorro	11 (50.0%
	Carolinian	1 (4.5%)
	Chamorro/Carolinian	3 (13.6%)
	Chamorro/Filipino	1 (4.5%)
	Chinese	1 (4.5%)
	Filipino	4 (18.2%)
	Pacific Islander	1 (4.5%)
Gender	Male	17 (77.3%)
	Female	5 (22.7%)
Age	Mean (SD)	37.5 (8.79)
	Median [Min, Max]	37 [19, 56]
Currently Chewing	Yes	6 (27.3%)
	No	16 (72.7%)
Cessation Length	Less than 6 months	4 (18.2%)
	1-3 years	9 (40.9%)
	4-9 years	4 (18.2%)
	10+ years	5 (22.7%)
Quitting Attempts	1	11 (50.0%)
	2-5	8 (36.4%)
	6-10	3 (13.6%)

1. The social environment is an agent for the start and end of pugua chewing

The social environment plays multiple factors in an individual's chewing experience. To start, most participants described their introduction to *pugua* being from their peers (friends, classmates, or family their age). The decision to chew for the first time was influenced by the desire for belonging and/or feelings of peer pressure.

> "I was introduced to betel nut when I was in middle school but didn't really make it habitual. It was just like, whenever I'm with the friends and then they, you know, like peer pressure. Something like that." – Participant 01

After that initial introduction, constant exposure and availability were factors in switching from social chewing to habitual chewing. Most participants symbolized the start of habitual chewing when they started buying their own *mama* mix.

> "And then like to start getting into it, I was about sixth grade. And then maybe carrying my own betel nut mix and everything was about 10th grade." – Participant 10

The social environment also served as the most prominent challenge in people's attempts to quit. *Pugua* is readily available at home, work, and social gatherings. (See table 3)

Table 3 – Quotations about *Pugua* Availability

Pugua is readily available at home, work, and social gatherings.
"Like I would see my friend, my coworker would chew. Especially like the smell of their breath. I know it might sound gross, but the smell of their breath made me like, 'Oh my gosh, I want to chew.'" – Participant 04
"For me, just the people I'm around with, you know, you just see it everywhere. You know, you go see you're with the boys, and they're like, *'Bat*, *mama*?' but you know, you're like, 'No *bat,* it's okay.' And then, especially when I drink. Like, you just want to chew." – Participant 14
"Socializing like, like when, for example, you know, I hate to bring it up, but when there's cookouts for like rosaries or whatever, you know, you're there. You're standing in the backyard somewhere, you know, yeah, dishing away. That's when becomes, because now you have a whole branch that's just hanging there, you know, and then around the back where the water tanks there's an abundant source of leaf, you know, so all you needed was basically the tobacco and the lime..." – Participant 16

Culturally, *pugua* symbolizes togetherness, and it is customary to share it, so much so that some purchase additional *pugua* specifically to offer to others.

> "Well, for me, like maybe a bag and a half or so. And then you know, the extra for sharing, right? Because it's a sharing thing. You know? I mean, you don't, you hardly see people chew and then put their stash away..." – Participant 16

So, when participants quit, people around them struggled with accepting and respecting their decision. The offering of goods like food and *pugua* is related to being a good host – a value held in high regard in many Pacific Island cultures. For individuals trying to stop chewing, though well-intentioned, these offerings were harmful and a deterrent to their cessation goals.

> "A lot of them {family} no {were not respectful of the decision to quit}, most of the time because like, I don't know, maybe out of ten like two would be like, 'Ayy good for you.' But the other eight are like, yeah, 'Here's chew, come and chew,' you know, they keep encouraging you to do it. I mean, it's not helping, right? And then the devil side says, oh, yeah, okay, just one time. But you know, I mean, it would be great if they kind of respect you and say, okay, you know what you're trying, and then I really hate the negative ones where they say, 'Oh, you're gonna go back you know, we have done it before.' Those were

the things So, like going through with the other times I tried quitting." – Participant 10

To support their personal cessation efforts, participants had to adjust their social settings. For many, the peer pressure applied by friends and family to partake in chewing was the reason their previous attempts failed.

