

Factors Inhibiting Physical Activity as Treatment for Diabetic Chuukese in Chuuk and Hawai'i

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Abstract

Type 2 diabetes is epidemic in the US Pacific. Developing culturally sensitive physical activities and anti-sedentary interventions may reduce morbidity and mortality associated with type 2 diabetes. The purpose of the study was to identify sedentary and physical activity factors related to diabetes prevention and control among Chuukese living in Chuuk and Hawai'i. This study utilized grounded theory to identify socio-cultural influences that hinder or facilitate adherence to physical activity recommendations. Data was gathered through focus group discussions with individuals with diabetes and their caretakers. Findings include in-depth and detailed information on five different types of sedentary behaviors (purposeful sitting, lazy sitting, wasting time, resting and recreation sitting, and no-can move) and environmental factors that influenced participants' sedentary behaviors and physical activity. These findings underscore the need for physical activity and anti-sedentary interventions that are purposeful, collectivistic, age and gender appropriate and church based.

Keywords

Physical Activity; Diabetes; Pacific Islanders; Chuukese; Community Based Participatory Research

Acronyms

T2DM (type 2 diabetes); FARRA (Faith in Action Research and Resource Alliance); UI (University of Iowa); CBPR (Community Based Participatory Research); CWC (Chuuk Women's Council); MU (Micronesians United); FSM DHSA (Federated States of Micronesia's Department of Health and Social Affairs)

Introduction

Type 2 diabetes is epidemic in the US Affiliated Pacific Islands.^{1,2} In the Federated State of Micronesia's State of Chuuk, the prevalence of type 2 diabetes (T2DM) is 35.4%,³ four times higher than the United States prevalence of 9.3%.⁴ Diabetes is also the leading cause of death, with 40% of all deaths being attributed to diabetes and its related co-morbidities (septicemia, myocardial infarction, cerebrovascular disease, and hypertension).⁵ Research shows that physical activity and anti-sedentary interventions can reduce morbidity and mortality associated with T2DM.⁶⁻¹¹ In 2012, the Federated States of Micronesia's Department of Health and Social Affairs (FSMDHSA) released physical activity data collected in 2009 and found that the Chuukese have low rates of physical activity. Among Chuukese adults, 63% reported low, 18% moderate, and 26% high physical activity levels as compared to 16% low, 22% moderate and 65% high in the United States.^{12,13} There is limited data on the burden of diabetes and lack of physical activity among Chuukese living in Hawai'i, however anecdotal evidence suggests that there are significant problems of obesity, diabetes, and cardiovascular

diseases.¹⁴ There is also a lack of information about differences in physical activity levels among Chuukese residing in Chuuk compared to those living in Hawai'i. Furthermore, little data is available on cultural and social determinants of physical activity and the Chuukese could benefit from a further understanding of the culture and context (geographic location, social and political environment) of T2DM risk factors.

The scientific study of sedentary behavior is relatively new. In an effort to determine how this emergent knowledge base can be used for health promotion and disease prevention, we applied the *Sedentary Behavior Epidemiology Research Framework*, which consists of five main research phases: (1) establish the link between sedentary behavior and health; (2) develop methods for accurately assessing sedentary behavior; (3) identify factors that influence levels of sedentary behaviors; (4) evaluate interventions to reduce levels of sedentary behavior; and (5) translate sedentary behavior research into practice.⁹ The purpose of the study was to (1) identify sedentary and physical activity factors related to diabetes prevention and control among Chuukese living in Chuuk and Hawai'i, and (2) evaluate how this emergent knowledge base can be used for health promotion and disease prevention.

Methods

To explore the contributions of culture and local context on risk factors related to T2DM, including sedentary behaviors, the Faith in Action Research and Resource Alliance (FARRA), a group of health advocates in the Pacific, partnered with the University of Iowa (UI), the Chuuk Women's Council (Chuuk), and Micronesians United (Hawai'i). Community-based participatory research (CBPR) principles were followed, which dictated community members' approval of methods, research topics, and study subjects.

The Chuuk Women's Council (CWC) and Micronesians United (MU) participated in the identification of subjects, recruitment, and logistics during data collection. Participant identification and recruitment involved presentations during CWC and MU meetings, at church events, and community gatherings to explain the purpose and requirements of the study in Chuuk and Hawai'i. A total of 120 individuals were interested in participating, and all 120 were formally invited to join the study via email and telephone. A total of 102 adults agreed to participate (43 from Chuuk and 59 from Hawai'i). Sixteen focus groups were held (8 in Chuuk and 8 in Hawai'i). Per cultural

protocols, all focus groups were divided by gender.¹⁵ The female focus groups were facilitated by a female staff member (also a church leader) and the male focus groups were facilitated by a male staff member (also a priest). Group facilitators were Pacific Islanders but did not reside on the same island as the participants. Staff were trained in qualitative methods, including focus group facilitation. Focus groups were conducted in English and sessions lasted 2 hrs 25 min to 2 hrs 75 min hours and were recorded. The audiotapes were reviewed after each session to guide probing questions for the next session. Participants also completed a one-page demographic questionnaire that includes age, sex, religion/denomination, and diabetes status. The University of Iowa's Institutional Review Board approved the study protocol and all participants provided written, informed consent.

