**Research Article**

**The Use of Social Media in Recruitment for Research: A Dental Health Utilization Study in the Republic of Palau**

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**Abstract**

**Objectives:** The use of social media to recruit participants for health research can be very effective. As the use of the Internet and social media continues to increase, so does the potential of social media in research recruitment. Pacific Islanders are among populations that can be difficult to reach for recruitment purposes due to limited resources, distance between islands, and sea travel conditions. The purpose of the surveys was to assess the feasibility of an oral cancer screening program by assessing the utilization of dental health resources by adults in Palau. We report on the recruitment success using Facebook Ads to engage Palauans in formative research on dental health utilization.

**Methods:** Facebook Ads were created using approved language and structure. All Facebook users age 18 and older within Palau were included in the audience. The survey was available in English and Palauan.

**Results:** Impressions, reach, clicks, click-through rate, and cost per click were evaluated. The survey was available through Facebook Ads for a total of 9 days, and there was a total of 229 responses. The response rate was 10.4%. The cost per link click was $0.28 USD, making the cost per completed survey approximately $2.90 USD.

**Conclusions:** Overall, Facebook was an effective recruitment tool for Palauans in completing a survey about dental health utilization, betel nut use, and beliefs about oral cancer. This method proved very affordable and feasible given the limitations in time and funding. This methodology can be utilized to improve recruitment among populations that are difficult to reach for important health research questions.

**Keywords:** Dental health; Facebook; Oral cancer, Palau; Recruitment; Social media

**Introduction**

The use of social media to recruit participants for health research has been shown to be effective in many different contexts [1-4]. The use of both the Internet and social media continues to increase [1], and as a consequence, the potential of social media to be a source of recruitment continues to grow, as well. Social media recruitment has the potential to expand study reach, reduce financial and structural costs of conducting research, and provide access to unique subsets of the population [5]. High volumes of individuals can be successfully recruited for research purposes through sites, such as Facebook [5-9]. Recruitment through Facebook has been shown to be cost effective, as well as improving access to populations not easily accessed through traditional methods of recruitment [5,6,8-10]. Facebook can minimize social and physical distance, and its expansive reach makes it particularly useful for disseminating opportunities to participate in research that actively engages potential recipients of interventions in geographically isolated, underserved populations [11].

Pacific Islanders are among populations that can be considered “Hard-To-Reach” through traditional research recruitment methods. ‘Hard-to-reach’ is a term used to describe sub-groups of a population that are difficult to reach or involve in research or public health programs due to their physical and geographical location or their social and economic situation [12]. As such, Palauans can be difficult to reach for recruitment purposes due to limited resources, distance between islands, sea travel conditions, and limited infrastructure. January 2021, The Republic of Palau had a population of approximately 18,100. 47.8% are female and 52.2% are male. 81.2% live in urban centers, while 18.8% live in rural areas. The Internet and social media have become established resources on these islands that provide the potential to address the challenges of traditional recruitment. As of January 2021, there were 6752 Internet users in Palau, with a 39% increase between 2020 and 2021. Internet penetration in Palau is estimated at 37.2%. In contrast, there 17,900 social media users in Palau in January 2021. This is equivalent to 98.7% of the total population at this time [10]. As such, social media represents a potential source for recruitment of participants in health research.

Cancer is the second leading cause of death in the Western region of the Pacific, largely due to late-stage presentation, high cost of off-island referral and treatment, and low likelihood of survival [13,14]. Betel nut use is a well-established and highly prevalent cultural tradition in Palau, an island nation in this region. Betel nut is also identified as a Group I human carcinogen by the World Health Organization (WHO), and this effect may be synergistic with the more recent addition of smokeless tobacco in betel quid in the development of oral cancer [15,16]. Oral cancer is the 5th most common cancer in Palau, and prognosis can be improved with early detection [17,18].

The purpose of the surveys deployed through Facebook was to assess the feasibility of a proposed oral cancer screening program by quantitatively and qualitatively assessing the utilization of dental health resources by adults in Palau. There were also secondary objectives of assessing knowledge, attitudes, and beliefs about oral cancer and betel nut use. The study was originally designed to be conducted through in-person key informant interviews and focus groups to achieve these same objectives. However, due to the travel and gathering restrictions implemented during the COVID-19 pandemic, the study design was modified to reach the population of interest through Internet-based surveys utilizing the features of Facebook Ads. As a social media platform, Facebook offers the potential to target certain demographic characteristics in the use of Facebook Ads for research recruitment efforts. Given the penetration of social media in certain international populations, such as in Palau, this provides an ideal opportunity to recruit participants for survey studies remotely. This is especially important in the context of the COVID-19 pandemic, which has significantly restricted the ability to conduct in-person qualitative research. We report on the recruitment success using Facebook Ads to engage Palauans in formative research on dental health utilization, in the context of determining feasibility to develop screening programs and improve health access for Palauans.

