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Cessation Strategies Young Adult Smokers Use After Participating in a Facebook Intervention

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Abstract

Background—Young adults underutilize current evidence-based smoking cessation strategies; yet social media are widely used and accepted among this population. A better understanding of whether and how young adults try to quit smoking in the context of a social media smoking cessation intervention could inform future intervention improvements.

Objectives—We examined frequency, strategies used, and predictors of self-initiated 24-hour quit attempts among young adults participating in a Facebook intervention.

Methods—A total of 79 young adult smokers (mean age = 20.8; 20.3% female) were recruited on Facebook for a feasibility trial. Participants joined motivationally tailored private Facebook groups and received daily posts over 12 weeks. Assessments were completed at baseline, 3-, 6-, and 12-month follow-up.

Results—In 12 months, 52 participants (65.5%) completed 215 quit attempts (mean = 4.1; median = 4; range 1–14); 75.4% of attempts were undertaken with the Facebook intervention alone, 17.7% used an electronic cigarette (e-cigarette), 7.4% used nicotine replacement therapy (NRT), and 3.7% used additional professional advice. Non-daily smokers, those who smoked fewer cigarettes, and those in an advanced stage of change at baseline were more likely to make a quit attempt. E-cigarette use to aide a quit attempt during the study period was associated with reporting a past year quit attempt at baseline. No baseline characteristics predicted NRT use.

Conclusions—After participating in a Facebook smoking cessation intervention, young adults predominantly tried to quit without additional assistance. E-cigarettes are used more frequently as cessation aid than NRT. The use of evidence-based smoking cessation strategies should be improved in this population.

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Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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Keywords

Smoking; cessation; treatment and intervention; young adults; Facebook

Cigarette smoking in the United States peaks in young adulthood (U.S. Department of Health and Human Services, 2014). Despite interest in quitting, young adults underutilize professional cessation advice and nicotine replacement therapy (NRT), and a majority try to quit without using assistance (Curry, Sporer, Pugach, Campbell, & Emery, 2007; Solberg, Asche, Boyle, McCarty, & Thoele, 2007). There is a need for novel approaches to engage young adult smokers in cessation interventions with established efficacy (McClure, Arheart, Lee, Sly, & Dietz, 2013).

Online social media are widely used among young adults; yet the effectiveness of using social media to deliver intervention for health behavior change has received limited attention in the research literature. Our group has designed and determined feasibility and promising quit rates for the *Tobacco Status Project* smoking cessation intervention for young adults delivered through Facebook (Ramo, Thrul, Chavez, Delucchi, & Prochaska, 2015). At the end of the 12-month follow-up interval, self-reported 7-day point prevalence smoking abstinence rates were 12.7%. In order to improve quit rates and the efficacy of social media interventions, it is of great interest to characterize the strategies used and predictors of quit attempts among intervention participants.

Quit attempts are among most well established predictors of successful smoking cessation (Hymowitz et al., 1997; Zhu, Sun, Billings, Choi, & Malarcher, 1999). Yet, little is known about predictors of quit attempts and quitting strategies used among young adults participating in smoking cessation interventions on social media. Given that electronic cigarettes (e-cigarettes) are heavily marketed (Grana & Ling, 2014), growing in prevalence among young adults (Ramo, Young-Wolff, & Prochaska, 2015), and increasingly used as smoking cessation aids (Popova & Ling, 2013), it is of interest whether they are being used to aid quit attempts among young people. It is further unclear if predictors of trying to quit are consistent for the use of e-cigarettes compared to other cessation strategies.

We aimed to examine prevalence, strategies used, and predictors of quit attempts made by young adults participating in a 3-month smoking cessation intervention on Facebook. We report number and characteristics of quit attempts made over one year, and predictors (demographic, smoking behavior, motivation) of any quit attempt as well as quit attempts with an e-cigarette or NRT.

Methods

Procedure and participants

Data came from a feasibility trial of a novel smoking cessation intervention for young adults delivered entirely through Facebook (Ramo, Thrul, et al., 2015). Recruitment efforts included a paid Facebook ad campaign conducted between June and August 2013 with details reported previously (Ramo, Rodriguez, Chavez, Sommer, & Prochaska, 2014). Advertisements directed participants to complete a secure, confidential online survey to

determine eligibility. For those eligible, informed consent to participate in the intervention was assessed and online consent questions were used to confirm understanding of study procedures. Consented participants were asked to send proof of identity either by emailing a copy of a photo ID with birth date or by “friending” the study on Facebook to determine age. Consenting and ID-confirmed participants were assigned to “secret” Facebook groups (invitation only, group and content not visible to the public) tailored to readiness to quit smoking (Precontemplation, Contemplation, Preparation; DiClemente et al., 1991). Smoking outcomes and quit attempts since the last assessment were assessed at 3-, 6-, and 12-months and participants were compensated with \$20 gift cards for every completed assessment. All study procedures were approved by the UCSF Committee on Human Research.

