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Exploring the perceived effectiveness and cultural acceptability of COVID-19 relevant social media intervention content among Alaska Native people who Smoke: The CAN Quit study

Christi A. Patten [a,*], Kathryn R. Koller [b], Pamela S. Sinicrope [c], Zoe T. Mercullieff [d], Judith J. Prochaska [e], Christine A. Hughes [f], Clara R. McConnell [g], Paul A. Decker [h], Kenneth Resnicow [i], Timothy K. Thomas [j]

[a] Department of Psychiatry and Psychology and Behavioral Health Research Program, Mayo Clinic, 200 1st St SW, Rochester, MN 55905, USA
[b] Research Services, Division of Community Health Services, Alaska Native Tribal Health Consortium, 4000 Ambassador Dr, Anchorage, AK 99508, USA
[c] Department of Psychiatry and Psychology and Behavioral Health Research Program, Mayo Clinic, 200 1st St SW, Rochester, MN 55905, USA
[d] Research Services, Division of Community Health Services, Alaska Native Tribal Health Consortium, 4000 Ambassador Dr, Anchorage, AK 99508, USA
[e] Stanford Prevention Research Center, Department of Medicine, Stanford University, 1265 Welch Road, Stanford, CA 94305, USA
[f] Department of Psychiatry and Psychology and Behavioral Health Research Program, Mayo Clinic, 200 1st St SW, Rochester, MN 55905, USA
[g] Wellness and Prevention, Division of Community Health Services, Alaska Native Tribal Health Consortium, 4000 Ambassador Dr, Anchorage, AK 99508, USA
[h] Division of Clinical Trials and Biostatistics, Department of Quantitative Health Sciences, Mayo Clinic, 200 1st St SW, Rochester, MN 55905, USA
[i] School of Public Health, University of Michigan, 109 S. Observatory, 3867 SPH1, Ann Arbor, MI 48109, USA
[j] Research Services, Division of Community Health Services, Alaska Native Tribal Health Consortium, 4000 Ambassador Dr, Anchorage, AK 99508, USA

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ABSTRACT

Social media platforms have potential for reach and effectiveness to motivate smoking cessation and use of evidence-based cessation treatment, even during the worldwide COVID-19 pandemic. This study builds on our prior community participatory approach to developing content postings for the CAN Quit Facebook intervention among Alaska Native (AN) people who smoke. With input from a community advisory committee, we selected new content on COVID-19 preventive practices (e.g., masking) and evaluated them using a validated, six-item perceived effectiveness scale and a single item assessing cultural relevance. We obtained feedback on six content postings (two videos and four text/pictures) from an online survey administered to 41 AN people (14 men, 27 women; age range 22–61 years) who smoke in Alaska statewide with 49 % residing in rural Alaska. Perceived effectiveness scale scores were high across postings, ranging from 3.9 to 4.4 out of a maximum score of 5.0. Cultural relevance item scores ranged from 3.9 to 4.3. We found no appreciable differences by sex, age, or rural/urban location for either score. This study adds new information on the adaptation, acceptability, and perceived effectiveness of content on COVID-19 preventive practices for future inclusion in a social media-based intervention for smoking cessation specifically tailored for AN people.

1. Introduction

In 2018, smoking prevalence was 14 % among the U.S. adult population (Creamer et al., 2019). Among U.S. Alaska Native (AN) and American Indian persons, 23 % reported smoking. Within Alaska, smoking prevalence among AN people is more than double that of non-Natives (37 % vs 17 %) (Alaska Department of Health and Social Services, 2019). Face-to-face tobacco cessation approaches have had limited reach and efficacy in rural remote AN communities (Patten et al., 2014; Patten et al., 2010) where geographic remoteness, weather, and travel costs impede access to in-person health care services for AN people (Sherry, 2004). Social media-formed support networks, such as Facebook, have shown promise as an intervention for smoking cessation (Luo et al., 2021) and are potentially effective tools for reaching,

* Corresponding author at: Department of Psychiatry and Psychology, Mayo Clinic, 200 First St SW, Rochester, MN 55905, USA.
E-mail addresses: patten.christi@mayo.edu (C.A. Patten), kkoller@anthc.org (K.R. Koller), sinicrope.pamela@mayo.edu (P.S. Sinicrope), zmerculieff@anhb.org (Z.T. Mercullieff), jpro@stanford.edu (J.J. Prochaska), hughes.christine@mayo.edu (C.A. Hughes), crmcconnell@anthc.org (C.R. McConnell), decker.paul@mayo.edu (P.A. Decker), kresnic@umich.edu (K. Resnicow), tkthomas@anthc.org (T.K. Thomas).

