

Effect of a Digital Social Media Campaign on Young Adult Smoking Cessation

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ABSTRACT

Introduction: Social Media (SM) may extend the reach and impact for smoking cessation among young adult smokers. To-date little research targeting young adults has been done on the use of social media to promote quitting smoking. We assessed the effect of an innovative multi-component web-based and SM approach known as Break-it-Off (BIO) on young adult smoking cessation.

Methods: The study employed a quasi-experimental design with baseline and 3-month follow-up data from 19 to 29 year old smokers exposed to BIO (n=102 at follow-up) and a comparison group of Smokers' Helpline (SHL) users (n=136 at follow-up). Logistic regression analysis assessed differences between groups on self-reported 7-day and 30-day point prevalence cessation rates, adjusting for ethnicity, education level, and cigarette use (daily or occasional) at baseline.

Results: The campaign reached 37,325 unique visitors with a total of 44,172 visits. BIO users had significantly higher 7-day and 30-day quit rates compared with users of SHL. At three month follow-up, BIO participants (32.4%) were more likely than SHL participants (14%) to have quit smoking for 30 days (odds ratio = 2.95, 95% CI = 1.56– 5.57, $p < .001$) and BIO participants (91%) were more likely than SHL participants (79%) to have made a quit attempt (odds ratio = 2.69, 95% CI = 1.03-6.99, $p = .04$).

Conclusion: The reach of the campaign and findings on quitting success indicate that a digital/social media platform can complement the traditional SHL cessation service for young adult smokers seeking help to quit.

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INTRODUCTION

In Canada, young adults (19-29) have the highest rate of smoking at 24.4% (Statistics Canada, 2011a) , but their use of cessation services and products is low (Minian, Schwartz, Di Sante, & Philipneri, 2010). This may reflect the common belief among young adults that the best way to quit is on their own (Bader, Travis, & Skinner, 2007). More than half of young adult smokers want to quit, but few are successful (Curry, Sporer, Pugach, Campbell, & Emery, 2007; Fagan et al., 2007), suggesting that there may be a mis-alignment between the needs of young people and the cessation methods available to them. However, those who are able to quit before the age of 30 will have a life expectancy nearly as long as those who never smoked (Jha et al., 2013), which holds hope for achieving population health impact if effective, accessible and attractive interventions are developed for this population. Innovative intervention solutions for reaching young adult smokers are needed.

Web and mobile phone-based interventions have shown promise for encouraging smoking cessation in young adults (Villanti, McKay, Abrams, Holtgrave, & Bowie, 2010) and social media tools and technologies have become a key resource for young adults. Social media is defined as *“any electronic, networked information resource that derives its principal value from user contributions, engagement and interaction”*(Norman, 2012). Among Canadian Internet users aged 16 to 24, 91% use the social media platform Facebook, 73% use instant messaging, and 33% participate in web based discussions on microblogging sites such as Twitter or post images on sites such as YouTube (Statistics Canada, 2011b) suggesting that these tools may be a promising means to engage young smokers.

Several reviews of web-based research have noted the importance of tailoring content to individuals and providing interactive components to promote greater engagement with the site and greater success in quitting (Bennett & Glasgow, 2009; Civljak, Sheikh, Stead, & Car, 2010; Crutzen et al., 2011; Shahab & McEwen, 2009). Other research suggests the importance of support from peers, and the

constant updating of website content (Bennett & Glasgow, 2009; Brouwer et al., 2011; Graham et al., 2013). A recent systematic review of mobile interventions found that text messaging was the most commonly identified smoking cessation intervention and pooled analysis showed that it doubled cessation rates (Free et al., 2013). However, there is little evidence concerning the effectiveness of social media interventions for changing health behaviours using platforms such as Facebook, Twitter or YouTube (Bennett & Glasgow, 2009; Cobb et al., 2011; Gold et al., 2011; Norman, 2012; Struik & Baskerville, 2014). Furthermore, a recent systematic review of social media-based interventions for health promotion noted the scarcity of empirical evidence and the need for more interventions with participatory and user-generated features (Chou, Prestin, Lyons, & Wen, 2013).

