



Addressing cigarette smoking cessation treatment challenges during the COVID-19 pandemic with social media

Meredith C. Meacham^{a,*}, Erin A. Vogel^b, Johannes Thrul^c, Danielle E. Ramo^{a,d},
Derek D. Satre^{a,e}

^a Department of Psychiatry & Behavioral Sciences and Weill Institute for Neurosciences, University of California, San Francisco, San Francisco, CA, United States of America

^b Stanford Prevention Research Center, Department of Medicine, Stanford University, Stanford, CA, United States of America

^c Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, United States of America

^d Hopelab, San Francisco, CA, United States of America

^e Division of Research, Kaiser Permanente Northern California Region, Oakland, CA, United States of America

ARTICLE INFO

Keywords:

Smoking cessation
COVID-19
Social media
Tobacco
Cigarettes

ABSTRACT

This commentary reviews barriers to smoking cessation during the COVID-19 pandemic and the potential of social media-based smoking cessation programs. Several published randomized controlled trials are summarized and future directions for designing and evaluating social media-based smoking cessation programs are described.

1. Smoking cessation treatment barriers during the COVID-19 pandemic

COVID-19 has brought the impact of cigarette smoking on health to even greater public awareness. Concerns about respiratory health have motivated many attempts to quit smoking (Elling et al., 2020; Grogan et al., 2020; Klemperer et al., 2020) and the role of cigarette smoking in COVID-19 severity continues to be debated (J et al., 2020; van Zyl-Smit et al., 2020). However, societal responses to the pandemic and changes in healthcare access (e.g., loss of insurance coverage, fewer office visits, overburdened providers) compound existing barriers to smoking cessation treatment.

In considering these difficulties, the social ecological model (McLeRoy et al., 1988) is a useful framework. At the individual level, people are experiencing greater stress and boredom during the pandemic, which are key triggers for smoking (American Psychiatric Association, 2020; Grogan et al., 2020). Individuals attempting smoking cessation describe numerous potential obstacles, including lack of access to previous coping strategies (e.g., going to the gym, visiting family and friends) (Rosoff-Verbit et al., 2021). At the interpersonal/relational level, conflict at home and living with other smokers contributes to continued smoking (Meacham et al., 2013). At the community/organizational

level, people may have less access to school- and workplace-based smoking cessation programs. Moreover, loss of employment in the United States usually results in lost access to health insurance (Panchal et al., 2020). At the policy level, public health departments face budget shortfalls, potentially scaling back smoking cessation resources. These challenges are likely to negatively impact the use of evidence-based smoking cessation treatments during the pandemic, including behavioral counseling, nicotine replacement therapy, and prescription medications.

2. Social media and smoking cessation

Social media is thoroughly integrated into most people's daily lives worldwide and has the potential to reach broad audiences (Perrin & Anderson, 2018), particularly those not engaged in healthcare. In the course of physical distancing recommendations, many people have turned to social media with greater frequency (Koeze & Popper, 2020). These trends could be leveraged to support smoking cessation. Our research group has completed multiple randomized controlled trials (RCTs) and published a review of intervention studies using social media for smoking cessation (Thrul et al., 2019). The review found that social media interventions were feasible, acceptable, and contributed to

* Corresponding author at: 401 Parnassus Avenue, San Francisco, CA 94143, United States of America.

E-mail address: meredith.meacham@ucsf.edu (M.C. Meacham).

smoking cessation. However, out of 12 included studies, only three were RCTs (vs. feasibility or observational studies) and the majority were conducted on Facebook or Twitter (vs. Instagram, Snapchat, WhatsApp, Reddit, TikTok, or Tumblr). Although the evidence base is still developing, promising results of RCTs are illustrative of social media's potential for delivering smoking cessation interventions.

One of the three RCTs in the review, the Tobacco Status Project, enrolled 500 U.S.-based young adult smokers (average age: 20.9, 44.8% male) randomized to a 90-day Facebook-based smoking cessation program or referred to the National Cancer Institute's [Smokefree.gov](https://www.smokefree.gov) website (Ramo et al., 2018). Young adults were not required to be interested in quitting to participate. Participants who received the Tobacco Status Project intervention were significantly more likely to have biochemically verified 7-day abstinence at the end of the intervention than those receiving the website referral. The Tobacco Status Project intervention was also made publicly accessible to young adults in the San Francisco Bay Area through the San Francisco Cancer Initiative.

Social media-based smoking cessation interventions have broad appeal and applicability beyond young adults and Facebook. Tweet2Quit, a smoking cessation intervention RCT delivered to 160 U.S.-based adults intending to quit smoking (average age: 35.7, 26.3% male) in private Twitter groups for 100 days, doubled sustained abstinence compared to a control group (Pechmann et al., 2017). In another RCT based in Hong Kong, adults (average age: 40.5, 76.5% male) who completed a treatment program and participated in a WhatsApp group for 8 weeks reduced their risk of relapse following smoking cessation compared to an informational booklet control group (Cheung et al., 2015).