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engaging, and connecting AN people in smoking cessation efforts.

The CAN Quit study developed a moderated, private, Facebook group intervention for promoting treatment uptake and cessation among AN individuals in Alaska who smoke (Sinicrope et al., 2019). Health communication programs and materials that make information relevant to their intended audience are more effective than those that do not (Kreuter and Wray, 2003). We used an iterative community-based participatory research approach to intervention development by incorporating feedback from potential end users (i.e., AN people who smoke) as the intended audience (Slater, 1996), and incorporating cultural variance and surface/deep structure health communication frameworks (Davis and Resnicow, 2012; Resnicow and Braithwaite, 2001) for content cultural tailoring of messaging/moderator postings (Merculieff et al., 2021). In a randomized, controlled pilot trial, we evaluated the Facebook intervention and commenced recruitment for the study in December 2019 coinciding with the first case of COVID-19 reported worldwide (manuscript in preparation).

The COVID-19 pandemic created an urgent need to include content on COVID-19 prevention within the context of quitting smoking (Meacham et al., 2021). As reliance on social media communications increased during the pandemic (Nguyen et al., 2020), study moderators for the Facebook group intervention noted conversations about COVID-19 taking place, including questions about what social media information was reliable, who to trust for accurate reporting of disease spread, and implications for quitting smoking during the pandemic. Moreover, from January to June 2020, the age-adjusted COVID-19 associated mortality among AN and American Indian persons in the U.S. was nearly twice that of non-Hispanic Whites (Arrazola et al., 2020). Thus, the purpose of this study was to (1) address the COVID-19 issues raised by the Facebook intervention group by posting accurate information consistent with cessation and COVID-19 messaging being communicated statewide by the Alaska Tribal Health System and (2) measure the perceived effectiveness and cultural relevance of materials specifically tailored for AN people living in Alaska and interested in smoking cessation. Content on COVID-19 perceived as culturally relevant and potentially effective for quitting smoking would warrant future inclusion in the existing Facebook intervention.

2. Materials and methods

This section describes the methods and materials used to develop COVID-19 prevention material for the CAN Quit Facebook intervention (formative phase) and the results of a survey measuring the perceived effectiveness and cultural relevance among AN people who smoke (survey phase). We further explored the potential applicability of message content to AN people who smoke across demographic subgroups of gender, age, and residence (rural/urban). The study received approval by the Alaska Area and Mayo Clinic Institutional Review Boards, and the Alaska Native Tribal Health Corporation (ANTHC) Board of Directors. We used a community-based participatory research approach in the current study and all phases of the CAN Quit study as requested by AN Tribal leaders (Dillard et al., 2018).

2.1. Formative phase

2.1.1. Existing Facebook intervention content library for moderators

In prior formative work (Merculieff et al., 2021), we learned AN adults who smoke preferred culturally relevant intervention content that included images of AN people, places, and activities; told a compelling story; and evoked an emotional response. If a story was not about AN individuals, it needed to incorporate AN values (e.g., family and children) or tell a story in a "real" way, with honesty and emotion (Merculieff et al., 2021). We developed a content library of 66 content postings (eight videos and 60 image/text postings) and organized it as a treatment manual for use by moderators (Sinicrope et al., 2022), two trained tobacco treatment specialists of AN heritage.

2.1.2. Selection of COVID-19 content postings

This study's formative phase began in April 2020, shortly after travel bans in Alaska disrupted supply chains and further isolated rural remote communities. Vaccines were not yet available, COVID-19 case studies were limited, and information on COVID-19 primarily focused on prevention practices. As noted above, conversations about COVID-19 were occurring in our Facebook group intervention.

Searching the Centers for Disease Control and Prevention, ANTHC public websites, and ANTHC media center postings, we located a small sample of intervention content on COVID-19-relevant information consistent with preferences in our prior formative work (Merculieff et al., 2021) described above. Our search was limited to these sources to keep intervention content on COVID-19 consistent with information being disseminated through ANTHC and the State of Alaska. While COVID-19 is a respiratory illness (Huang et al., 2020), current evidence is mixed on the role of smoking in disease risk and severity (Polosa and Caci, 2020; Reddy et al., 2021). As with existing postings, all COVID-19 postings included a call to action to quit smoking that provided the toll-free Alaska's Tobacco Quitline number and embedded web link.