A grounded theory approach was used to guide the analysis process.¹⁶ The grounded theory method involves the discovery of theory through the analysis of data rather than beginning with a hypothesis. This study began with focus groups and questions that included: (1) What is the role of family, religion (church), and community in controlling diabetes? (including decreasing sedentary behavior and increasing physical activity); and (2) What are some cultural attitudes and beliefs regarding sedentary and physical activity? From the collected data, segments were coded with a label that concurrently categorizes, summarizes, and accounts for each piece of data.⁷ The coding team, which included members of the Pacific Community, worked through the transcripts looking for coding incidences and paying attention to *In Vivo* codes or words/phrases that compress meanings or consist of widely-used terms from the participants themselves. The team then sorted the initial codes and grouped them into common themes. These groupings were then used to develop major categories and subcategories with links between them. These grouping and results were also validated via member checking through our community partners.

Results

The average age of participants was 46 years (43 years in Chuuk and 47 in Hawai'i); 55% were female, 53% had T2DM, and 90% had a primary healthcare provider (Table 1). Focus group responses revealed five different types of sedentary behaviors including personal factors (Table 2) and environmental factors that influenced participants' sedentary behaviors and physical activity. There were no differences in responses from female and male participants. Similar responses were also observed across all themes between Hawai'i and Chuuk study participants.

Personal Factors and Types of Sedentary Behaviors

The following five sedentary behaviors were described by participants in each focus group and were differentiated by narrating (1) purpose or actions, (2) reasons or motives, and (3) rewards or consequences.

Purposeful Sitting. Purposeful Sitting is sitting while engaging in activities that meet the needs of the individual, family, church,

and/or community. During sitting, there may be movements (eg, sewing, weeding grass, or weaving baskets) or there may not be movements (eg, participating in meetings or watching the house). Motivations behind engaging in these activities included a desire to conform to cultural expectations, kindness, and fulfilling family roles (eg, mother, caregiver, and provider). Participants reported feelings of satisfaction, fulfillment, and pride in engaging in these activities, which can also be a reward for continuing the behavior. Furthermore, these activities are approved and encouraged by the community. As one of the male participants narrated:

We have a consensus culture so we encourage a lot of discussions—long discussions. That means we have a lot of meetings that require us to sit, listen, and discuss - so not a lot of moving around. A lot of people outside of our culture think that we have too many meetings, and we sit too much or too long, but these meaningful discussions are very critical in our culture.

Another participant added:

We also sit for other good reasons like weaving mats and weeding grass. Sitting in this case is not bad because we are doing something useful.

Lazy Sitting. Lazy sitting is when there are needs to be met and individuals are physically able to meet those needs, but they choose not to take part. Participants reported sitting without actions (eg, watching television and talking story) and the most reported feelings were of hopelessness, indifference, and sadness. As a result of lazy sitting, participants reported feeling angry and frustrated. A female from Chuuk recounted:

I know I have to participate in our women's group church clean-up every Saturday, but sometimes, like last week, I just didn't feel up to it. There is absolutely nothing wrong with me physically, and I was not busy, but I just give up sometimes.

Wasting Time. Wasting time is similar to lazy sitting or sitting when there are needs to be met, but the difference is the emotions behind the inaction, as wasting time, was due to feeling angry and frustrated with family and others versus "just being lazy." Furthermore, although some participants narrated feeling guilty or ashamed (similar to lazy sitting), most reported feeling satisfied and delighted. They felt justified in their actions and do not feel shame, but the community as a whole frowns upon wasting time because wasting time does not serve the needs of the community. A participant from Hawai'i explained:

There are times when I deliberately did not do what I was supposed to do and not because I was tired or not motivated, I was just angry with somebody or something. Call it passive-aggressive, but to me it is one of the few ways I can show my frustration.

Resting and Recreational Sitting. Resting and recreational sitting was described as sitting to give the body needed rest or to reward oneself for engaging in purposeful activities. Although

actions are similar to lazy sitting and wasting time, participants reported being fulfilled and satisfied, as one participant from Chuuk explained:

The body needs rest, and in our culture a break from doing work for your family, church, and community is encouraged. Resting is necessary so it is just not sitting there to be lazy or wasting time.