"Yeah, I had to like avoid the people who were chewing. That's the challenge is to avoid them…Because those guys are the ones who keep, you know, peer pressure. They keep on like, 'No, come on, just do it just one time.' {I've} been off for a long time and I wanted to stay off." – Participant 07

For one participant, after multiple attempts to quit, their success came during the COVID-19 shutdown. Staying home limited the access to *pugua* and removed the social influences from work and family gatherings, allowing them to minimize chewing triggers.

"With this last one, I guess we were more - how do you say? - we stayed home a lot. And that was also during the shutdown and everything. So, in a way, I didn't really watch a lot {of environmental influence}. We were staying at my father-in-law's, so my *niao* was the only one that chewed, but it's not like, we hang out, you know what I mean? So, it was it made it easy because he would stay inside or whatever. So, yeah, that kind of helped a lot when you don't see people do it. But I think after a while, you get used to it. Like, long while. After a year for me. It was like, a year and a half. That's why after a year and a half, or my second year, you know, I was really proud of myself. That's something I would shout to the world like, oh my god, I quit for two years." – Participant 10

The limited accessibility and visibility were` also a driver in cessation in the six participants who quit when they left Saipan. The opposite was the reason that they resumed chewing when returning home.

"Okay, well, I've attempted to quit once. But I did stop chewing when I moved to the states. Like, when I moved in 2007, the only time I chewed was probably when I visited home. But I'd go years without chewing. So, there was a pause there. It's not necessarily that I quit. It just wasn't accessible. I wasn't going to drive to Ranch 99 to go get betel nut or whatever. But if it was there, it was there. But when I did attempt to quit, I was already here…" – Participant 09

2. Individuals prefer peer services over public health offerings

Most participants did not believe that there could be a public health program that would help them quit chewing *pugua,* nor do they think they would avail of such programs. All participants were deeply rooted in the belief that successful cessation comes from the individual willpower to quit.

"I don't think that there could have been any other programs that would be impactful enough for me for the for it to for it to help me quit chewing. Because there was so much, I mean, Pugua chewing is so much connected to culture. I'm constantly surrounded by it, you could you know, everybody shares their pugua bag, and you know, it's accessible. So I don't think that any program availability would help me unless you're going to kidnap me and *chuckles* and yeah." – Participant 08

Pride also served as a barrier for many when describing why they wouldn't access services.

"I hear a lot of the assistance that's available out there like Community Guidance Center (CGC) and all that. And I think part of it, of me not seeking those assistance, is maybe my pride, probably. I mean, I find it, you know, in my, my heart, or my mind that if, if I want to quit, you know, it's got to come from me." – Participant 02

"I think we just have too much pride… I don't need a class to, you know. But then again *reflective pause* I think *reflective pause* Yeah, man, actually scratch that. I don't think that class would help. I really don't think so. I think it's just the person, and I think for a lot of people that I know that actually stopped, it's because - and these guys are people that can run through 10 bags of pugua per day - the people I know that actually stopped they stopped because it hit home. They lost someone to oral cancer. But I really cannot think of anyone that just decided to stop because they want to stop." – Participant 14

Additionally, in a small, well-connected community like Saipan, there is distrust in the healthcare system to protect their identities and safeguard their experiences.

"You know, and some of these people don't realize that, although they think they're being confidential about it. But the minute that you release a small piece of information that can identify anybody you know? I don't know how to even explain that. It just - it really bugs the hell out of me when certain things are supposed to be confidential, and you find out that they're not because people share information. And even if they say, Yeah, but I didn't say the name. Yeah, but you said how old and where this person was from? You know, and then you told me that I know the person was shit if I know them and they live in Kagman, and they're this old, well, shit. That narrows it down to this many people that I know back there." – Participant 12

However, despite not thinking that health services would be helpful, participants did find value in other people's experiences. When talking about receiving help, most individuals would rather receive it from a peer going through the same thing.

"Honestly, I thought about this at one point, each time that I regressed. And this came about when I was watching a show where, you know, the alcoholics, they have a sponsor, right. So, every time they're like, they start thinking about it, they will call the sponsor right to say, oh, you know, I need to talk about whether I wish I had something like that for, for the tobacco {in pugua} addiction that I have. I wish I had, I had an outlet to go to share my feelings of trying to pull back or trying to or wanting

> to do it. I think that would have helped me if someone motivated me to, you know, continue with abstaining from tobacco use." – Participant 03

Family and friends often sought out individuals who had maintained cessation for many years. They would ask about their experience and use them as motivation for their own progress.