2.1.3. Request for community input on COVID-19 content postings

In May 2020, we sought guidance on the COVID-19 content from the ANTHC Research Consultation Committee (RCC), an existing community advisory committee for research with AN people that has provided feedback and advice on implementation of all phases of the CAN Quit study (Sinicrope et al., 2019). The RCC meets monthly on the AN Health Campus in Anchorage or virtually via Zoom. From June to August 2020, we revised postings according to the RCC recommendations and identified additional content for consideration.

2.2. Survey phase

2.2.1. Study design

Prospective, cross-sectional survey design involving a 1-time survey.

2.2.2. Sampling strategy

In this phase of the study, our objective was to obtain sufficient feedback on preferences for COVID-19 content messaging/postings from potential end-users of the Facebook smoking cessation intervention as the intended audience (Kreuter and Wray, 2003; Slater, 1996). Thus we purposefully sampled (Hibberts et al., 2012; Patton, 2014) AN adults statewide who smoke. Because this separate sub-study was conducted with limited time and resources, we estimated a total of 40 participants would meet this goal, which is consistent with sample size recommendations for early stage formative work to develop digital interventions (Baker et al., 2014). We recruited a new sample of AN people who smoke who had not participated in any other phase of the CAN Quit study including the pilot randomized controlled trial. We used Facebook advertisements geo-targeted to Alaska to recruit study participants until the targeted sample size was reached.

2.2.3. Recruitment and study eligibility criteria

Recruitment occurred during September 2020 through January 2021. Facebook advertisements indicated "Alaska Native people who smoke needed to share opinions in a research study" and would "receive $25 for completing an online survey." Advertisements included a study email link and a toll-free phone number where interested individuals could obtain more information.

We screened potential candidates by phone to assess eligibility. Eligibility criteria included self-reported AN heritage, current residence in Alaska, age 19 years or older, having a Facebook account or willing to create one, smoked at least one cigarette per day during the past seven days, cigarettes were the main nicotine/tobacco product used, and willingness to make a quit attempt. We did not distinguish between commercial and non-commercial tobacco use. Unlike some other Indigenous populations, tobacco was not used by AN people before

contact with western traders and is not used in AN traditional ceremony (Alaska Department of Health and Social Services, 2019; Renner et al., 2004; Smith et al., 2010). Participants were excluded if they had enrolled in a cessation program or used cessation pharmacotherapy during the past 30 days or were a current participant in the randomized controlled pilot trial or had participated in a prior CAN Quit study phase. Individuals meeting the eligibility criteria received details on the study and, if interested, were asked to provide verbal consent over the phone.

2.2.4. Procedures

Following consent, we emailed each enrollee a link to complete an approximately 20-minute online survey administered via Qualtrics (Provo, Utah, U.S.). Participants received a $25 Visa gift card in the mail as remuneration when survey completion was noted by Qualtrics. Results will be shared with participants via a mailed newsletter.

2.2.5. Survey Measures

2.2.5.1. Socio-demographic characteristics. The survey assessed several socio-demographic characteristics, including participant sex, age, community of residence, employment, and education; and number of cigarettes smoked per day.

2.2.5.2. Perceived effectiveness. To evaluate COVID-19 content, we used a validated six-item perceived effectiveness scale (Davis et al., 2017; Davis et al., 2013; Davis et al., 2011). Measures of perceived effectiveness are frequently used to assess audience receptivity to mass media campaigns and other health communication messaging and are useful in formative work to assess the likelihood of success of potential messaging before conducting large scale efficacy for behavioral impact (Dillard et al., 2007; Yzer et al., 2015). Experimental studies in health communication indicate that perceived effectiveness involves emotional and cognitive processing, and greater perceived effectiveness predicts change in health behavioral attitudes and intentions (Dillard et al., 2007).

After viewing each content posting, participants reported how much they agreed with the following statements: "This was worth remembering," "This grabbed my attention," "This was powerful," "This was informative," "This was meaningful," and "This was convincing" using a five-point response scale from 1 = strongly disagree to 5 = strongly agree. The perceived effectiveness scale score was produced by summing scores for the six items and dividing by the number of items in the scale (i.e., possible total score range 1 to 5). If three or more items were missing, the total score was set to missing.

2.2.5.3. Cultural acceptability. The study team developed a single item, "This fits with my culture," that we used in earlier work to develop Facebook intervention content (Merculieff et al., 2021). The item using the same five-point response scale as the above PE measure to assess cultural acceptability of each posting.