Social marketing provides a means of raising awareness of an issue or intervention and drawing attention to a specific intervention aimed at large-scale social change issues (Andreasen, 2002). Implementing a social marketing approach through social media to drive interest and engagement for a web-based program is both practical and consistent with the way young people use the media to share ideas and promote themselves, thus the intervention was considered a central focus of a larger campaign. The aim of this study was to examine the effect of the Break It Off (BIO) campaign, a digital social media campaign on young adult smoking cessation.

METHODS

Interventions

The BIO campaign was developed and implemented by the Canadian Cancer Society (CCS) and funded by Health Canada. It started January 2012 and was promoted through to the end of March 2012 and continues to be available – www.breakitoff.ca. The January to March 2012 period represents the first time the campaign ran. The campaign was aimed at young adult smokers aged 19-29. The principal

aim of the campaign was to engage young adults in smoking cessation through use of a web-site and social media. The campaign targeted young adults in six provinces across Canada.

BIO used a “break-up” metaphor, comparing quitting smoking with ending a romantic relationship, to provide support and encourage young adults to “break up” with their smoking addiction. The campaign’s website guided users through the challenging stages of ending an unhealthy relationship with smoking: getting it over with, staying split up, and moving on with life (Figure 1). Through the site, users could learn about established quit methods, such as telephone counselling, nicotine patches and nicotine gum. Visitors to the site could upload a video of their “break-up with smoking” experience as well as announce their break-up status to friends via Facebook. One of the central features of the campaign was a multi-platform smartphone app that provided instant support during specific trigger points (e.g. when stressed, angry, tipsy, or bored). A free BIO smartphone app was available for download (Figure 2). The app provided information that was designed to be time-sensitive in its response, allowing the information to be accessed at the moment a smoker felt an urge to smoke. BIO was promoted primarily through paid (e.g. Online Banner Ads through Facebook, Google, Yahoo, Microsoft, etc.), and earned (e.g. television, radio and print) media.

Smokers’ Helpline (SHL), the comparison intervention, is a quitline that provides a telephone based smoking cessation service to support people who would like to quit smoking, maintain their quit, or help someone else to quit. Quitlines are an evidence-based smoking cessation intervention (Fiore et al., 2008; Stead, Perera, & Lancaster, 2007; Stead, Hartmann-Boyce, Perera, & Lancaster, 2013) offered in at least 53 countries (World Health Organization, 2011a) and usually at no cost to the user. SHL is an established intervention and provides smokers who want to quit information, self-help materials, referrals to other resources, tailored motivational counselling, as well as proactive follow-up counseling to adult smokers, including young adults 19-29, in six Canadian provinces. During the intervention

period, SHL was promoted through both paid and earned media as well as referrals from health organizations and professionals.

Design and Participants

This study employed a quasi-experimental, pre and post-test design with one experimental and one unmatched comparison group (D. T. Campbell & Stanley, 1963; Shadish, Cook, & Campbell, 2002) to test the effect of the BIO intervention. The Transparent Reporting of Evaluations with Non-randomized Designs (TREND) guideline statement was used to assist in the reporting of this study (Des Jarlais, Lyles, Crepaz, & TREND Group, 2004).

Participants were English speaking smoking young adults 19-29 years of age in the Canadian provinces of Saskatchewan, Manitoba, Ontario, New Brunswick, Nova Scotia and Prince Edward Island. BIO participants were recruited through a link to the study registration form on BreakItOff.ca from February to September 2012 and through ads placed in the general labour section of Kijiji.ca (an online classified service) in various Canadian cities from June 29 until September 20, 2012. Three months after registration and completing an online baseline survey, participants were emailed a link to an online follow-up survey. BIO Participants received a \$10 iTunes redemption code as incentive for registering and another \$15 iTunes redemption code upon completion of the follow-up survey. Young adult SHL participants were recruited through the SHL's usual administrative and evaluation procedures where participants complete baseline demographic and smoking status questions over the telephone and a follow-up telephone survey interview between October 1, 2010 and September 30, 2011. All study participants provided informed consent at registration and the study was approved by the University of Waterloo, Office of Research Ethics.