> "You know, since you asked, I've not, I've not checked up, I have a close friend who started the journey and would always check-in and inform me and tell me, 'It's been a month I haven't chewed. You know, and when I'm really stressed out, I want to go back to it, but I think of you.' He would tell me, 'I think of you, and you know, then I tell myself not to go back.'" – Participant 01

3. There is a desire for more localized information on pugua and oral cancer

Participants felt unclear about the health implications associated with *pugua* chewing. Many shared that their knowledge is usually from friends or family, though they acknowledged they didn't know how "true" it was.

> One of the reasons I actually stopped chewing or transitioned into tobacco use or chewing tobacco was a friend of mine was saying that that there was a study done on betel nut chewing that they found that the betel nut itself is actually what causes, I mean, tobacco also causes cancer, but it's not just the tobacco. And they say that 'Oh you know chewing betel nut without the tobacco is harmless.' But what he shared with me was the meat of the betel nut is a carcinogen, which causes cancer with a lot of people who chew betel nut… But what I do now, with the betel nut, I take the meat out of it. – Participant 03

Misconceptions of how oral cancer occurs may lead to people developing their own strategies for cancer prevention.

> You know what, I don't know if anybody had told you this, but some people would be scared to stop chewing because then there were some cases where people who pass or people who, who were diagnosed with mouth cancer because of chewing, some of them quit chewing like a couple of years back. Only then their cancer came. Right? So, some people think like, if they're heavy chewer now, and if they stop, they might get cancer quicker. – Participant 04

Participants would also like to see the direct impact on the CNMI's health. Some believe that seeing the data can help prevent or encourage cessation among others.

> I think if I knew because I didn't, I think if I knew the actual rate of cancer in young people, it would have deterred me more. In young people specifically. – Participant 15

Collectively, participants named increased education and awareness specifically on the causation of oral cancer from *pugua* chewing as something they would like to see more of.

> I think the education needs to be put into the schools, into the community. You know and make it like, because betel nut chewing is real. It's cancerous. It's, and, what I was saying earlier is we have some doctors - local doctors - here and we've really - I mean, look at me - I don't really know the exact cause. You know, everyone is saying it's the lime, right? It's the lime from Rota that's different colors. That everybody that's getting cancer is using that lime. They're saying that it's the lime because our brothers and sisters in Palau, for example, their cancer rate is not as high as us over here. So, they must be doing something, you know. But I think that's where we can do more is the education side of it. Because, you know, we can just hop over to the next island and see what works for them…– Participant 21

4. Pugua chewing may have fewer cultural ties today

Efforts made to reduce *pugua* consumption in the CNMI were previously frowned upon by the community because of its cultural ties. Chewing *pugua* is thought of as a cultural identifier and is a tradition taught through generations. Children are exposed to *pugua* almost at birth, and it is culturally acceptable for kids to begin chewing as young as elementary school [4][8]. Interviews also revealed that a few of the first interactions with *pugua* were to chew and soften it for their grandparents. However, when asked, participants said they would not consider *pugua* chewing a cultural practice today. (See Table 4)

Table 4 – Participant Responses on the Strength of Cultural Ties Today

Is chewing *pugua* still cultural today?	No (N=14)	Not Sure (N=3)	Yes (N=3)	Yes, but not with cigarette (N=2)	Overall (N=22)
Ethnicity					
Chamorro	8	1	1	1	11
Carolinian	1	0	0	0	1
Chamorro/Carolinian	2	0	0	1	3
Chamorro/Filipino	0	0	1	0	1
Filipino	3	1	0	0	4
Chinese	0	1	0	0	1
Pacific Islander	0	0	1	0	1
Age					
18-29	2	1	1	0	4
30-39	5	1	0	2	8
40-49	6	1	1	0	8
50-59	1	0	1	0	2

When individuals describe *pugua* as cultural, they often reference how their grandparents and other *manam'ko* enjoyed *pugua*. First, they did not use cigarettes. The "traditional mix" is seen as *pugua*, *åfok*, and *pupulu*. When the *manam'ko* did use tobacco, it was natural chewing tobacco or *åmaska*. It was also reserved for special occasions, like family gatherings, or used

medicinally. Now, participants believe it has lost its cultural significance after the addition of cigarettes and the transition from casual use to an addictive habit. (See table 5)

