

An Assessment of E-health Resources and Readiness in the Republic of the Marshall Islands: Implications for Non-communicable Disease Intervention Development

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Abstract

The prevalence of non-communicable diseases (NCDs) is rapidly increasing in low and middle income countries (LMIC). The Republic of the Marshall Islands is an island country in the Pacific located near the equator and has the third highest prevalence of diabetes in the world, high rates of complications, and early mortality with limited or no resources for tertiary care of these complications. Given the limited resources of the country, there is a need for strategies which emphasize NCD prevention. E-health interventions are becoming more popular in LMICs. A rapid qualitative assessment, involving focus groups, site visits, and key informant interviews, was performed to ascertain community perceptions about the causes of NCDs including diabetes and potential solutions. An assessment of the technology infrastructure was conducted to assess capacity for potential e-health interventions. Thirty local participants were interviewed. Participants identified diabetes as the highest priority NCD with dietary shifts toward imported, processed foods and decrease in physical activity as the major causes. Text messaging and Facebook were found to be widely utilized for personal and public communication. Given the low-tech, low-cost communication mechanisms and widespread use of Facebook, a social media intervention could help support local NCD prevention communications initiatives.

Keywords

Diabetes, Marshall Islands, E-health

Background

Geographic, Economic, and Health of the Marshall Islands

The Republic of the Marshall Islands (RMI) is an island country located near the equator in the Pacific Ocean, slightly west of the International Date Line. The country's population of 53,158 people is spread out over 29 atolls covering 181 square miles. About 74% of Marshallese live on Majuro, the capital, and Ebeye. Majuro atoll has a land area of only 3.7 square miles and has a port, a shopping district, hotels, and an international airport.¹

The RMI attained independence in 1986 under a Compact of Free Association (COFA) after almost four decades under United States (US) administration as the easternmost part of the United Nations Trust Territory of the Pacific Islands. Compensation claims continue as a result of US nuclear testing on some of the atolls between 1947 and 1962. Under the terms of the Amended COFA enacted in 2004, the US will provide millions of dollars

to the RMI until 2023, at which time a Trust Fund made up of US and RMI contributions will begin perpetual annual payouts.²

The small island economy is largely supported by US government assistance. Imports far exceed exports because the islands have few natural resources. In 2006, about 40% of employed persons worked in the public sector and the median household income was \$12,603 across the country and \$14,737 in Majuro.³

Non-communicable diseases (NCD), such as cancer, diabetes, and hypertension, are emerging as some of the leading causes of death in the RMI. Over 62% of the population is overweight or obese. The US COFA reparation includes the provision of health care services, but funding is limited, resulting in a lack of mechanisms for health services linkages, care fragmentation, and loss of continuity in the care for patients with chronic disease.³ Therefore, the public health approach of choice is primary prevention. Training of outreach and prevention staff with the skills and knowledge necessary to deliver health promotion and disease prevention messages is still needed. Such training should include sessions on communication skills, public relations, the nutritional value of foods and self-managing diabetes and its complications.³

At the same time, promising tailored health education and primary prevention approaches are present. Since 2006, a Diabetes Wellness Center provides a behavioral change program addressing healthy lifestyle, diet, and physical activity. Culturally relevant and in-language diabetes and other NCD educational materials have also been developed in Majuro.³

Type 2 Diabetes in the Marshall Islands

The prevalence of type 2 diabetes in low and middle income countries (LMIC) has been consistently increasing over the most recent decades. The RMI has the third highest prevalence of diabetes in the world, and about 35% of adults ages 20 to 79 have diabetes in the RMI.⁴ Furthermore, there are high rates of complications and early mortality,³ and diabetes-related amputation is the most common surgical procedure performed on the island.⁵ There are no dialysis units for patients with kidney failure, a common complication of poorly controlled diabetes; and the nearest dialysis facilities are accessible only

by the few who can afford costs of travel and care in Hawai'i or the Philippines.

E-health Readiness

E-health uses information and communications technologies to more efficiently and effectively deliver health communication and information to reach targeted audiences.⁶ Like the use of traditional mass media, designing innovative health education interventions using communications technology must be relevant and usable for the intended targeted audiences and the specific purposes.⁷ The purpose of an e-health readiness assessment is to examine the preparedness of health care institutions or communities for changes if programs that entail information and communication technology use are introduced.⁶ E-health readiness assessments have been conducted in various geographical regions of the world to identify the extent to which e-health strategies would fit with existing systems, cultures, and other external contexts, eg, resources, skills.^{4,8,9} The purpose of this paper is to describe the findings from a rapid qualitative assessment procedure aimed at assessing the fit and capacity of RMI, as a small island nation, to disseminate technology-based health interventions to prevent non-communicable diseases.