Data Collection

The baseline and follow-up questionnaires were administered to both the intervention and comparison groups. Questionnaires were based on the questions contained within the minimal data set

for tobacco cessation (H. S. Campbell, Ossip-Klein, Bailey, & Saul, 2007) with new questions added for the current study. In addition to financial incentives for completing the study, a modified Dillman method (Dillman, Smyth, & Christian, 2009) was employed by contacting participants that registered at baseline up to five times either by email or telephone to increase response rates. The baseline questionnaire consisted of demographic and baseline smoking behaviour questions. The follow-up questionnaire included questions on use of cessation services, satisfaction with services, cessation support relationships, and smoking behaviour.

Measures

Seven-day and 30-day point prevalence abstinence (PPA) rates were measured at 3 month follow-up for both groups. SHL participants provided the date of last cigarette smoked to determine abstinence at 3-months based on a 7 month follow-up and according to SHL's administrative procedures. Quit rates were based on those participants who completed the follow-up surveys. For both treatment groups, respondents who completed the follow-up survey, but did not provide answers to the point prevalence questions were considered to be smokers. We followed the intention-to-treat principle in that participants were analysed in the groups to which they were allocated, regardless of whether they received or adhered to the allocated intervention (Gupta, 2011).

Smoking Status

The self-reported 7-day point prevalence cessation rate was determined by asking, "Have you smoked any cigarettes, even a single puff, in the last 7 days?" The self-reported 30-day point prevalence cessation rate was determined by asking, "Have you smoked any cigarettes, even a single puff, in the last 30- days?"

Cigarette consumption

At registration, participants were asked whether their current cigarette use was daily, occasional, or had quit and were trying to stay quit.

Heaviness of Smoking Index

Level of addiction was measured using the heaviness of smoking index (HSI) that combines the number of cigarettes smoked per day and the time to first cigarette in the morning (Heatherton, Kozlowski, Frecker, Rickert, & Robinson, 1989; John et al., 2004; Pérez-Ríos et al., 2009) High scores on the HSI indicate higher levels of addiction and greater difficulty in quitting. HSI was categorized as low (scores of 0 to 2), medium (scores of 3 and 4), and high (scores of 5 and 6).

Intention to Quit

Intention to quit smoking was measured by asking current smokers if they intended to quit in the next 30 days or not. Valid responses were “yes” or “no”.

Used any Cessation Aid

At follow-up, participants were asked if they had used any of the following cessation aids other than SHL or BIO to help them quit and included the options: Champix; Zyban; NRT gum, lozenges, inhaler, or nasal spray; advice from a physician, pharmacist, nurse or other health professional; group cessation program; self-help materials; quit contests; websites; and, smart phone apps.

At least one support person was available

At follow-up, participants were asked if they had at least one person they could count on for support in quitting smoking. Valid responses were “yes” or “no”.

At least one action taken toward quitting

At follow-up, participants were asked if they had taken any of the following actions toward quitting: cutting down the number of cigarettes smoked; stopping smoking for 24 hours in an attempt to quit; and set a quit date.

Larsen Satisfaction Score

User satisfaction was measured using the Larsen Satisfaction Score (Larsen, Attkisson, Hargreaves, & Nguyen, 1979), which was computed by summing the responses for three questions about satisfaction, each coded on a 4 point scale with 1 being low. The satisfaction questions were: To what extent has the

program met your needs? Overall, how satisfied were you with the service you received from the program? If you were to seek help again, would you use the program? The resulting Larsen Score ranges from 3 – 12, with 12 indicating “very high” satisfaction and 3 “very low”.

Statistical Analyses

We compared baseline characteristics, use of cessation aids/ supports, service satisfaction, and smoking abstinence outcomes between BIO and SHL young adult participants. Characteristics, smoking abstinence rates at three months after registration, use of cessation aids/supports, satisfaction, and other cessation related outcomes were summarized using the mean \pm SD for continuous variables and frequency percentages for categorical variables, and they were compared between programs using the *t* test for independent groups or the χ^2 test, respectively. Further, to test for attrition bias, baseline demographic characteristics and baseline smoking behaviours of participants that completed the follow-up survey and those that did not were compared using the χ^2 test. Finally, a separate analysis of smoking abstinence rates was conducted using the χ^2 test that assumed participants lost to three-month follow-up were smokers.