No-can Move. No-can move is sitting and not engaging in purposeful activities due to an illness or injury. Depending on the illness or injury, individuals engaged in action and/or non-action activities. Although the community approved of this type of sedentary behavior, those who no-can move reported feeling guilty or sad that they cannot participate. Others feel blessed that they have a family and community who can do work. As one amputee said:

As you can see I can't walk or even stand by myself, so I just sit. I feel bad that my family members have to take care of many of my needs on top of everything else. In our culture this is acceptable, and I'm grateful. I wish I could do more, but I just can't.

Environmental and Cultural Factors

Environmental factors influenced participants' sedentary behaviors and physical activity. Participants identified: (1) access to facilities and culturally- or contextually-appropriate programs; (2) deeply engrained cultural practices and norms related to physical activity/inactivity; and (3) lack of support from healthcare providers, faith leaders, their church, and the community.

Access. The discussions of socio-cultural influences began with poverty and living in low-income communities where streets are not safe for walking and facilities are lacking. These themes were present across all focus groups in Chuuk and Hawai'i. Chuuk participants cited a lack of sidewalks, no streetlights, stray dogs, and teens throwing stones at pedestrians as barriers to walking (main type of purposeful physical activity). They also reported the lack of physical activity facilities such as gyms, playgrounds, soccer/football fields, and running tracks as barriers to recreational physical activity. Hawai'i participants reported the availability of sidewalks, but safety was a barrier as the rate of crime and gang activity was high in their neighborhoods. Moreover, there were facilities (gyms, playgrounds, and fields) near the housing areas, but participants reported bullying and safety issues, so they were not utilizing them.

Chuukese Cultural Practices and Norms. Prominent topics discussed by participants were (1) collectivistic practices; (2) age-appropriate physical activities; and (3) gender-specific physical activities. The most mentioned culture-related topic was the collectivistic practices of engaging in activities as a

group and putting great value on group consensus and approval. This results in more sedentary behaviors, as participants have to sit for long periods of time at lengthy community meetings. A faith and community leader explained,

We do a lot of group discussions as part of our cultural practice of making decisions, so we sit through those meetings. We also attend church services and events that last two to five hours, so more sitting.

The second most mentioned cultural practice was age-appropriate activities. The discussion centered on the practice of the young serving elders. A caregiver from Chuuk gave this explanation:

Our culture fully respects our elders; they contributed a lot to our community and when they are older they deserve to be served. You see many of the old folks sit and the younger folks fetch drinks, serve food, massage, and stuff like that. This is how we show respect, and if we don't do it then other people will think that we are bad people. Our culture frowned on not following these practices.

An elder woman from Chuuk added:

It is not regal for older folks to do all the running around, so we normally sit and play the role of advisor.

Finally, participants discussed gender-specific cultural roles, and their relationship with physical activity. Culture dictates the separation of males and females in many situations including chores and recreational activities. A focus group participant from Hawai'i observed:

We moved here [Hawai'i] from Chuuk about eight years ago, and I know the culture here is different—men and women can do stuff together. I saw men and women doing exercise dancing in the same room, but none of us joined in because it just doesn't feel right.

Healthcare Provider Support. People with diabetes and caregivers reported a lack of support in the form of encouragement and accountability from healthcare providers. People with diabetes recalled their doctor or nurse telling them to "exercise," but they did not provide physical activity education, referrals, or encouragement. The majority of the patients reported tuning out the "exercise" advice because they have heard it many times and felt that providers are required to say that for all other conditions. They also felt that there was no sense of urgency or importance in the doctors' and nurses' voices or actions. One diabetes patient from Hawai'i recalled his last visit to the doctor:

I was only in there less than 10 minutes, he went over my test results, spent most of the time explaining my medication, and at the end he told me to watch what I eat, exercise, and take care.

Table 1. Participants' Demographic Characteristic		
	n	Years
Mean Age		
Overall		46
Chuuk	43	43
Hawai'i	59	47
Mean Residency		
Chuuk	43	43
Hawai'i	59	47
Gender		
Male	46	45
Female	56	55
T2DM Status		
Present	54	53
Not present	48	47
Do you have a primary healthcare provider?		
Yes	92	90
No	10	10