Table 5 – Quotations about *Pugua* and Culture

Is chewing *pugua* still cultural today?
"I feel like one, and I really don't. To be honest, I won't say I agree to a response of culture. Because I grew up and my mom chewed, her family, but we were not encouraged to growing up. You know, so I would, I'm not gonna say it's culture. If you were to give me a response of, because it's culture, I would really shake my head and be like, no." – Participant 01
"Honestly, now, it's not about culture. Betel nut chewing is not about culture now. Especially when you chew it with just cigarette and lime, that's not our culture. Traditionally, our culture is, you know, with *pupulu*, you know, the *åfok* and *pugua* and, you know, some use the fresh tobacco, you know. That's our culture, and also our culture is, you know, the *pugua* is more of a medicinal, you know, back in the days. Now, a lot of young kids is like, they just chew and just try and look like they're it, you know, the cigarette. So, I don't think that's our culture, you know, with that betel nut and cigarette and lime. It's becoming more just like being in the group and just you know, yeah. It's like they show off about it." – Participant 02
"Honestly, no, no. It may be for the elderly, but you know, now people are just putting whatever on it. Yes. So, the original mix or whatever that thing changed a long time ago." – Participant 07
"In the younger generation? I don't think so. I think it's more now because even when I started chewing, it was more of, 'How cool is this? I'm not even 18 and I'm buying a pack of cigarettes. I'm chewing with a pack of cigarettes.' Our elders when they chew, they never chewed cigarette, they would chew åmaska." – Participant 12
"{In response to why family was upset when they chewed} I don't know. For me, it was the, it was like tobacco. My grandma didn't, before, she just give us like the *pugua* and the leaf. And like that's it. Don't even put lime. Sometimes she's like, you can go ahead and chew that, but I think she noticed I started taking like tobacco from her, it was more of the tobacco side that made her I guess upset." – Participant 14
"Yeah, they make culture for the betel nut as an excuse, but to be honest, the betel nut chewing is only for the elders. I'm already 51, I'm still not yet considered as elder in the Carolinian custom." – Participant 17

Feelings of significant cultural connection were assumed to be barriers to cessation and cessation services. However, the visible impact of oral cancer and related health issues in the CNMI may be a driver in the shift of cultural views.

DISCUSSION

Four major themes were identified from the lived experiences with quitting *pugua* chewing. First, social influence by peers and family was instrumental in the introduction of chewing and a barrier to stopping. Second, a mix of distrust in the healthcare systems, personal pride, and feelings that no program can instill willpower led to many people saying that they would not use *pugua*-related public health services, even if available. However, participants would seek the help of peers who have successfully quit chewing. Third, the lack of local material regarding the health impacts of chewing makes space for speculation and misconceptions about the causes of oral cancer and strategies for prevention. Lastly, the most unexpected finding was that *pugua* chewing may have fewer cultural ties in the CNMI today. From these findings, I offer four recommendations for the development of future services to support self-driven cessation and improve community prevention and intervention efforts.

1. Reframe social support in a cultural context to boost individual cessation efforts

> "That's one of the things too, I noticed, you know, when I, at the time, I quit, was support. My family, they supported me, and they didn't, when I quit chewing they didn't, you know, encourage me by handing me the bag and saying 'here, you know, like, here, don't you miss it {betel nut}, don't you?' you know, like, things like that. Instead, they didn't offer. They didn't put it in my face. And so, I was very thankful for that" – Participant 01

Current *pugua* cessation services are mimicked after tobacco cessation programs that are individual and clinic-based [19]. A barrier to quitting faced by participants is the socio-cultural relevance of chewing [20]. In a community like Saipan's (rural and Indigenous), everyone is interconnected, and a community-based approach may be better at addressing the challenges

of *pugua* cessation. Similarly documented with smoking cessation, participants agreed that cessation would not be possible without the individual willpower - or readiness - to quit [21].

Support is truly needed in reframing social support in a cultural context to boost individual cessation efforts. People may feel that not offering *pugua* to someone they know chews – even if they quit – goes directly against our culture and values in the CNMI. Thus, education on the harm done – despite the intention of love – when pressuring someone to chew is a method to rethink our cultural operations. Outreach efforts by public health outreach can be redesigned to provide the community with the tools to be supportive and encouraging in an individual's cessation efforts. Starting a community conversation about our cultural customs and their potential harms can help shift current views from "saying no is disrespectful" to "saying no is setting healthy boundaries."