Ongoing questions about this line of research include how engagement (e.g., viewing, liking, or commenting on posts) is related to smoking changes, as well whether tailoring content to specific demographic groups and communities or co-occurring behaviors improves cessation outcomes. We conducted two additional pilot RCTs comparing the Tobacco Status Project to tailored interventions among 165 LGBTQ+ young adult smokers (Vogel et al., 2019) and 179 heavy drinking young adult smokers (Meacham et al., 2021). Participants receiving the LGBTQ+ tailored intervention were significantly more likely to report 7-day abstinence than those receiving the non-tailored intervention. Participants in tobacco only and tobacco and heavy episodic drinking trial arms did not significantly differ in smoking abstinence, though both groups reduced smoking compared to baseline.

3. Future directions in implementing and evaluating social media-based interventions

A key issue in scaling up smoking cessation interventions during the COVID-19 pandemic is the different speeds at which publicly funded biomedical research and social media environments managed by private corporations evolve. For example, by the time an intervention has been funded, developed, implemented, and tested for efficacy (usually several years (Ross et al., 2013)), social media platforms and users may have changed. Intervention researchers in traditional settings may need to partner with technology-focused nonprofit groups, health systems, and industry partners to speed up this process. At the same time, technologists should ground novel programs in evidence-based strategies for behavior change.

In the meantime, service programs and individuals quitting smoking have independently created smoking cessation peer support communities on Facebook, Reddit, WhatsApp, and other platforms. These communities provide emotional and instrumental support to help people manage health conditions (Fox, 2013). Although carefully designed and evaluated interventions tend to be the gold standard in healthcare, the clinical and societal value of independently created, targeted, and moderated communities should also be explored. These peer-driven online communities may be more engaging and responsive to individual needs and include current memes and discussion relevant to participants. However, information shared may not be evidence-based, and

the norms and attitudes within online communities, e.g., towards vaping, can shift over time. Service providers should become familiar with the social media platforms used by populations they serve, noting how content is generated and interacted with, and attitudes towards various information sources. Effective smoking cessation communities may moderate content using social rather than regulative styles, such as fostering civil and pleasant discussion as a group norm and minimizing negative audience reactance to health promotion messaging (Majumdar et al., 2020).

A final major concern is the privacy of information shared on social media. While healthcare services and academic research take great pains to rigorously protect patient and participant identity and health conditions, there have been multiple well-publicized data breaches from platforms such as Facebook and Twitter (Cisomag, 2020; Granville, 2018), which place protected health information at risk. The social stigma of smoking, smoke-free workplaces, and differences in insurance premiums may mean that a data breach could have serious consequences. For these reasons, privacy concerns could present a deterrent to participation in social media-based smoking cessation treatment or peer community support.

4. Conclusions and recommendations

Social media-based smoking cessation is an innovative and promising way to reach people, especially those not engaged in other forms of treatment. As the COVID-19 pandemic limits in-person healthcare services and leads to increased levels of stress, the potential reach of social media to support smoking cessation should continue to be explored, with particular attention to privacy, inclusion of timely content, and deeper understanding of how social media engagement may promote sustained behavior change.

Funding

Manuscript preparation was supported by National Institutes of Health grants K01 DA046697 and K24 AA025703.

References

- American Psychiatric Association. (2020). New poll: COVID-19 impacting mental well-being: Americans feeling anxious, especially for loved ones; older adults are less anxious [Press release]. Retrieved from <https://www.psychiatry.org/newsroom/news-releases/new-poll-covid-19-impacting-mental-well-being-americans-feeling-anxious-especially-for-loved-ones-older-adults-are-less-anxious>.
- Cheung, Y. T. D., Chan, C. H. H., Lai, C.-K. J., Chan, W. F. V., Wang, M. P., Li, H. C. W., ... Lam, T.-H. (2015). Using WhatsApp and Facebook online social groups for smoking relapse prevention for recent quitters: A pilot pragmatic cluster randomized controlled trial. *Journal of Medical Internet Research*, 17(10), e238. <https://doi.org/10.2196/jmir.4829>.
- Cisomag. (November 26, 2019). Hundreds of users impacted in Twitter and Facebook data breach. Retrieved from Cisomag. <https://www.cisomag.com/hundreds-of-users-impacted-in-twitter-and-facebook-data-breach/>.
- Elling, J. M., Crutzen, R., Talhout, R., & de Vries, H. (2020). Tobacco smoking and smoking cessation in times of COVID-19. *Tobacco Prevention and Cessation*, 6, 39. <https://doi.org/10.18332/tpc/122753>.
- Fox, S. (2013). After Dr Google: Peer-to-peer health care. *Pediatrics*, 131(Suppl. 4), S224–S225. <https://doi.org/10.1542/peds.2012-3786K>.
- Granville, K. (2018, March 19). Facebook and Cambridge analytica: What you need to know as fallout widens. *The New York Times*. Retrieved from <https://www.nytimes.com/2018/03/19/technology/facebook-cambridge-analytica-explained.html>.
- Grogan, S., Walker, L., McChesney, G., Gee, I., Gough, B., & Cordero, M. I. (2020). How has COVID-19 lockdown impacted smoking? A thematic analysis of written accounts from UK smokers. *Psychology & Health*, 1–17. <https://doi.org/10.1080/08870446.2020.1862110>.
- J, J. B., S, M. M., S, A. R. M., & S, M. J. M. (2020). Why do some reports claim that the number of COVID-19 hospitalized smokers is smaller than expected? *Journal of Biomedical Physics and Engineering*, 10(5), 659–662. <https://doi.org/10.31661/jbpe.v0i0.2007-1144>.
- Klemperer, E. M., West, J. C., Peasley-Miklus, C., & Villanti, A. C. (2020). Change in tobacco and electronic cigarette use and motivation to quit in response to COVID-19. *Nicotine & Tobacco Research*, Article ntaa072. <https://doi.org/10.1093/ntr/ntaa072>.