Table 2. Sedentary and Sitting Behaviors, Actions and Reasons				
Sedentary Behavior	Purpose/No purpose	Actions/No-Actions	Personal Factors	Rewards and Consequences
Purposeful Sitting	Engaging in activities that have purpose or meet the needs of the individual, family, church and community.	Sitting with actions (eg, sewing, gardening and weaving baskets). Sitting without actions (eg, participating in meetings and watching the house).	Conform to cultural expectations, kindness, and fulfilling family roles.	Personal: Fulfillment, Pride, and Satisfaction Community: Approves
Lazy Sitting	Not engaging in purposeful activities when there is a need and individual has the capacity to engage.	Sitting without actions (eg, watching television, talking story and people watching).	Lack of motivation due to hopelessness, indifference, sadness, and emotional pain.	Personal: Guilt and Shame Community: Disapproves
Wasting Time	Not engaging in purposeful activities when there is a need and individual has the capacity to engage.	Sitting with actions (eg, playing games). Sitting without actions (eg, watching television, talking story, and people watching).	Expression of anger, frustration, and discontentment	Personal: Satisfaction, Pleasure, Enjoyment, Guilt and Shame Community: Disapproves
Resting	Resting from purposeful activities	Sitting with actions (eg, playing games). Sitting without actions (eg, watching television, talking story, and people watching)	Taking a break from or reward for purposeful activities	Personal: Fulfilling, Proud, and Satisfaction Community: Approves
No can move	Not engaging in purposeful activities with actions but individual does not have the physical capacity to engage	Sitting without actions (eg, watching television, talking story, and people watching)	Illness or injuries	Personal: Guilty, Sad, Grateful, Blessed Community: Approves

Discussion

This was the first study that investigated socio-cultural influences that hinder or facilitate adherence to physical activity recommendations for Chuukese in Chuuk and Hawai'i. Participants elucidated five sedentary behaviors that emphasized the importance of purpose, motivation, and attitudes. They also expressed the need for anti-sedentary and physical activity interventions that are purposeful, collectivistic, age and gender appropriate, and church-based. These findings can be used to inform future programs and research.

At the core of sedentary and physical activity behavior discourses was the idea of purpose and meeting the needs of individuals, family, church, and community. Participants unpacked cultural influences (eg, collectivistic, age-appropriate behaviors, role of faith leaders and churches, and gender-appropriate activities). Collectivistic practices of engaging in activities as a group and putting great value on group approval were central in individuals' motivation to engage in physical activity. Culture dictates the division of activities according to age. Participants reported that, "the older you get, the fewer activities you are expected to do" and the bulk of work especially "heavy work" is required of younger adults who have "strength" and "skills." Surveillance results showed this pattern as the percentage of younger adults (age 44 and younger) engage in higher levels of physical activity than older adults (age 55-64).¹² Data for individuals over the age of 65 years showed even lower levels of physical activity. Study participants reported that it is not regal for elders to engage in physical activity and they are expected to sit and play the role of advisor. Culture also dictates the separation of activities by gender. Males were expected to engage in more rigorous, arduous, and dangerous purposeful and recreational physical activities. FSM DHSA surveillance data showed that the percentage of males were also engaging in higher levels of physical activity than women. Finally, the roles of churches and faith leaders are key to successful interventions. Participants regarded faith leaders as highly respected and influential and they serve as role models in addition to providing education and motivation through one-on-one counseling, group sessions, and sermons. They would like to see physical activity reminders and tips in the Sunday bulletins and on bulletin boards. Participants also would like their church to sponsor exercise programs such as standing during service, physically intensive community cleaning, and implement policies such as walking to church. A comprehensive review of faith-based physical activity interventions shows significant promise for improving physical activity participation and related health outcomes.¹⁷

Participants also mentioned the following environmental and cultural factors and norms that influenced the types and levels of sedentary behaviors: safe places to engage in non-sedentary activities, cultural practices and norms that promote sedentary activities, and support in the form of motivation and encouragement from healthcare providers. It is critical to understand and address these influencers in order to develop an environment that is conducive to promoting physical activity and anti-sedentary behaviors.

The limitations of this study include the use of the English language as those who are not fluent in English might have different experiences and perspectives. Having a priest as a focus group facilitator might have prompted participants to give socially desirable replies among the men. To minimize this, the priest and a female church leader were from another Pacific Island. Another limitation is that responses from participants are not separated by geographic location. Since Chuuk and Hawai'i differ, studies looking at these populations separately may be needed.

Conclusion

This study identified sedentary and physical activity factors related to diabetes prevention and control among Chuukese living in Chuuk and Hawai'i. Researchers, health practitioners, and policy makers can use these findings to inform future research interventions that are purposeful, collectivistic, age and gender specific, and church based. This is the first study to elucidate sedentary behaviors of the Chuukese and the cultural influences on sedentary behavior that are specific to this population. It is a first step in developing culturally-sensitive interventions for a nation with a significant need to reduce morbidity and mortality associated with T2DM.

Conflict of Interest

None of the authors identify a conflict of interest.

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