2.2.6. Statistical methods

We summarized sample characteristics and responses to individual items and perceived effectiveness scale score for each posting using descriptive statistics (numbers, percentages, mean ± standard deviation (SD), median, range). The Kruskal Wallis test was used to assess the associations of the mean perceived effectiveness scale score and cultural relevance item score to sex, age group (<30, 30–49, and ≥ 50 years), and locality (urban, rural). We considered p-values ≤ 0.05 statistically significant.

A criterion for future inclusion of COVID-19 postings into the Facebook intervention was receiving a mean perceived effectiveness scale score of ≥ 3.5 (Davis et al., 2017; Davis et al., 2013). We also included postings that contained elements considered relevant to AN people who smoke (i.e., cultural relevance item score ≥ 3.5).

3. Results

3.1. Formative phase

3.1.1. Community input on COVID-19 content postings

Responding to our request for feedback on the initial three text/pictures and video, RCC members recommended using pictures demonstrating social distancing, wearing masks, and other best prevention practices during the pandemic. They suggested that multiple generations be represented (i.e., rural young people) as well as AN people engaged in AN-related activities. For text addressing only tobacco use, the committee suggested adding messaging on social distancing or other COVID-19 prevention behaviors. To enhance readability, they suggested we enlarge print size of the messages on all postings, the equivalent of increasing printed material from a font of 10–20.

3.1.2. Final COVID-19 content postings for evaluation

In response to RCC feedback, we adapted, removed, and added postings during June and July 2020 for final evaluation. Consistent with our health communication frameworks, postings were adapted or added to reinforce AN values and have multiple generations represented (cultural variance, deep structure) as well as AN people engaged in AN-related activities (surface structure). We doubled the message print size of all postings and included pictures/text/videos where individuals practiced or reinforced physical distancing and/or other COVID-19 prevention behaviors.

We selected a final set of six postings for evaluation (four text/pictures and two video messages). Each of the six postings included a call to action to quit smoking along with the toll-free phone number for the Alaska's Tobacco Quitline and an embedded link to access the quitline web page. The postings were shown to participants in the following order: (1) a young AN woman engaged in traditional dancing with accompanying text "Help protect yourself from COVID-19. Practice physical distancing and wash your hands"; (2) a female AN Elder drying fish with text "SAY NO to tobacco in the time of COVID-19 and always"; (3) two men ice fishing with text "SAY NO to tobacco in the time of COVID-19 and always. Wash your hands and practice physical distancing with people outside of your household"; (4) a male AN Elder sitting on a bench with text "Smoking may increase your risk of getting a severe case of COVID-19. Quit today"; (5) a video (duration: 92 s) featuring the ANTHC nursing staff president, an AN woman, discussing COVID-19 health and safety updates, and emphasizing physical distancing guidelines to protect Elders and the "health of our people"; and (6) a video (duration: 47 s) by ANTHC Cultural Committee featuring AN men and women of different ages who encouraged wearing a mask, washing hands, and staying home when sick to prevent the spread of COVID-19 among Elders, healthcare providers, and others.

3.2. Survey phase

3.2.1. Participants

We recruited 44 AN people during September 2020 through January 2021. Of the 44 screened, 41 met eligibility criteria and were invited to complete the online survey. Reasons for ineligibility were use of the nicotine patch in the past 30 days or did not smoke cigarettes. All 41 invited completed the survey. Participants were 14 men and 27 women, with a mean age of 38.1 ± 9.9 years (range 22–61), 34 % worked for pay, 54 % reported a high school or less than high school education, and 49 % resided in a rural Alaska region. Participants smoked an average of 7.8 ± 5.6 (range 1–22) cigarettes per day. All participants had an existing Facebook account.

3.2.2. Perceived effectiveness and cultural relevance ratings and their correlates

Results presented in Table 1 indicate all postings exceeded our *a*

Table 1
Perceived Effectiveness and Cultural Acceptability of COVID-19 Relevant Content for Incorporation within a Facebook Intervention among Alaska Native People who Smoke (N = 41).