Participants were 18 to 25 years old, English literate, and reported having smoked at least 100 cigarettes in their lifetime, currently smoked on at least 3 days per week, and used Facebook at least 4 days per week. Of the 586 respondents who met criteria to participate, 230 signed online consent, and 79 completed a baseline assessment and were assigned to a Facebook group. A total of 76% of participants completed the 3-month assessment, 82% completed the 6-month assessment, and 72% completed the 12-month assessment. Completers and noncompleters of the 12-month follow-up assessment did not differ on any baseline variables.

The intervention consisted of daily postings to each Facebook group for 90 days adapted from U.S. Clinical Practice Guidelines (Fiore et al., 2008) and transtheoretical model skills for smoking cessation (Pro-Change Behavior Systems, 2009). In all groups, a PhD psychologist conducted weekly “Ask-the-Doctor” interactive sessions and participants could opt to participate in 7 sessions of cognitive-behavioral (CBT) counseling delivered through Facebook chat. Both Ask-the-Doctor and CBT sessions were optional for participants. Although not directly available through the study, information was given about NRT and medication for smoking cessation to all groups through posts, Ask-the-Doctor sessions, and CBT counseling sessions. The use of e-cigarettes was not recommended as part of the intervention and participant questions on e-cigarettes were addressed in accordance with the current evidence on their effectiveness for smoking cessation as well as their safety (e.g., e-cigarettes are not approved smoking cessation devices and evidence of their effectiveness is unclear, the devices are not regulated by the FDA, and they may still be harmful to the user’s health).

Measures

All measures were administered online through a secure server using Qualtrics software. At baseline, a Smoking Questionnaire (Hall et al., 2006) assessed average days smoking per week (from which we computed percent smoking 7 days as “daily”), total cigarettes smoked in the past week, and presence of at least one past year quit attempt (y/n). Time to first cigarette upon waking (<30 min or >30 min), was used as a measure of dependence (Baker et al., 2007). The 3-item Tobacco Smoking Stages of Change Questionnaire (Prochaska & DiClemente, 1983) assessed motivation to quit at baseline, categorizing smokers into one of three stages of change (Precontemplation: no intention to quit within the next 6 months; Contemplation: intention to quit within the next 6 months but no 24-hr quit attempt in the

past year; Preparation: intention to quit within the next month and a 24-hr quit attempt in the past year). As only 10 participants (12.6%) were in Preparation, this variable was dichotomized in analysis (Precontemplation vs. Contemplation/Preparation).

Participants were instructed to report every purposeful 24 hr smoking quit attempt made during each follow-up period, and up to 17 strategies used in each attempt from a list of responses. Strategies were grouped into categories of *without additional assistance* (e.g., quit “cold turkey,” gradually cut down), *e-cigarette*, *NRT* (e.g., patch, gum, lozenge), and *additional professional advice* (e.g., stop smoking class, advice or counseling from health professional, telephone quit line). The use of strategies was not mutually exclusive and any use from baseline to 12 months was computed for each category (y/n).

Statistical analyses

Descriptive statistics for baseline characteristics, total number of quit attempts, and cessation strategies were calculated. Logistic regression analyzed predictors of participants undertaking any quit attempt and predictors of using e-cigarettes and NRT in any quit attempt (three analyses). Significant predictors of the simple logistic regression analyses were subsequently included and tested in a multiple logistic regression model. All analyses were conducted with Stata 11.2 (StataCorp, 2009).

Results

Descriptive results

Sample characteristics can be found in Table 1 (full sample). In 12 months, 215 quit attempts were reported by 52 of the 79 participants (65.8%). Overall, 45 (57.0%) of all 79 participants tried at least once to quit without additional assistance, 19 (24.1%) used e-cigarettes, 9 (11.4%) used NRT, and 4 (5.1%) used additional advice. The average number of quit attempts among those reporting at least one was 4.13 (SD = 2.45; range: 1–14). Of these 215 attempts, 162 (75.4%) were undertaken without additional assistance, 38 (17.7%) with e-cigarettes, 16 (7.4%) with NRT, and 8 (3.7%) with additional professional advice. In six of the total 215 attempts NRT and additional advice were used simultaneously, and in three NRT and e-cigarettes were used simultaneously, for a total of nine attempts with multiple simultaneous strategies used.