> "I almost wish there was like a course on like stop peer pressure. *laughs* Even with drinking. Like, if someone, like normalizing, if people say no, not asking them why. And then just being like, 'Okay, you don't want, okay.' It's not about you. *laughs* – Participant 15

2. Public health efforts should be aimed at supporting peer-driven services

With barriers of personal pride, distrust in health services, and low desire for public health programs, one way we can organize for success is to improve and increase community support for one another. In other settings, peer-driven intervention services can help remove the stigma associated with accessing health services and offer a safe space for conversation and vulnerability. Much literature already demonstrates the positive impacts of peer-to-peer services. Because peer educators share characteristics (i.e., cultural values, experience with

overcoming *pugua* chewing, etc.) with their potential participants, feelings of trust can be better established and allow for de-stigmatization of cessation [22].

> "You know, I wasn't sure if there were any classes for chewers. But I wish they have that only because I feel that when we all share our experiences together, and especially for new chewers, they would, you know, kinda wanna quit and even more to kind of put more sense into them. Only because when you do it on your own, and then you kind of cheer on your other peers and quitting, right? Versus the cheer on to keep chewing, you know? Yeah. So I'd like to have like that positive vibe, one with the ones that are that want to quit chewing versus remember how I said, like, when I was around my cousins, they're like, the eight of them will be like, 'go ahead and chew' the other three were like 'ay good for you.'" – Participant 10

There were two ways participants envisioned this happening. The first is in a small group setting where people share their success stories with those working to achieve cessation. The second is a buddy system where people are paired with someone they can check in with via text or call. In both options, it's evident that interpersonal relationships are important to the participants. Exploring methods like community-based participatory research to develop future health services ensures that our community voice is heard, cultural values are centered, and participation rates are favorable [23][24][25].

3. Increase education on pugua and oral cancer, including cessation experience

There was much overlap in the *pugua* cessation experience among the participants, such as weight gain, irritability, and task association as a chewing trigger. Another commonality was that individuals felt alone in their experiences. In research, we know that *pugua* is a psychostimulant that improves mood, energy, and alertness. It also decreases appetite, need for sleep, and distractibility [26]. However, this may not be common knowledge, especially on

Saipan. Participants also communicated the need for more localized education on the health impacts of chewing. In 2020, a survey in the CNMI found that 87% of *pugua* chewers have "considerable misconceptions regarding the dangers of chewing and the nature of oral cancer" [10]. Added education on what *pugua* is, its effects on the body, and its link to oral cancer may increase individual cessation efforts, improve prevention efforts, and reduce cancer rates in the CNMI. Education should be expanded to include content on what to expect after quitting to help prepare individuals and ease feelings of experiencing this alone.

4. The disassociation with culture allows for early education and intervention

As more individuals disassociate the current *pugua* chewing practices from Chamorro and Refaluwasch cultures, the long-standing taboo that hindered health programs from addressing chewing may be removed. The shift in community attitudes and acceptance of youth chewing practices was displayed with the passing of House Bill 19-65, "To prohibit the sale, offer, or give betel nut to any person who is under the age of 18," into Public Law 19-66 [27]. In the CNMI, the youngest chewer recorded is six years old, with 12 being the average age people start chewing [8]. On the island of Saipan, 63.4% of high school students chew regularly, and 17.5% of high school students chew tobacco (alone or with *pugua)* [8]. Research from the IACR suggests that the higher frequency and quantity of betel nut use, the higher the likelihood of developing oral cancer [4]. Twenty of the 22 participants had their first experience with betel nut at a school-level age. Early prevention and intervention within the schools reduces the risk of addiction and dependence through adulthood [26].

CONCLUSION

This exploratory study analyzed the experiences of individuals on Saipan who have quit or attempted to quit chewing *pugua.* Though a cessation program for chewing is pending results, these findings suggest that public health efforts may be better suited to cater to increasing education and awareness and support peer-driven cessation services. There are people on Saipan who desire to stop chewing *pugua*, and there are also people (outside of the healthcare system) who want to help. In Chamorro, we refer to our inter-connectedness and desire to take care of one another as *inafa'maolek* [28]. Investing resources in community-led approaches and allowing our *inafa'maolek* to serve as the foundation may be the best approach to respecting our cultures while preserving lives.