Item	Message Format[a]					
	Text/Picture				Video	
	1. Woman dancing Mean ± SD Median Range	2. Woman drying fish Mean ± SD Median Range	3. Men on snow machine Mean ± SD Median Range	4. Elder man sitting on bench Mean ± SD Median Range	5. ANMC nursing president Mean ± SD Median Range	6. ANTHC Cultural Committee Mean ± SD Median Range
1. This was worth remembering	4.02 ± 0.91 4.0 1–5	3.95 ± 1.07 4.0 1–5	3.90 ± 1.09 4.0 1–5	4.20 ± 0.81 4.0 2–5	4.34 ± 0.69 4.0 3–5	4.49 ± 0.64 5.0 3–5
2. This grabbed my attention	3.93 ± 0.89 4.0 2–5	4.23 ± 0.73 4.0 3–5	4.10 ± 0.79 4.0 2–5	4.33 ± 0.69 4.0 3–5	4.10 ± 0.84 4.0 3–5	4.38 ± 0.70 4.5 3–5
3. This was powerful	3.68 ± 1.04 4.0 1–5	3.79 ± 1.04 4.0 1–5	3.78 ± 0.95 4.0 1–5	4.15 ± 0.81 4.0 2–5	4.18 ± 0.81 4.0 3–5	4.35 ± 0.80 5.0 2–5
4. This was informative	3.89 ± 0.89 4.0 1–5	3.80 ± 1.02 4.0 1–5	3.95 ± 0.69 4.0 3–5	4.10 ± 0.90 4.0 2–5	4.28 ± 0.82 4.0 2–5	4.35 ± 0.77 5.0 3–5
5. This was meaningful	4.00 ± 0.90 4.0 2–5	4.00 ± 0.89 4.0 1–5	4.05 ± 0.72 4.0 3–5	4.23 ± 0.77 4.0 2–5	4.18 ± 0.79 4.0 3–5	4.38 ± 0.75 5.0 3–5
6. This was convincing	3.79 ± 0.99 4.0 1–5	3.77 ± 1.01 4.0 1–5	3.80 ± 0.91 4.0 2–5	4.03 ± 0.83 4.0 2–5	4.05 ± 0.88 4.0 2–5	4.23 ± 0.84 4.0 2–5
Perceived EffectivenessScale score[b,c]	n = 38 3.88 ± 0.75 3.9 2.33–5.00	n = 39 3.91 ± 0.83 4.0 1.83–5.00	n = 40 3.93 ± 0.72 4.0 2.67–5.00	n = 40 4.18 ± 0.72 4.1 2.33–5.00	n = 40 4.19 ± 0.72 4.2 3.00–5.00	n = 40 4.37 ± 0.69 4.5 2.83–5.00
7. This fits with my culture	n = 37 4.0 ± 0.82 4.0 2–5	n = 40 4.18 ± 0.78 4.0 2–5	n = 40 3.93 ± 0.86 4.0 2–5	n = 40 3.95 ± 0.93 4.0 2–5	n = 40 4.08 ± 0.89 4.0 2–5	n = 40 4.30 ± 0.85 4.5 2–5

NOTE: Table observations are based on non-missing data. Item scores range from 1.00 (strongly disagree) to 5.00 (strongly agree). ANMC = Alaska Native Medical Center. ANTHC = Alaska Native Tribal Health Consortium.

[a] See text for description of the six content postings.

[b] Based on six items (#1–6 above), used to evaluate the Centers for Disease Control and Prevention Tips™ videos and advertisements. (K. C. Davis et al., 2017), the total score median is the median of means, frequently resulting in a non-whole number.

[c] If three or more items were missing the perceived effectiveness scale score was set to missing. Missing data ranged from 1 to 3 participants for perceived effectiveness scale score and between 1 and 4 participants for the cultural relevance item score.

priori threshold for perceived effectiveness and cultural acceptability. Specifically, the perceived effectiveness scale score across items ranged from 3.9 to 4.4 and cultural relevance item score ranged from 3.9 to 4.3, both out of a maximum score of 5.0. The text/picture posting featuring AN men on a snow machine had greater mean scores for cultural relevance among men compared to women participants (4.4 ± 0.5 vs 3.7 ± 0.9; $p = 0.02$). No other statistically significant associations were detected for perceived effectiveness scale or cultural relevance item scores by participant sex, age group, or locality (See Table 2). The two video postings were rated higher than the four text/picture postings for both perceived effectiveness scale (4.28 ± 0.67 vs 3.98 ± 0.61) and cultural relevance item (4.19 ± 0.80 vs 4.01 ± 0.64) scores.