Predictors of quit attempts, e-cigarette, and NRT use

A quit attempt was more likely among non-daily smoker, among those smoking fewer cigarettes at baseline, and among participants in contemplation or preparation stages of change compared to precontemplation (Table 1). These significant predictors were subsequently included in a multiple logistic regression model, in which only stage of change (Contemplation or Preparation vs. Precontemplation) increased the likelihood of undertaking a quit attempt during the study.

The use of e-cigarettes was more likely among participants reporting a quit attempt within the past year at baseline (Table 2). No baseline characteristics significantly predicted the use of NRT (results not shown).

Discussion

Two-thirds of all Facebook intervention participants undertook one or more quit attempts, with each of these participants averaging more than four attempts. This is in line with daily assessments of quit attempts (Hughes et al., 2014), and speaks to the dynamic nature of the smoking cessation process and that many smokers need multiple quit attempts before they attain abstinence. Smoking and motivational variables increased the likelihood of undertaking one or more quit attempts during the study period, also consistent with previous findings in adult and young adult samples (Diemert, Bondy, Brown, & Manske, 2013; Hughes et al., 2014; Vangeli, Stapleton, Smit, Borland, & West, 2011). However, even half of participants in the Precontemplation stage of change tried to quit at least once during the course of this study.

Trying to quit without assistance beyond the Facebook intervention was most popular, congruent with previous studies among young populations not in smoking cessation treatment (Myers & MacPherson, 2004; Solberg et al., 2007). These findings point to the importance of enhancing social media interventions to foster increased interest and engagement with evidence-based smoking cessation strategies. Of note, engagement in our intervention was high, with 61% of participants making at least one comment in response to a Facebook post during the 3-month intervention (Thrul, Klein, & Ramo, 2015). The group may have offered the support participants needed to make an attempt without additional help. Social media intervention can use the high volume of quit attempts to improve cessation outcomes by maximizing the social support available and using strategies to enhance self efficacy (e.g., scheduling quit dates as events of social media, asking participants to send messages of support often within groups, asking those with quit attempts to share experiences as social media posts).

Compared to previously reported data on cessation strategy use among young adult daily smokers (Curry et al., 2007), we found that a low percentage of participants used cessation medication (11.4% vs. 17.7% in Curry et al., 2007), but we found similar numbers with regard to behavioral cessation advice (5.1% vs. 4.0% in Curry et al., 2007). However, it should be noted that these comparisons are limited in several ways: (1) we reported NRT only, while Curry et al. (2007) included other medications such as Zyban, and (2) participants in our study already participated in a behavioral cessation intervention on Facebook, thus seeking behavioral advice signifies advice in addition to the treatment they were already receiving. Our results regarding NRT use are similar to a previous study that reported 13.7% of young adult smokers used smoking cessation medication after telephone counseling (Rabius, McAlister, Geiger, Huang, & Todd, 2004).

Given the conflicting evidence on the effectiveness of e-cigarettes for smoking cessation (Grana, Benowitz, & Glantz, 2014; Hajek, Etter, Benowitz, Eissenberg, & McRobbie, 2014), their use was not recommended as part of this intervention. Yet, a substantial number of participants used these devices in one or more quit attempts, which may reflect young adults' beliefs in the effectiveness of e-cigarettes as cessation devices (Choi & Forster, 2014)—indeed their use was more common than the use of NRT in our study.

The relative unpopularity of NRT was disappointing given its efficacy with young adults (Buller et al., 2014) and emphasis in the intervention, but not unexpected (Curry et al., 2007; Solberg et al., 2007). NRT should be recommended to young adults and more effective strategies are needed to enhance the use of these cessation aids in this population (e.g., awareness of free NRT or counseling through state programs, quitlines). Interventions can focus on reducing barriers to using NRT (e.g., comparing costs to tobacco use, addressing concerns about side-effects and erroneous beliefs about harms from using NRT).

Limitations

We used self-reported data, which may be subject to recall bias (Berg et al., 2010; Hughes et al., 2014). Our participants are not representative of young adult smokers in the U.S. Some of our nonsignificant results may be due to a low test power rather than absence of an effect. Our study was underpowered to judge the effectiveness of using e-cigarettes or NRT/ additional professional advice compared to no additional assistance to attain abstinence at follow-up.