First, logistic regression models were fitted to examine the associations of variables to the odds of having two primary outcomes – 7 day PPA and 30 day PPA. Variables significantly associated with quitting were included as covariates in the subsequent analysis to examine the effect of BIO on smoking cessation. Second, regression models were fitted to examine the associations between the exposure to the programs and the primary outcomes adjusting for possible confounders identified at first step. A variable was considered to enter the final model if it produced a significant association with the outcome with a p-value less than .05 for any level of the variable. Assumptions such as sufficient sample size for single cell counts and Goodness-of-fit tests were used. A backward elimination strategy was employed in order to evaluate each covariate in the presence of others. Potential confounders were removed one at a time starting with the least significant predictor and continuing until the p-value was

less than 10% for all variables in the model. Findings were summarized using unadjusted and adjusted odds ratios (ORs) and corresponding 95% confidence intervals (CIs). We used PROC LOGISTIC in SAS 9.3.2 for analyses.

RESULTS

Participant Characteristics

The flow of participants through the study is depicted in Figure 3. One-hundred and twenty-two participants were excluded after baseline given that they had already quit smoking for more than 30-days prior to the commencement of the intervention. A total of 322 participants were lost to follow-up (66% for BIO vs. 48% for SHL). A total of 238 participants completed follow-up and contributed to the analysis with overall follow-up rates for BIO and SHL of 34% and 52% respectively.

Important differences were found between BIO and SHL participants at baseline (see Table 1). Users of SHL were more likely to be female (63.2% vs. 49.0%, $\chi^2 (1, N = 238) = 4.81, p = .03$), white (89.1% vs. 76.2%, $\chi^2 (1, N = 229) = 6.71, p = .01$), have high school education or less (50.7% vs. 36.3%, $\chi^2 (1, N = 238) = 4.93, p = .03$), intended to quit in the next 30 days (80.9% vs. 69.6%, $\chi^2 (1, N = 238) = 4.07, p = .04$), and were much more likely to be daily smokers (81.6% vs. 59.1%, $\chi^2 (1, N = 224) = 13.68, p < .001$). Level of addiction in terms of cigarettes smoked per day and time to first cigarette in the morning was not significantly different between groups with 59.6% of SHL participants and 63.5% of BIO participants reporting a low HSI. Significant demographic, baseline cigarette consumption and HSI differences were not found between those that completed follow-up and those that did not for both BIO and SHL participants (data not shown).

Program Reach and Participation

From January 2012 to March 2012, the total visits to BreakitOff.ca were 44,172 with 37,325 unique visitors. The average user viewed 2.47 pages during their visit. Ontario was the most prevalent

audience with an average of 59% of visits, followed by Saskatchewan with 22%. There were also 3,937 installations of the mobile app, 339 visitors interacted by posting content with the social media components (Facebook and YouTube). Only 21 visitors connected to SHL via the BIO campaign web-site. Larson satisfaction was 9.7 ± 1.97 and 78% of study participants visited the BIO website two or more times with 18% visiting six or more times.

SHL reached 488 young adult smokers (19 to 29 years of age) from six provinces during the January 2012 to March 2012 intervention period. Ontario represented 75% of users. Similar to BIO, Larson satisfaction was 9.5 ± 2.19 and 68% of SHL participants 19 to 29 years of age received two or more telephone calls for counselling with 10% receiving six or more calls.

Break-it-Off – Regression Analysis

Table 2 provides the results of association between participant characteristics and the primary study outcomes. As expected, having post-secondary education or higher is significantly associated with increased odds of quitting smoking for 7 day PPA, AOR = 2.16, 95% CI = 1.06-4.41, $p = .03$. In addition, occasional cigarette use is significantly associated with increased odds of quitting for both 7 day PPA and 30 day PPA (AOR = 6.26, 95% CI = 3.10 – 12.67, $p < .001$ and AOR = 5.93, 95% CI 2.82 – 12.46, $p < .001$, respectively). Other characteristics that were positively associated but not significant were being 25 to 30 years of age, non-white, intending to quit in the next 30 days and having social support (see Table 2).