- Koeze, E., & Popper, N. (2020, April 7). The virus changed the way we Internet. *The New York Times*. Retrieved from <https://www.nytimes.com/interactive/2020/04/07/technology/coronavirus-internet-use.html>.
- Majmundar, A., Le, N., Moran, M. B., Unger, J. B., & Reuter, K. (2020). Public response to a social media tobacco prevention campaign: Content analysis. *JMIR Public Health and Surveillance*, 6(4), Article e20649. <https://doi.org/10.2196/20649>.
- McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly*, 15(4), 351–377. <https://doi.org/10.1177/109019818801500401>.
- Meacham, M. C., Bailey, J. A., Hill, K. G., Epstein, M., & Hawkins, J. D. (2013). Alcohol and tobacco use disorder comorbidity in young adults and the influence of romantic partner environments. *Drug and Alcohol Dependence*, 132(1–2), 149–157. <https://doi.org/10.1016/j.drugalcdep.2013.01.017>.
- Meacham, M. C., Ramo, D. E., Prochaska, J. J., Maier, L. J., Delucchi, K. L., Kaur, M., & Satre, D. D. (2021). A Facebook intervention to address cigarette smoking and heavy episodic drinking: A pilot randomized controlled trial. *Journal of Substance Abuse Treatment*, 122, 108211. <https://doi.org/10.1016/j.jsat.2020.108211>.
- Panchal, N., Kamal, R., Orgera, K., Cox, C., Garfield, R., Hamel, L., ... Chidambaram, P. (2020). The implications of COVID-19 for mental health and substance use. Retrieved from <https://www.kff.org/health-reform/issue-brief/the-implications-of-covid-19-for-mental-health-and-substance-use/>.
- Pechmann, C., Delucchi, K., Lakon, C. M., & Prochaska, J. J. (2017). Randomised controlled trial evaluation of Tweet2Quit: A social network quit-smoking intervention. *Tobacco Control*, 26(2), 188–194. <https://doi.org/10.1136/tobaccocontrol-2015-052768>.
- Perrin, A., & Anderson, M. (2018). Share of U.S. adults using social media, including Facebook, is mostly unchanged since 2018. Retrieved from <https://www.pewresearch.org/fact-tank/2019/04/10/share-of-u-s-adults-using-social-media-including-facebook-is-mostly-unchanged-since-2018/>.
- Ramo, D. E., Thrul, J., Delucchi, K. L., Hall, S., Ling, P. M., Belohlavek, A., & Prochaska, J. J. (2018). A randomized controlled evaluation of the tobacco status project, a Facebook intervention for young adults. *Addiction*. <https://doi.org/10.1111/add.14245>.
- Rosoff-Verbit, Z., Logue-Chamberlain, E., Fishman, J., Audrain-McGovern, J., Hawk, L., Mahoney, M., ... Ashare, R. (2021). The perceived impact of COVID-19 among treatment-seeking smokers: A mixed methods approach. *International Journal of Environmental Research and Public Health*, 18(2). <https://doi.org/10.3390/ijerph18020505>.
- Ross, J. S., Mocanu, M., Lampropoulos, J. F., Tse, T., & Krumholz, H. M. (2013). Time to publication among completed clinical trials. *JAMA Internal Medicine*, 173(9), 825–828. <https://doi.org/10.1001/jamainternmed.2013.136>.
- Thrul, J., Tormohlen, K. N., & Meacham, M. C. (2019). Social media for tobacco smoking cessation intervention: A review of the literature. *Current Addiction Reports*, 6(2), 126–138.
- Vogel, E. A., Ramo, D. E., Meacham, M. C., Prochaska, J. J., Delucchi, K. L., & Humfleet, G. L. (2019). *The put it out project (POP) Facebook intervention for young sexual and gender minority*. Smokers: Outcomes of a Pilot Randomized Controlled Trial. *Nicotine Tob Res*. <https://doi.org/10.1093/ntr/ntz184>.
- van Zyl-Smit, R. N., Richards, G., & Leone, F. T. (2020). Tobacco smoking and COVID-19 infection. *The Lancet. Respiratory Medicine*, S2213-2600(2220), Article 30239-30233. [https://doi.org/10.1016/S2213-2600\(20\)30239-3](https://doi.org/10.1016/S2213-2600(20)30239-3).