**Methods**

Facebook Ads were created using University of Rochester Medical Center (URMC)-approved language and structure. Wording and photos used in the ads were chosen based on previous Facebook Ads for research recruitment, as well as input from collaborators in Palau and Hawai’i. The photos used in the ads did not include people/faces, despite the counseling that these types of photos typically draw more responses. This was due to the inability to obtain permission from the people in photos in our possession to be used in this endeavor in a timely manner. Therefore, landscape/scenery photos of Palau were used instead. Examples of ads that were used are represented in (Figures 1a, 1b). The dashboard used is displayed in (Figure 2). All Facebook users within Palau were included in the audience. The survey was available in English and Palauan. Survey responses were directly stored in URMC REDCapTM (Research Electronic Data Capture, Vanderbilt University). REDCapTM is a secure, web-based application designed to support data capture for research studies. Metrics included “Impressions,” defined as the number of times the ad is shown to the target demographic audience, “Reach, defined as the number of people who saw the ad, “Clicks,” which represent the number of clicks the ad received, and the “Click-Through Rate “(CTR), which is defined as the number of clicks the ad received divided by the number of times it was shown on the site. Average cost per click was calculated as the amount spent by the number of clicks received. The average cost per thousand impressions is calculated as the amount spent divided by the number of impressions received. This study was given ethical approval by the University of Rochester Research Subject Review Board.

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**Figure 1a and 1b:** Examples of Facebook Ads for recruitment that ran during the study period.

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**Figure 2:** Screenshot of Facebook Ad Manager Interface depicting criteria for displaying targeted recruitment advertisements.

**Results**

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**Figure 3:** Example of Ad Manager Task View for Facebook advertisements and recruitment.

(Figure 3) summarizes reach, cost, and impressions of the Facebook Ads used and potential Facebook accounts reached through various target characteristics. The survey was available through Facebook Ads from May 23, 2021-May 31, 2021, for a total of 9 days. The funding budget for this was $600 USD, which was used in its entirety. The survey was updated two times during the study for improved flow and some minor technical issues. At the conclusion of the study period, there were 229 responses. Of these, 3 were excluded due to being incomplete and 3 more excluded as duplicates, for a total of 223 unique completed survey responses. Reach was calculated as 40,016, which represents approximately 200% saturation of the estimated available social media (Facebook) users in Palau. There was a total of 258,377 impressions, which represents the number of times an ad was shown to a member of the target audience. There was a total of 2,153 link clicks with a Link Click-Through Rate (CTR) of 0.83%. Link CTR represents the number of clicks per impression. The response rate, as calculated by completed surveys to link clicks, was 10.4%. The cost per link click was $0.28 USD, making the cost per completed survey approximately $2.90 USD (response rate x cost per link click = cost of completed survey).

**Participant Characteristics (Table 1)**

The age range of respondents was 18-75, with a mean age of 42.7 years. Approximately half of respondents were between ages 36-55 (n=111, 49.8%), with the greatest number of respondents between 46-55 years of age (n=56, 25.1%). Of the total respondents who indicated their age, 74 were age 50 or older (33.1%). One hundred seventy-seven (80.1%) respondents identified as female. The majority of respondents (60.4%) reside on Koror, the island with the most populous state in Palau and Palau’s most urban area. In 2012, 66.7% of the population was reported to reside in Koror [19]. 60.4% of respondents have some university/college level education (attended and/or graduated). The vast majority (94.3%) reported ever having seen a dentist in Palau.

|  |  |  |
| --- | --- | --- |
| **General characteristics** | **n** | **% or mean** |
| **Gender** |  |  |
| female | 177 | 80.10% |
| male | 44 | 19.90% |
| other | 0 | 0 |
| Total | 221 | 100% |
| **Age in years, mean (SD)** |  | **42.7** (13.18) |
| Age 18-25 | 23 | 10.30% |
| **Age 26-35** | 48 | 21.5% |
| **Age 36-45** | 55 | 24.7% |
| **Age 46-55** | **56** | 25.1% |
| Age 56-65 | 33 | 14.80% |
| Age 66-75 | 8 | 3.60% |
| **Education** |  |  |
| Less than High School | 8 | 3.60% |
| High school/General Education Development | 39 | 17.50% |
| University/college | 146 | 65.40% |
| Advanced degree (Master’s degree, PhD, MD, etc.) | 30 | 13.50% |
| Total | 223 | 100% |
| **State of residence** |  |  |
| Koror | 134 | 60.40% |
| Airai | 43 | 19.40% |
| Ngiwal | 10 | 4.50% |
| Ngarchelong | 7 | 3.20% |
| Melekeok | 5 | 2.30% |
| Ngaraard | 4 | 1.80% |
| Ngerdmau | 4 | 1.80% |
| Ngeremlengui | 4 | 1.80% |
| Imeliik | 4 | 1.80% |
| Ngchesar | 2 | 0.90% |
| Peleliu | 2 | 0.90% |
| Ngercheangel | 1 | 0.50% |
| Ngeaur | 1 | 0.50% |
| Tochobei | 1 | 0.50% |