BIO users had significantly higher 7-day and 30-day quit rates compared with users of SHL (Table 3). The 7-day quit rate for BIO (47.1%) was more than double that of SHL (15.4%), OR= 4.87, 95% CI = 2.66-8.93, $p < .001$ and AOR = 3.89, 95% CI = 1.98-7.67, $p < .001$, controlling for education, ethnicity and daily or occasional cigarette use. Although it was less prominent, the same pattern was seen with 30-day quit rates, BIO (32.4%) and SHL (14.0%), OR= 2.95, 95% CI = 1.56-5.57, $p < .001$ and AOR = 2.14, 95% CI = 1.05-4.38, $p = .04$, controlling for covariates. For secondary outcomes, 91% of BIO participants made a

quit attempt during the three-month intervention period compared to 79.1% of SHL participants, OR= 2.69, 95% CI = 1.03-6.99, $p = .04$. Although not statistically significant, 89.4% of BIO participants versus 79.4% of SHL participants cut down amount smoked, OR = 2.18, 95% CI=0.88 – 5.44, $p = .09$. Both BIO and SHL participants were equally likely to have set a quit date (Table 3).

Treating all those who did not complete follow-up as smokers, there was a significant difference ($\chi^2 (1, N = 560) = 7.55, p=.004$) for 7-day point prevalence abstinence between users of BIO (16.1%) and SHL (8.0%) and the 30-day point prevalence was also higher for BIO participants (11.0%) compared to SHL (7.3%); however, the difference was not statistically significant ($\chi^2 (1, N = 560) = 1.91, p = .15$).

DISCUSSION

The current study found that the BIO campaign had a significant effect on young adult cessation rates. The results compare favourably to other digital social media interventions (Civljak, Stead, Hartmann-Boyce, Sheikh, & Car, 2013) such as “Happy Ending” in the Netherlands which reported a 44.7% 7-day point prevalence abstinence rate at 3 months (Brendryen & Kraft, 2008). Further, a randomized trial of SHL had similar results to those reported here. Participants in the SHL arm of the trial had a 7-day quit rate at 3-month follow-up of 19.8% (Smith et al., 2004) as compared to 15.4% in this study. The doubling of quit rates for the digital social media intervention group (AOR = 2.14, 95% CI 1.05 – 4.38) was similar to the findings of a recent systematic review of internet-based and text messaging interventions that also reported a doubling of quit rates (Civljak et al., 2013; Free et al., 2013). In addition, BIO participants were significantly more likely to make a quit attempt as compared to SHL participants (91% vs. 79%). BIO is helping smokers to try to quit and it is argued that increasing quit attempts is key to improving the overall population cessation rate (Zhu, Lee, Zhuang, Gamst, & Wolfson, 2012).

Study Limitations

There are important limitations of the current study that are worth noting. First, some of the limitations of this study are inherent in the nature of the quasi-experimental design (Shadish et al., 2002) and internet-based research in general such as the low study recruitment and high attrition rate (Bull, Levine, Schmiede, & Santelli, 2013; Maher et al., 2014). However, attrition bias was not a limitation as the baseline characteristics between those who completed follow-up and those that did not were not significantly different for both comparison groups. Second, threats to internal validity, such as selection effects, were mediated by adjusting for observed group differences. However, there is possibility of bias due to unobserved characteristics. In addition, BIO participants may have been more motivated to participate due to receiving an incentive of up to \$25 (Can). Third, In terms of generalizability, the BIO campaign results may only be applicable to those young adults who are motivated to use social media. Given the novelty of the BIO concept, the campaign may not work as effectively at another time and setting. Fourth, we were not able to obtain corresponding SHL data for the same time periods as BIO; however, using the older data may have prevented contamination of our findings given that a SHL specific promotion campaign happened during the fall of 2012. Finally, while biochemical validation was not conducted, the recommendation of the Society for Research on Nicotine and Tobacco is that biochemical validation is not required for large population health trials (Benowitz et al., 2002). In fact, a Cochrane Review of Internet-based interventions for smoking cessation found that very few studies used this method (Civljak et al., 2010) and accurate estimates of the prevalence of cigarette smoking among Canadians can be derived from self-reported smoking status data (Wong, Shields, Leatherdale, Malaisson, & Hammond, 2012)