4. Discussion

Using a community participatory approach, this study is one of the first to evaluate COVID-19 content for future inclusion within a Facebook intervention for smoking cessation tailored for AN or Indigenous people. We explored social media intervention content on COVID-19 prevention practices to reduce the spread of the virus for perceived effectiveness and cultural acceptability. We found perceived effectiveness scale and cultural relevance item scores to be generally high, ranging from 3.9 to 4.4 of possible score of 5.0. By comparison, the Centers for Disease Control and Prevention *Tips*™ from Former Smokers national mass media education campaign found total perceived effectiveness scale scores for videos and other content featuring factual, emotional, true stories about the health risks of smoking ranged from 3.5 to 3.8 (Davis et al., 2017) and 3.7–4.0 (Davis et al., 2013). Our results perhaps reflect the community participatory approach used up front and consideration of cultural factors in the selection of postings to evaluate (Institute of Medicine, 2013). With all six COVID-19 moderator postings meeting our criteria, the research team had the data necessary to support their future inclusion in the CAN Quit Facebook intervention content library. This study extends the literature on social media interventions for smoking cessation as prior studies were conducted before the pandemic (Luo et al., 2021) and content was tailored for AN people. Adding the cultural relevance item to a validated measure of perceived effectiveness provided novel information on the cultural acceptability of COVID-19 social media content among AN people who smoke.

Aside from our prior work (Merculieff et al., 2021), there are few studies of perceived effectiveness of health communication messaging among AN people (Hiratsuka et al., 2019). Prior research on the perceived effectiveness of the *Tips*™ campaign found that U.S. Black and Hispanic people responded more favorably to message content compared with White persons (Davis et al., 2017). Further, higher perceived effectiveness ratings were observed for respondents aged 18–24 years compared with older age groups (40–64 and 65 +), but no differences in perceived effectiveness were detected by sex, education, or income (Davis et al., 2017).

Table 2
Associations of Sex, Age Group, and Locality with Perceived Effectiveness and Cultural Acceptability of COVID-19 Moderator Postings for a Social Media Intervention among Alaska Native People who Smoke (N = 41).