> All those families that pass away because of oral cancer, I started thinking twice on the bag of betel nut, leaf, and lime. It's not worth my life. I'm buying my own death. I'm buying my own poison. It's slowly killing me. – Participant 17

ACKNOWLEDGEMENTS

Un dangkulu na si yu'us ma'ase to my participants for sharing their time and stories and to my family and friends in the CNMI and in Washington for the endless support during my MPH program.

REFERENCES

1. Tuck, E. (2009). Suspending Damage: A Letter to Communities. *Harvard Educational Review*, *79*(3), 409–428. https://doi.org/10.17763/haer.79.3.n0016675661t3n15
2. Commonwealth of Northern Mariana Islands (CNMI) and Guam | Pacific Islands Benthic Habitat Mapping Center. (n.d.). Pacific Islands Benthic Habitat Mapping Center. http://www.soest.hawaii.edu/pibhmc/cms/data-by-location/cnmi-guam/
3. United States Census Bureau. "2020 Island Areas Censuses: Commonwealth of the Northern Mariana Islands (CNMI)." *United States Census Bureau*, www.census.gov/history/pdf/sis_2020map_cnmi.pdf.
4. Dalisay, F., Buente, W., Benitez, C., Herzog, T. A., & Pokhrel, P. (2019). Adolescent betel nut use in Guam: beliefs, attitudes and social norms. *Addiction research & theory*, *27*(5), 394–404. https://doi.org/10.1080/16066359.2018.1538410
5. Buente, W., Dalisay, F., Pokhrel, P., Kramer, H. K., & Pagano, I. (2020). An Instagram-Based Study to Understand Betel Nut Use Culture in Micronesia: Exploratory Content Analysis. *Journal of Medical Internet Research*, *22*(7), e13954. https://doi.org/10.2196/13954
6. Gupta, P. C., & Warnakulasuriya, S. (2002). Global epidemiology of areca nut usage. *Addiction Biology*, *7*(1), 77–83. https://doi.org/10.1080/13556210020091437
7. Narayanan, A. M., Finegersh, A., Chang, M. P., Ogo, J., Orosco, R. K., & Moss, W. J. (2019). *The profound oral cavity cancer burden in the United States Commonwealth of the Northern Mariana Islands: A global health opportunity*. American journal of otolaryngology, *40*(6), 102267. https://doi.org/10.1016/j.amjoto.2019.07.011
8. Oakley, E., Demaine, L., & Warnakulasuriya, S. (2005). Areca (betel) nut chewing habit among high-school children in the Commonwealth of the Northern Mariana Islands (Micronesia). Bulletin of the World Health Organization, 83, 656–660. https://doi.org/10.1590/S0042-96862005000900010
9. World Health Organization. (2018). WHO country cooperation strategy at a glance : Northern Mariana Islands (Commonwealth of). World Health Organization. https://apps.who.int/iris/handle/10665/136821.
10. Narayanan, A. M., Yogesh, A., Chang, M. P., Finegersh, A., Orosco, R. K., & Moss, W. J. (2020). A Survey of Areca (Betel) Nut Use and Oral Cancer in the Commonwealth of the Northern Mariana Islands. *Hawai'i journal of health & social welfare*, *79*(4), 112–116.
11. Commonwealth of the Northern Marianas Islands (CNMI) Health and Vital Statistics Office. (2021) *Report: Malignant Neoplasm of Lips, Oral Cavity, & Pharynx Statistics, 2015-2020.* Commonwealth Healthcare Corporation.
12. Dela Cruz, R., & Cash, H. (2016). *Commonwealth of the Northern Mariana Islands Non-Communicable Diseases & Risk Factor Hybrid Survey Report.* Commonwealth Healthcare

Corporation - Division of Public Health Services - The Non-Communicable Disease Bureau.