**Table 1:** Demographic characteristics of adults who completed the survey (n=223).

**Discussion**

Overall, Facebook was an effective recruitment source for Palauans to complete a survey about dental health utilization, betel nut use, and beliefs about oral cancer. With 223 completed surveys in 9 days, and at $2.90 per completed survey, this method proved very affordable and feasible given the limitations in time and funding involved in conducting this survey. Although there is a lack of similar studies using different recruitment methods by which to compare cost efficacy, other studies using more traditional recruitment mechanisms, such as newspaper or radio advertising, email, and use of consulting companies, report much higher costs per completed survey [8].

Facebook is a useful mechanism for recruiting geographically dispersed research participants, such as Pacific Islanders. The Republic of Palau consists of over 340 islands in the Western Pacific stretching over 700 miles. While the original study design included in-person interviews on-site in Koror, this alternative recruitment method of using Facebook enabled us to receive responses and information from those outside of this location. This proved to be particularly important in that the distances and travel between islands was found to be a factor in the ability of some respondents to use dental health services. While in-person interviews would have been based on purposive sampling and allowed for more in-depth exploration of responses, the online survey through Facebook Ads allowed for a broader geographic sample. This also facilitated a much larger overall sample than the original design of focus group and key informant interviews. It is unknown if the purposive sampling proposed in the original study design would have resulted in a similar gender demographic (majority female). However, our research team would likely have had more control over selecting subjects for interviews that were more equally distributed in gender, education, and age.

The sample in this study is a convenience sample. Factors that affect the ability to convert clicks into participants include the type of study, financial incentive, and sex/gender. There was no financial incentive offered for completing this survey. It has been shown that women are more likely to search the Web for health information than men [9]. Although Facebook has many potential advantages over traditional methods of participant recruitment, there is limited research examining the representativeness of participants recruited via Facebook. Characteristics or populations that were most often reported to be overrepresented included younger participants, women, and those who were well educated [20]. Although Topolovec-Vranic and colleagues did not find a difference between male and female recruitment in their scoping review of social media recruitment in medical research studies [9], our sample does support this female selection bias in our sample characteristics. 80% of the respondents were female with a mean age of 42.7 years, which is important in the interpretation of survey responses. While Internet and social media use are often associated with younger demographics, our study demonstrated that in Palau, the majority of Facebook users who responded to the Facebook Ad were between 36-55 years old, and one third of respondents were age 50 or older. Males and the elderly are underrepresented in this sample, which may reflect differences in interest in the topic, as well as social media patterns of use. The urban concentration of respondents is similar to the overall distribution of urban/rural residence in Palau, which is estimated to have 80.5% of its population residing in urban locations [21].

**Limitations**

As with all recruitment methods, Facebook recruitment has its limitations. The first limitation is that study samples may not represent target populations. While the entire population of Palau can be considered ‘hard-to-reach,’ this method of recruitment did over-represent certain demographic characteristics within this group. The demographic characteristics of the study population do not perfectly reflect the overall demographic characteristics of adult Palauans as a whole. Females are clearly overrepresented in this sample. Higher levels of education may also be overrepresented in this sample, as well. Social media (Facebook) was the only recruitment method utilized in this study, therefore there is no control or comparison group to evaluate efficacy of recruitment or cost efficiency. In addition, the duration of the survey was limited exclusively by availability of funding.

**Conclusion**

As a common method of communication all over the world, social media represents a useful strategy that can be leveraged for research to find and engage potentially hard-to-reach populations. Facebook recruitment is cost-effective, efficient, flexible, and may lead to better response rates. Facebook recruitment is well equipped to find study participants to answer many important public health questions that may not be possible through traditional recruitment and research settings. Researchers desiring to understand health behaviors of adults in Palau, and perhaps other Pacific Island nations, should consider social media as a viable option for recruitment.

**Conflicts**

The authors have no conflicts of interest associated with the material presented in this paper.

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