	Message Format[a]					
	Text/Pictures				Videos	
Ratings and Demographic Groups	1. *Woman dancing* Mean ± *SD* Median Range	*2. Woman drying fish* Mean ± *SD* Median Range	3. *Men on snow machine* Mean ± *SD* Median Range	4. *Elder man sitting on bench* Mean ± *SD* Median Range	5. *ANMC nursing president* Mean ± *SD* Median Range	6. *ANTHC Cultural Committee* Mean ± *SD* Median Range
Perceived Effectiveness Scale Score						
Sex						
Men	4.1 (0.8) 4.2 (2.3–5.0)	4.1 (0.7) 4 (2.7–5.0)	4.1 (0.6) 4 (2.7–5.0)	4.2 (0.8) 4.1 (2.3–5.0)	4.3 (0.6) 4.3 (3.0–5.0)	4.3 (0.6) 4 (3.2–5.0)
Women	3.7 (0.7) 3.6 (2.7–5.0)	3.8 (0.9) 3.8 (1.8–5.0)	3.8 (0.8) 4 (2.7–5.0)	4.2 (0.7) 4.1 (3.0–5.0)	4.1 (0.8) 4 (3.0–5.0)	4.4 (0.7) 4.6 (2.8–5.0)
P	0.1	0.28	0.26	0.84	0.36	0.5
Age Group						
Age 19–29	3.8 (0.8) 3.8 (2.3–5.0)	4.0 (1.1) 4.3 (1.8–5.0)	3.9 (0.9) 4 (2.7–5.0)	4.4 (0.7) 4.9 (3.0–5.0)	4.3 (0.8) 4.4 (3.0–5.0)	4.5 (0.7) 4.8 (2.8–5.0)
Age 30–49	4.0 (0.7) 4 (2.7–5.0)	3.9 (0.7) 3.8 (2.5–5.0)	3.9 (0.7) 4 (2.7–5.0)	4.2 (0.7) 4.1 (3.0–5.0)	4.2 (0.7) 4.2 (3.0–5.0)	4.4 (0.7) 4.5 (3.0–5.0)
Age 50+	3.7 (0.9) 3.6 (2.7–4.8)	3.8 (0.8) 3.7 (3.0–5.0)	4.0 (0.6) 4 (3.0–4.7)	3.8 (0.9) 3.9 (2.3–5.0)	4.0 (0.7) 3.8 (3.0–5.0)	4.1 (0.7) 4.3 (3.0–5.0)
P	0.57	0.82	0.96	0.36	0.58	0.47
Locality						
Urban	3.8 (0.8) 3.7 (2.3–5.0)	3.9 (0.9) 3.8 (1.8–5.0)	3.9 (0.8) 3.9 (2.7–5.0)	4.2 (0.8) 4.1 (3.0–5.0)	4.1 (0.8) 4.2 (3.0–5.0)	4.3 (0.8) 4.5 (2.8–5.0)
Rural	4.0 (0.7) 4.2 (2.7–5.0)	3.9 (0.7) 4 (2.5–5.0)	4.0 (0.6) 4 (2.7–5.0)	4.1 (0.7) 4.1 (2.3–5.0)	4.3 (0.7) 4.2 (3.0–5.0)	4.4 (0.6) 4.6 (3.0–5.0)
P	0.57	0.98	0.5	>0.99	0.51	0.82
Cultural Relevance Item						
Sex						
Men	4.3 (0.6) 4 (3.0–5.0)	4.5 (0.5) 4.5 (4.0–5.0)	4.4 (0.5) 4 (4.0–5.0)	3.8 (1.1) 4 (2.0–5.0)	4.1 (0.9) 4 (3.0–5.0)	4.4 (0.6) 4.5 (3.0–5.0)
Women	3.8 (0.9) 4 (2.0–5.0)	4.0 (0.8) 4 (2.0–5.0)	3.7 (0.9) 4 (2.0–5.0)	4.0 (0.8) 4 (2.0–5.0)	4.0 (0.9) 4 (2.0–5.0)	4.2 (1.0) 4.5 (2.0–5.0)
P	0.1	0.068	0.02	0.61	0.76	0.71
Age Group						
Age 19–29	4.3 (0.5) 4 (4.0–5.0)	4.3 (1.1) 5 (2.0–5.0)	4.0 (0.8) 4 (3.0–5.0)	4.4 (1.1) 5 (2.0–5.0)	4.1 (1.0) 4.5 (3.0–5.0)	4.5 (0.8) 5 (3.0–5.0)
Age 30–49	4.0 (0.8) 4 (3.0–5.0)	4.1 (0.7) 4 (3.0–5.0)	3.9 (0.9) 4 (2.0–5.0)	3.9 (0.9) 4 (2.0–5.0)	4.2 (0.9) 4 (2.0–5.0)	4.4 (0.8) 4.5 (2.0–5.0)
Age 50+	3.2 (0.8) 3 (2.0–4.0)	4.2 (0.8) 4 (3.0–5.0)	4.0 (0.9) 4 (3.0–5.0)	3.5 (0.8) 4 (2.0–4.0)	3.7 (0.8) 3.5 (3.0–5.0)	3.7 (1.0) 4 (2.0–5.0)
P	0.074	0.56	0.95	0.059	0.42	0.13
Locality						
Anchorage	4.2 (0.8) 4 (3.0–5.0)	4.2 (1.0) 4.5 (2.0–5.0)	4.0 (0.9) 4 (3.0–5.0)	4.0 (1.1) 4 (2.0–5.0)	4.0 (0.9) 4 (2.0–5.0)	4.3 (1.0) 5 (2.0–5.0)
Other	3.8 (0.9) 4 (2.0–5.0)	4.2 (0.6) 4 (3.0–5.0)	3.9 (0.9) 4 (2.0–5.0)	3.9 (0.7) 4 (2.0–5.0)	4.2 (0.8) 4 (3.0–5.0)	4.4 (0.7) 4 (2.0–5.0)
P	0.26	0.53	0.7	0.42	0.41	0.98

Note: ANMC = Alaska Native Medical Center. ANTHC = Alaska Native Tribal Health Consortium.
[a] See text for description of six content postings.

While recent studies demonstrate interventions offered via social media to improve health behaviors have produced moderate-size effects in populations with disparities (Vereen et al., 2021), these effect sizes vary by population and health topic (Yang, 2017). Additionally, AN diversity (characterized by three culturally and linguistically distinct ethnicities (Fortuine, 1989); and unique living conditions (e.g., geographic isolation, harsh climate) challenge assumptions that health communication findings in other Indigenous populations may also apply

to AN people and underscore the need for population-specific information.

In our exploratory analyses, we found no appreciable differences in perceived effectiveness or cultural acceptability across postings by sex, locality, or age. The one posting that was rated higher for cultural relevance among men than women featured AN men on a snow machine. That this posting appealed to men is encouraging, as it could be used by intervention moderators to foster connections among men who engage in Facebook to quit smoking.