Implications for Practice

There are important policy and practice considerations given the reach of a campaign such as BIO compared to traditional quitline services using telephone-based counselling. Most young adults who live on their own do not have landlines, prefer other modes of communication such as texting, and

the percentages are growing for other population groups (Canadian Radio-Television and Telecommunications Commission, 2010). Older technology is quickly being replaced by mobile smartphone technology which act as computers, are projected to be used by 5 billion people world-wide by 2025, and have almost limitless functionality for accessing information and facilitating interaction (Miller, 2012). Our findings support the need for determining the role of social media and mobile technology interventions within a tobacco cessation system, given the effectiveness and potential for greater reach into population groups not served by or motivated to use traditional cessation services (Abrams, 2010). For example, building on the results of the initial BIO campaign findings, Health Canada has committed to extending the BIO campaign for five years Canada-wide (Health Canada,), expanding the reach and the potential depth of information tools and resources available through BIO.

Implications for Research

Given that research on the effectiveness of social media for health promotion and behaviour change is still new, there are a number of areas for further research. More formative evaluation is needed to answer such questions as how social media are used by different audiences. Other questions relate to implementation science; for example, what are the design features that encourage deeper engagement with social media to support behaviour change and the dose needed to produce a behaviour change response (Cobb et al., 2011). BIO is a multi-component intervention; thus, it was not possible to determine to what extent each component of BIO contributed to the overall campaign's impact. For example, it is not known if the smartphone app is more effective than the website itself. However, the BIO website "Get it over with" section was the most popular aspect of the campaign among BIO users and the "Break-up methods" section of the website received the most page views. Research to disentangle which elements of a multi-component intervention are accounting for change is needed as is further research to explore the cumulative effect of the intervention and how it can connect with other social media or technological resources.

Overall, there is very little evidence on the effectiveness and cost-effectiveness of social media interventions available to decision makers. The World Health Organization recently made a call to action for more research on the effectiveness of social media and mHealth interventions for behaviour change (World Health Organization, 2011b). In addition, further research is needed to ensure that smartphone and social media interventions incorporate evidence-based practices (Fiore et al., 2008) rather than non-evidence-based practices such as hypnosis (Abroms, Padmanabhan, Thaweethai, & Phillips, 2011; Richardson, Vettese, Sussman, Small, & Selby, 2011) and that this knowledge is translated for policy-makers (Abroms, Lee Westmaas, Bontemps-Jones, Ramani, & Mellerson, 2013; Backinger et al., 2011; Prochaska, Pechmann, Kim, & Leonhardt, 2012; Richardson et al., 2011).

Conclusion

A large number of young adults prefer a forum such as BIO for help to quit smoking in comparison to traditional quitline services. The reach of the campaign and findings on quitting success indicate that a multi-component digital and social media campaign offers a promising opportunity to promote smoking cessation. While there is no one-size-fits-all policy for smoking cessation, an integrated approach that combines traditional quitline cessation services and a BIO type social media campaign may be more effective, particularly in reaching young adult smokers.

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Authorship Contributions

NBB led the conceptualization and design of the study and CDN, KM and KSB contributed to the design of the study. NBB and SA drafted the manuscript. NBB, SA, CDN, KM and KSB critically revised the manuscript for important intellectual content. NBB is principal investigator and CDN and KSB are co-investigators on the research funding application. KM provided administrative, technical, and material support. NBB is the guarantor.

Declaration of Interests

None declared.

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Table1. Socio-demographic Characteristics, Smoking Behaviours at baseline and Use of Cessation Aids and Supports by Young Adult Smokers in Break-It-Off and Smokers' Helpline Programs