Methods

Setting

In September 2014, two Centers for Disease Control and Prevention (CDC) sponsored projects were funded by collaborating academic institutions. The University of Hawai'i (UH) was awarded the Racial and Ethnic Approaches to Community Health (REACH) grant to work with the US Affiliated Pacific Islands (USAPI) on tobacco and nutrition interventions. A requirement for each of the USAPI jurisdictions is a communication plan and strategies regarding reduction of second-hand smoke exposure and improving nutrition. Additionally, the University of Rochester Medical Center (URMC) was awarded a Prevention Research Center-sponsored program as the CDC's Global and Territorial Health Research Network Coordinating Center (GHTRN). This project collaboratively conducts, shares, and translates innovative chronic disease prevention research in low-resource settings, particularly those relevant to the USAPI, Puerto Rico, and the US Virgin Islands.

In June 2015, the UH REACH and URMC GHTRN partners conducted an initial assessment of priority health issues and e-health readiness of the USAPI via surveys and questionnaires at a biannual face-to-face meeting of the USAPI Cancer Coalition and REACH representatives in Hawai'i. The preliminary assessment results revealed NCDs as a priority health issue across the Pacific and a general readiness toward e-health initiatives. The RMI was selected as a site to pilot a research project on an e-health initiative.

Instrument Development and Testing

The team developed a focus group guide and questionnaire to assess e-health readiness. Focus group questions were aimed at identifying sources of major NCD burden in Majuro as well as perspectives on the causes of NCDs. The e-health readiness questionnaire was adapted from previously published instruments assessing self-reported content and processes that have been purported to describe various organizational and geographic regional levels of "e-readiness."¹⁰ The e-health assessment included data gathering on current health communication initiatives, as well as questions on barriers and facilitators of e-health programs on the island. The tool was pilot tested via emails and video conferencing between the researchers and local Majuro team members. Two key contacts in health from Majuro participated in the pilot testing of the focus group guide via videoconferencing by responding to the questions and providing suggestions to tailor questions according to relevancy.

Data Collection

The objective of this formative research project was to conduct a Rapid Assessment Procedure (RAP)—an intensive, team-based qualitative inquiry using triangulation, iterative data analysis, and additional data collection to quickly develop a preliminary understanding of a situation from the insider's perspective—to better understand the enabling factors, challenges, and opportunities related to health, technology (high and low, e-health), and communication in Majuro to help address chronic disease.¹¹ In August 2015, a RAP was conducted in Majuro to identify the community's priorities related to NCD prevention in order to address national and regional goals toward NCD reduction. The community's e-health readiness was assessed for opportunities to pursue information and communication technology (ICT)-based chronic disease prevention initiatives.

Focus group participants were selected from a local convenience sample of community members. The academic partners subsequently used chain sampling during the visit to identify key people in community health outreach or local communication. The focus groups and e-health assessments were conducted at convenient site locations, eg, health department, health clinic, and church, and facilitated by a URMC or UH researcher and audio-recorded with field notes taken. At the end of each day, the field team convened to debrief impressions and complete their notes from the day's focus groups. No identifying information was collected on individual participants. The project was approved by local stakeholders and the Institutional Review Boards of both UH and URMC.

Data Analysis

The inductive coding process began with a review of field notes and audio recordings to develop a coding tree. Dedoose qualitative analysis software program was used to support the

coding for key themes and constructs by an initial reviewer. Dedoose is a cloud-based qualitative data analysis program using cloud-based data storage in a HIPAA compliant SAS 70 type II data center and utilizes SSL-EV and AES-256 encryption (www.dedoose.com), thus allowing multiple coders with the cloud-based platform.¹²

Content thematic coding examines for patterns or themes in participants' discussions. Content thematic coding was compatible with the aims of most qualitative health research in presenting the key elements of participants' accounts. Themes were coded as recurrent concepts to be used to summarize and organize the range of topics, views, experiences, or beliefs voiced by participants.¹⁰ The thematic codes were then reviewed by two additional reviewers for corroboration, with any discrepancies discussed and resolved by the team.

Results

Fifteen men and 15 women representing different employment sectors, including the healthcare sector, participated in the group and individual interviews which averaged 39 minutes each. The team additionally completed four hours of meetings with officials and engaged in 12 hours of community introduction, cultural activities, and site visits.