A strength of our study is that we recruited AN people statewide, with about half residing in rural Alaska areas which approximates the statewide AN population distribution. More women than men enrolled in the study, whereas Alaska smoking prevalence is higher for AN men than women (Patten et al., 2022). This finding may reflect our recruitment methods using Facebook advertisements, as Facebook use in the U. S. is greater for women than men (Auxier and Anderson, 2021).

We purposefully sampled potential end users of the intervention as our intended audience for COVID-19 messaging. Because this separate sub-study was conducted with limited time and resources, the findings are based on a small sample of participants. While our analyses examining perceived effectiveness scale and cultural relevance item scores by demographic groups did not produce any significant differences, it is possible that such differences could be detected in a larger sample. The findings are limited to individuals interested in quitting smoking. Thus, the results are considered exploratory and preliminary. Our study did not include a control group or employ an experimental design. The order of postings presented was not random and viewing one posting may have affected responses to subsequent postings. Inspection of Table 2 indicates average perceived effectiveness scale scores slightly increased with each posting rated, but there was no apparent trend for the cultural relevance item scores. We observed that video postings appeared to be rated higher than text/picture postings. However, the videos were presented as the last two (of six) postings, raising the possibility of order effects.

Because we conducted our study before the literature contained substantive research findings on the associations of smoking and COVID-19 risks, our social media content was limited to COVID-19 prevention practices. Higher perceived effectiveness ratings of content included in the *Tips*™ campaign were associated with increased likelihood of quit attempts on a population level (Davis et al., 2017), as well as proximal changes in smoking intentions and desire to quit (Davis et al., 2013). However, our short study timeline precluded an assessment of smoking outcomes or of COVID-19 related attitudes, beliefs, or behaviors, and our cultural relevance measure was limited to a single item. Furthermore, we did not assess key features of postings such as particular images or wording contributing to the high ratings of perceived effectiveness and cultural fit.

Despite these limitations, this preliminary study points to new directions for health communication and nicotine research. We need further research to assess perceived effectiveness and cultural acceptability in more representative and larger Indigenous population samples adequately powered to examine potential differences by sociodemographic groups and smoking characteristics including individuals not ready to quit smoking. Future research can build on our formative work by including an experimental design and in-depth assessment of features of postings that contribute to increased perceived effectiveness and cultural acceptability. Future studies should expand upon our single-item measure of cultural relevance to include a more comprehensive assessment of cultural acceptability. Research emphasizes the effectiveness of tailoring health communication messaging to enhance the relevance for the intended audience (Kreuter and Wray, 2003). Our community-based participatory approach and assessing the cultural fit of health communication messaging can therefore serve as a framework for researchers to develop COVID-19 and future infectious disease or pandemic relevant content among disparate groups with high prevalence of commercial smoking. In conclusion, this preliminary study found high perceived effectiveness and cultural acceptability of postings on COVID-19 prevention practices for future inclusion in an existing content library created to enhance a social media-based intervention for smoking cessation among AN people.

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CRediT authorship contribution statement

Christi A. Patten: Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing, Supervision, Funding acquisition . **Kathryn R. Koller:** Conceptualization, Methodology, Investigation, Resources, Writing – original draft, Writing – review & editing, Project administration. **Pamela S. Sinicrope:** Conceptualization, Methodology, Investigation, Resources, Writing – review & editing. **Zoe T. Mercurieff:** Conceptualization, Methodology, Investigation, Resources, Writing – review & editing. **Judith J. Prochaska:** Conceptualization, Methodology, Investigation, Writing – original draft, Writing – original draft. **Christine A. Hughes:** Conceptualization, Methodology, Investigation, Data curation, Writing – original draft, Writing – review & editing, Project administration. **Clara R. McConnell:** Conceptualization, Methodology, Investigation, Resources, Writing – review & editing. **Paul A. Decker:** Methodology, Software, Formal analysis, Data curation, Visualization, Writing – original draft, Writing – review & editing. **Kenneth Resnicow:** Conceptualization, Methodology, Writing – review & editing. **Timothy K. Thomas:** Conceptualization, Investigation, Resources, Writing – review & editing, Supervision.

Declaration of Competing Interest

Unrelated to this project, Dr. Prochaska has provided consultation to pharmaceutical and technology companies that make medications and other treatments for quitting smoking and has received funding from Facebook for planning evaluation of a mobile health intervention. Dr. Prochaska also has served as an expert witness in lawsuits against tobacco companies. No other potential conflict of interest was reported by authors.

Data availability

The data that support the findings of this study are available from the corresponding author, CAP, upon reasonable request and Alaska Area Institutional Review Board approval.

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