Conclusions

Young adults participating in a Facebook smoking cessation intervention were prompted to make a large number of quit attempts, the large majority of which were undertaken without support beyond the intervention. Young adults, especially those with a previous failed quit attempt, are most likely to use e-cigarettes when they do seek help beyond the behavioral intervention, despite unclear evidence of their effectiveness. Social media interventions should maximize the social environment for support and enhancement of self-efficacy for quitting to increase likelihood of cessation among those ready to make a smoking cessation attempt. Social media smoking cessation interventions should also focus on improving the uptake of NRT and other medications in the context of counseling, consistent with US Clinical Practice Guidelines.

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Dr. Ramo designed the parent study and wrote the protocol. Dr. Thrul conducted the analyses in consultation with Dr. Ramo. Dr. Thrul completed the first draft of the manuscript, including all parts, and both authors reviewed and revised subsequent drafts of the manuscript. Both authors contributed to and have approved the final article. The authors acknowledge the contributions of the staff and research participants in this study.

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Table 1

Sample characteristics and baseline predictors of any quit attempt during the study period (logistic regression results).

Predictor	Full sample (n = 79)		No quit attempt (n= 27)		Quit attempt (n = 52)		Simple logistic regression		Multiple logistic regression ^a	
	M	(SD)/% (n)	M	(SD)/% (n)	M	(SD)/% (n)	OR	95% CI	AOR	95% CI
Age	20.84	(2.15)	21.18	(2.21)	20.67	(2.12)	0.89	[0.72,1.11]	—	—
Gender female	20.3%	(16)	29.6%	(8)	15.4%	(8)	2.32	[0.76,7.08]	—	—
Ethnicity white	79.8%	(63)	81.5%	(22)	78.6%	(41)	0.85	[0.26,2.75]	—	—
Smoking behavior										
Daily smoking	74.7%	(59)	88.9%	(24)	67.3%	(35)	0.26 [*]	[0.07,0.98]	0.40	[0.09,1.88]
Number of cig/past 7 days	75.2	(55.5)	95.9	(55.9)	64.5	(52.8)	0.99 [*]	[0.98,1.00]	0.99	[0.98,1.00]
Smoking days/week	6.35	(1.26)	6.74	(0.86)	6.15	(1.39)	0.61	[0.36,1.04]	—	—
Time to first cigarette <30 min	51.9%	(41)	63.0%	(17)	46.2%	(24)	0.50	[0.19,1.31]	—	—
Past year quit attempt	57.0%	(45)	44.4%	(12)	63.5%	(33)	2.17	[0.84,5.59]	—	—
Stage of change										
Precontemplation	41.8%	(33)	59.3%	(16)	32.7%	(17)	reference		reference	
Contemplation or Preparation	58.2%	(46)	40.7%	(11)	67.3%	(35)	2.99 [*]	[1.14,7.84]	3.20 [*]	[1.16,8.84]

Note: AOR = adjusted odds ratio; OR= odds ratio; CI = confidence interval;

^a Significant predictors of the simple logistic regression analyses were subsequently included and tested in a multiple logistic regression model.

^{*} $p < .05$

Table 2

Baseline predictors of e-cig use in any quit attempt in the study period (simple logistic regression results).

Predictor	No e-cig use (<i>n</i> = 60) M (SD)/% (<i>n</i>)	E-cig use (<i>n</i> = 19) M (SD)/% (<i>n</i>)	OR	95% CI
Age	20.90 (2.21)	20.68 (2.06)	0.95	[0.75,1.22]
Gender female	20.0% (12)	21.1% (4)	0.94	[0.26,3.34]
Ethnicity white	76.7% (46)	89.5% (17)	2.59	[0.53,12.59]
Smoking behavior				
Daily smoking	78.3% (47)	63.2% (12)	0.47	[0.16,1.45]
Number of cig/past 7 days	78.7 (56.3)	64.2 (52.9)	0.99	[0.98,1.01]
Smoking days/week	6.42 (1.22)	6.16 (1.38)	0.86	[0.58,1.26]
Time to first cigarette <30 min	53.3% (32)	47.4% (9)	0.79	[0.28,2.21]
Past year quit attempt	50.0% (30)	79.0% (15)	3.75*	[1.11,12.62]
Stage of change				
Precontemplation	45.0% (27)	31.6% (6)	reference	
Contemplation or Preparation	55.0% (33)	68.4% (13)	1.77	[0.59,5.29]

Note: OR = odds ratio; CI = confidence interval.

*
 $p < .05$