Non-communicable Diseases in RMI

While the local participants mentioned a range of NCDs, diabetes emerged as a main priority across employment sectors and among local individuals. Participants described dramatic shifts in community diet away from traditional, island- and sea-generated foods such as breadfruit, fish, pandanas, and coconut toward more conveniently available and quickly prepared foods like canned tuna and meats, ramen noodles, and sugary beverages. Shifts away from traditional economic activities like fishing and active transportation were also seen as responsible for the increasing rates of diabetes in the RMI. A church pastor offered his perspective on the roles of modernization and globalization on diabetes in the RMI:

“All the local foods, they keep people healthy, and there was no diabetes in the Marshall Islands but after we depend on the store-things from the store. That's how we got diabetes.”

Furthermore, participants relayed experiences of embarrassment and fear related to learning of one's diagnosis with diabetes, interfering with timely treatment and secondary and tertiary prevention of additional diabetes-related morbidity. Participants were generally knowledgeable about the roles of physical activity and diet as diabetes risk factors. However, participants also cited challenges to translating that knowledge into behavior change, such as the increasing preference for food that is convenient and a desire for a more modern lifestyle. Nevertheless, the significance of traditional practices and values of the community elders were emphasized.

Information and Communication Technology on Majuro

Perspectives from the local participants were obtained regarding the ICT available in the community and the role of ICTs in health education, outreach, and care. Participants explained that technology infrastructure was present on the island in general, with the majority of public offices and buildings on Majuro using landline, cable-based internet connections. Fiber optic cable connections were noted to be available on eight of the islands in the RMI. Participants also reported that less than half of the population has internet access in the home which is primarily through a Wi-Fi connection.

Participants reported that most of the population has access to mobile phones, though not necessarily smartphones, but all with basic text messaging capabilities. The National Telecommunication Authority sends mass text messages that include alerts of importance or interest to the population, eg, power outages, bingo announcements, celebrations, and sales or specials at stores. As a result, mass text messaging was noted to be an effective method of disseminating information throughout the community. One participant noted:

“There is also a mass text on cell phones... For example, it was world TB [tuberculosis] day a couple of months ago and a message was sent out to everybody's cell phone that there was an activity going on and just a little bit of information about TB...”

There are also some initiatives to incorporate technology into community outreach. One local clinic coordinator reported:

“We put everyone on our team on 'Evernote' because we all have smartphones so we keep track of what's going on. It is shared calendar or schedule... You can share notes, you can share data, and you can share schedules...”

The participant described examples of outreach activities, which could be advertised through a phone-based app system, including community events like cooking demonstrations. Nevertheless, issues with connectivity in the home setting were noted as a major barrier to the success of e-health interventions. One participant noted other barriers like the initial capital costs and the lack of sufficient personnel support for maintaining the technology required for e-health programming and initiatives.

E-health Expansion in Majuro

There is interest in expanding e-health initiatives on Majuro and converting health materials to electronic communication formats. One participant noted:

“...If you give us the content, we can translate it into the TV. We can translate it so you can put it on Facebook, the social media—the driving engine of the country... Just give us the content and we can pump it up for free.”

There is also interest in increasing individual access. A participant described a generational gap in ICT use with the younger generation having more interest and ability to use various communication and social media platforms than older generations.

Social Media in Majuro

All participants viewed NCDs as an important issue in the community that should be addressed, and most felt that social media was an acceptable way of engaging most of the population in health education. One participant suggested mass texting as a means of community health messaging:

“For two hours, you would send out a mass text that said ‘everyone get up for 15 minutes and walk around’.”

A major finding on social media was that island residents commonly use social and electronic media to communicate within and across islands and to other geographic regions to receive information, engage in electronic social interaction, and learn information about others. Facebook was noted as the most popular platform by several key informants:

“Everybody is on Facebook out here.”

Participants also noted personal examples, stories, and testimony delivered electronically or face-to-face as being preferred content of health messages.

“We’ve had people who have changed their lifestyle and improved their health, go on the radio and tell their story, and that influences other people—if this person did it, I can do it.”

Engaging health champions in media outreach was viewed as an important component in changing habits and preventing and treating diabetes. As one participant was quoted:

“People just cannot make changes until they see something.”

Other suggestions for using texting to reach out to the community included a health promotion campaign that consists of text messages with questions to get people thinking and stimulate follow-up discussion.

Discussion

The RMI, like other LMICs, experienced shifts in diet and activity that can be attributed to social, political, economic circumstances that lead to chronic disease. Diabetes was found to be a key issue for the Marshallese. This study suggests a need for outreach and prevention staff to be trained in delivery of key health promotion and disease prevention messages that include the nutritional value of foods, as well as the prevention and self-management of diabetes and its complications.³ In addition, since social media has become important in many aspects of daily living including advertising, it has the potential to be

used as a tool for health messaging promotion that enhances local health communications efforts.