	BIO User (N=102) (n, %)	SHL User (N=136) (n, %)	P value *
Socio-demographics			
<i>Gender</i>			
Male	52 (51.0)	50 (36.8)	.028
Female	50 (49.0)	86 (63.2)	
<i>Age †</i>			
19 to 24	54 (54.5)	64 (47.1)	.257
25 to 29	45 (45.5)	72 (52.9)	
<i>Highest level of education</i>			
High school or less	37 (36.3)	69 (50.7)	.026
Post-secondary or higher	65 (63.7)	67 (49.3)	
<i>Ethnicity †</i>			
White	77 (76.2)	114 (89.1)	.010
Other ethnicity	24 (23.8)	14 (10.9)	
<i>Working status †</i>			
Not working	49 (49.5)	62 (45.6)	.554
Working (full or part-time)	50 (50.5)	74 (54.4)	
Smoking behaviour at baseline			
<i>Cigarette consumption †</i>			
Smoking daily	52 (59.1)	111 (81.6)	<.001
Not smoking daily	36 (40.9)	25 (18.4)	
<i>Heaviness of smoking index †</i>			
Medium or high	31 (36.5)	55 (40.4)	.556
Low	54 (63.5)	81 (59.6)	
<i>Intent to quit in next 30 days</i>			
No	31 (30.4)	26 (19.1)	.044
Yes	71 (69.6)	110 (80.9)	
Use of cessation aids and supports			
<i>Have used cessation aids</i>			
No	40 (39.2)	48 (35.3)	.535
Yes	62 (60.8)	88 (64.7)	
<i>Social support: at least one support person was available</i>			
No	11 (12.0)	22 (16.2)	.374
Yes	81 (88.0)	114 (83.8)	

*: P value for Chi-Square test of association

†: some missing values for this variable in the study population

Table 2. Multiple Logistic Regression for the Association between Participant Characteristics with 7 day and 30 day Smoking Abstinence at Three Months.

	7 day Point prevalence at 3 months			30 day point prevalence at 3 months		
	Abstinent * n (%)	OR crude (95% CI)	OR adjusted † (95% CI)	Abstinent, n (%)	OR crude (95% CI)	OR adjusted ‡ (95% CI)*
Socio-demographics						
<i>Gender</i>						
Male \$	31 (30.4)	1.00	1.00	23 (22.6)	1.00	1.00
Female	38 (27.9)	0.89 (0.51-1.56)	0.90 (0.45-1.82)	29 (21.3)	0.93 (0.50-1.73)	1.12 (0.53-2.39)
<i>Age</i>						
19 to 24 \$	31 (26.3)	1.00	1.00	21 (17.8)	1.00	1.00
25 to 29	31 (31.6)	1.30 (0.74-2.29)	1.09 (0.54-2.21)	31 (26.5)	1.67 (0.89-3.11)	1.62 (0.76-3.45)
<i>Highest level of education</i>						
High school or less \$	21 (19.8)	1.00	1.00	18 (17.0)	1.00	1.00
Post-secondary or higher	48 (36.4)	2.31 (1.28-4.19)	2.16 (1.06-4.41)	34 (25.6)	1.70 (0.89-3.22)	1.38 (0.64-2.97)
<i>Ethnicity</i>						
White \$	53 (27.8)	1.00	1.00	40 (20.9)	1.00	1.00
Other ethnicity	15 (39.5)	1.70 (0.82-3.50)	1.86 (0.74-4.69)	11 (29.0)	1.54 (0.70-3.37)	2.06 (0.77-5.52)
<i>Working status</i>						
Not working \$	29 (26.1)	1.00	1.00	20 (18.0)	1.00	1.00
Working (full or part time)	39 (31.4)	1.30 (0.74-2.29)	1.15 (0.57-2.29)	31 (25.0)	1.52 (0.81-2.85)	0.94 (0.44-2.00)
Smoking behaviour at baseline						
<i>Cigarette consumption</i>						
Smoking daily \$	29 (17.8)	1.00	1.00	21 (12.9)	1.00	1.00
Not smoking daily	36 (59.0)	6.65 (3.48-12.74)	6.26 (3.10-12.67)	28 (45.9)	5.74 (2.90-11.34)	5.93 (2.82-12.46)
<i>Heaviness of smoking index</i>						
Medium or high	16 (18.6)	1.00	1.00	13 (15.1)	1.00	1.00
Low	49 (36.3)	2.49 (1.31-4.76)	1.00 (0.42-2.34)	36 (26.7)	2.04 (1.01-4.12)	0.90 (0.35-2.32)
<i>Intent to quit in next 30 days</i>						