13. *Tobacco and Betel Nut Prevention and Cessation*. (n.d.). Commonwealth Healthcare Corporation. https://chcc.gov.mp/tobaccobetelnutprevention.php
14. University of Guam. (2020). *NIH-NCI U54 University of Guam/Cancer Center of Hawaii Partnership Full Project II: The Betel Nut Intervention Trial* (Clinical Trial Registration No. NCT02942745). clinicaltrials.gov. https://clinicaltrials.gov/ct2/show/NCT02942745
15. *UOG Researchers Work to Understand the Impact of Areca Nut Chewing | University of Guam*. (n.d.). Retrieved June 4, 2021, from 2016-uog-researchers-work-to-understand-the-impact-of-areca-nut-chewing.php
16. Sadler, G. R., Lee, H.-C., Lim, R. S.-H., & Fullerton, J. (2010). *Research Article: Recruitment of hard-to-reach population subgroups via adaptations of the snowball sampling strategy.* Nursing & Health Sciences, *12*(3), 369–374. https://doi.org/10.1111/j.1442-2018.2010.00541.x
17. Vaioleti, T. M. (2016). *Talanoa Research Methodology: A Developing Position on Pacific Research.* Waikato Journal of Education, *12*(1). https://doi.org/10.15663/wje.v12i1.296
18. Taosaka, S. (2002). *Let's Talk Story: Professional Development in the Pacific*. Pacific Resources for Education and Learning, 900 Fort Street Mall, Suite 1300, Honolulu, HI 96813. https://eric.ed.gov/?id=ED474355
19. Rayens, M. K., Hahn, E. J., & Hedgecock, S. (2008). *Readiness to Quit Smoking in Rural Communities*. Issues in Mental Health Nursing, *29*(10), 1115–1133. https://doi.org/10.1080/01612840802319860
20. Sotto, P., Mendez, A., Herzog, T., Cruz C., Chennaux, J., Legdesog, C., Paulino, Y. (2020). *Barriers to Quitting Areca Nut Consumption and Joining a Cessation Program as Perceived by Chewer and Nonchewer Populations in Guam*, Substance Use & Misuse, 55:6, 947-953. https://doi.org/10.1080/10826084.2020.1716012
21. Abar, B., Baumann, B. M., Rosenbaum, C., Boyer, E., Ziedonis, D., & Boudreaux, E. D. (2013). *Profiles of importance, readiness and confidence in quitting tobacco use*. Journal of Substance Use, *18*(2), 75–81. https://doi.org/10.3109/14659891.2011.606351
22. Stengel, C. M., Mane, F., Guise, A., Pouye, M., Sigrist, M., & Rhodes, T. (2018). "*They accept me, because I was one of them": Formative qualitative research supporting the feasibility of peer-led outreach for people who use drugs in Dakar, Senegal*. Harm Reduction Journal, *15*(1), 9. https://doi.org/10.1186/s12954-018-0214-1
23. Torres, V. N., Williams, E. C., Ceballos, R. M., Donovan, D. M., Duran, B., & Ornelas, I. J. (2020). *Participant engagement in a community based participatory research study to reduce alcohol use among Latino immigrant men*. Health education research, 35(6), 627–636. https://doi.org/10.1093/her/cyaa039
24. Ford, P., Clifford, A., Gussy, K., & Gartner, C. (2013). *A systematic review of peer-support programs for smoking cessation in disadvantaged groups.* International journal of

environmental research and public health, *10*(11), 5507–5522. https://doi.org/10.3390/ijerph10115507

25. Apata, J., Sheikhattari, P., Bleich, L., Kamangar, F., O'Keefe, A. M., & Wagner, F. A. (2019). *Addressing tobacco use in underserved communities through a peer-facilitated smoking cessation program*. Journal of Community Health, 44(5), 921–931.
26. Phillips, K. A., Epstein, D. H., & Preston, K. L. (2014). *Psychostimulant addiction treatment.* Neuropharmacology, 87, 150–160. https://doi.org/10.1016/j.neuropharm.2014.04.002
27. To prohibit the sale, offer, or giving of arcea nut (betel nut) to any person who is under the age of 18 (minors); and for other purposes. CNMI Pub. L. No. 19.66, (2016). https://www.cnmilaw.org/pdf/public_laws/19/pl19-66.pdf
28. Tisnado, D. M., Sablan-Santos, L., Guevara, L., Quitugua, L., Castro, K., Aromin, J., Quenga, J., & Tran, J. (2010). *A Case Study in Chamorro Community and Academic Engagement for a Community-Partnered Research Approach*. Californian journal of health promotion, 8(SE), 39–51.