Discussion from e-health assessments revealed that e-health readiness was high. A social media based, culturally-relevant and engaging diabetes prevention/intervention that enhances existing NCD initiatives and policies and features local content and activities of interest would enrich efforts to prevent the high-risk of diabetes expressed by participants. There is increasing support for Facebook-based interventions in delivering evidenced-based prevention messages.¹³⁻¹⁶ More research needs to be done to improve the duration of the positive effects.

The majority of the population on Majuro has access to text messaging, which can be used to broaden the reach of a social media health education and behavior change campaign, especially as a tool for follow-up and ongoing encouragement of participants. This approach is consistent with current literature which suggests that text messaging campaigns positively affect health outcomes both in conjunction with other intervention components and as stand-alone initiatives.^{14,17} In addition, due to the significant burden of disease in LMICs and comparatively fewer available resources, e-health-based interventions can often have a greater overall impact.¹⁷ Although mass texting for residents in Majuro has been criticized for its use beyond emergencies, it remains a very effective means to reaching out to the general public.

Preliminary results from the qualitative assessments underwent a further validation via a presentation at another biannual face-to-face meeting of cancer control and other public health leaders from the USAPI. The local partners from the RMI corroborated the preliminary qualitative findings and contributed to the interpretation of results. Given its popularity and reach within Majuro, Facebook was identified as an appropriate and viable communication method for the majority of Marshallese with specific health messaging.

A project to conduct and evaluate a diabetes prevention intervention using Facebook as a means to deliver primary, secondary, and tertiary diabetes prevention health messages is being pilot tested. As with the assessment phase, continuous engagement of the local Majuro partners in the research intervention planning and implementation reflected and resulted in a collaboratively developed, feasible pilot intervention. Potentially positive results from the pilot research study may be scaled up in the RMI, other Pacific jurisdictions, and other LMICs. The continued community engagement will better ensure that social media and other e-health approaches will be relevant and sustainable as an overall strategy in NCD prevention in the Marshall Islands.

Strengths and Limitations

Strengths of the project were related to the academic and community partnerships, the ability to meet with many local key

informants onsite, and the qualitative coding methods. The chain sampling approach to recruitment allowed researchers to further engage with the community by allowing focus group participants to identify additional key informants for this study. In addition, the sectors represented in the focus groups indicated saturation of responses suggesting that there was no need for “more of the same” participant representation. Thanks to existing partnerships from previous and current collaborations, the research team was able to meet with local participants with different levels of influence within the local government, and completed the qualitative assessment in five days. The qualitative analysis used direct thematic coding from the audio transcripts with the Dedoose software, which decreases the risk of information loss from inaccuracies in written transcription of the audio, associated with more traditional coding processes.

This study is not without its limitations. The short duration of the initial field work did not allow for alternate networks of key informants. For example, interviews of members of inner community networks or sectors who may provide alternative perspectives, eg, village leaders and traditional healers, could not be quickly arranged even though these individuals had been recommended. Although these key community individuals were identified during the discussions, the protocols including securing trusted English and Marshallese translators would have required much advance planning that was not possible while the team was already onsite. However, through the careful use of chain sampling strategies, the discussions involved professionals and community members who would also serve as potential future partners in implementing the resulting pilot Facebook intervention and other community-based initiatives.

Implications

Social and economic determinants of NCDs that affect the ability to practice healthy lifestyles will need to continue to be addressed to reduce the NCD burden in RMI. While issues surrounding social and economic determinants of health were discussed, suggestions to address resulting obesity and diabetes prevalence emphasized primary prevention through healthy lifestyle messaging.

A Facebook-based communications intervention may provide an acceptable and engaging opportunity to shape health promotion and disease prevention norms and behaviors to prevent diabetes and its complications, especially as other isolated and remote small island nations face dramatic shifts in diet and activity and burgeoning NCD epidemics. Combining such efforts with available mass media avenues such as mass text-messaging and the local radio station could further expand the reach of diabetes prevention initiatives. The health communications approach would focus on primary and secondary messaging integrating

local experiences, images, and examples to enhance message internalization and behavior adoption. Furthermore, by providing a venue for participants to contribute their own content, a Facebook-based intervention has the potential for evolving self-sustainability. Further research will determine the types of electronic health messages that may enhance health communication and education efforts in small island communities like Majuro in the Republic of the Marshall Islands.

Conflict of Interest

None of the authors identify a conflict of interest.

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