No §	10 (17.5)	1.00	1.00	8 (14.0)	1.00	1.00
Yes	59 (32.6)	2.27 (1.07-4.81)	2.19 (0.79-6.12)	44 (24.3)	1.97 (0.87-4.47)	2.56 (0.79-8.28)
Use of cessation aids and supports						
<i>Have used cessation aids</i>						
No §	27 (30.7)	1.00	1.00	20 (22.7)	1.00	1.00
Yes	42 (28.0)	0.88 (0.49-1.56)	0.70 (0.34-1.45)	32 (21.3)	0.92 (0.48-1.74)	0.72 (0.33-1.56)
<i>Social support: at least one support person was available</i>						
No §	5 (15.2)	1.00	1.00	4 (12.1)	1.00	1.00
Yes	59 (30.3)	2.43 (0.89-6.60)	2.45 (0.79-7.62)	45 (23.1)	2.18 (0.73-6.52)	2.22 (0.64-7.70)

*: Number and percent of participants who were abstinent at 7 days or 30 days at 3 months follow-up in each group.

†: Confounders included in all final models: education, ethnicity, cigarette consumption, intent to quit in next 30 days, and social support.

‡: Confounders included in all final models: age, education, ethnicity, cigarette consumption, intent to quit in next 30 days, and social support.

§: referent group

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Table 3. Multiple Logistic Regression for the Associations between the Social Media Campaigns and Three Month Smoking Cessation Outcomes

Outcomes	Favorable outcomes * n (%)	OR crude (95% CI)	OR adjusted † (95% CI)
Primary Outcomes			
7 day PPA			
Smokers' Helpline ‡	21 (15.4)	1.00	1.00
Break-it-off	48 (47.1)	4.87 (2.66-8.93)	3.89 (1.98-7.67)
30 day PPA			
Smokers' Helpline ‡	19 (14.0)	1.00	1.00
Break-it-off	33 (32.4)	2.95 (1.56-5.57)	2.14 (1.05-4.38)
Secondary Outcomes			
Made a quit attempts (stopped for ≥ 24 hours)			
Smokers' Helpline ‡	87 (79.1)	1.00	1.00
Break-it-off	61 (91.0)	2.69 (1.03-6.99)	2.05 (0.77-5.49)
Cut down amount smoked			
Smokers' Helpline ‡	85 (79.4)	1.00	1.00
Break-it-off	59 (89.4)	2.18 (0.88-5.44)	2.18 (0.76-6.24)
Set a quite date			
Smokers' Helpline ‡	69 (63.3)	1.00	1.00
Break-it-off	42 (65.6)	1.11 (0.58-2.11)	1.30 (0.61-2.73)

*: Number and percent of participants who obtained favorable outcomes at 3 months follow-up in each group.

†: Confounders included in all final models: education, ethnicity, and cigarette consumption at baseline.

‡: referent group.

BREK IT OFF

Get It OVER WITH. Stay SPLIT UP. Move On WITH LIFE.

59,793 CIGARETTES DUMPED

It's not me, it's you.

Stay Split Up
How to overcome old habits and cravings.

Move On With Life
Because you're totally worth it.

Get It Over With
You know you have had enough of your smokes.

Break-up Methods

World's Biggest Break-up

The Ugly Truth

Break it off on Facebook.

GIVE A QUIT COACH YOUR DIGITS.
416 555-1212
[What's a Quit Coach?](#)

Get our FREE app for help on the go.

Join the world's biggest break-up with smoking!
Make it official by telling the world exactly what you think of smoking. **Have 'the talk' now.**

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Figure 1. Break It Off homepage

BREK IT OFF

Get It OVER WITH **Stay SPLIT UP** Move On WITH LIFE

24,535,035 CIGARETTES DUMPED

Break It Off Mobile

Dump smoking wherever, whenever.
Download the FREE Break It Off App and avoid smoking temptations as they happen.

Smoking is a total creep. It'll follow you around waiting for the moment when you're at your most vulnerable. And when you are, that's when it'll try to get back with you. The Break It Off App helps you through those moments of weakness, so you can get over your smoking relationship once and for all.

I'm stressed
I'm bored
I'm tipsy
I can't concentrate
I can't relax
I'm stuffed
Call a Quit Coach!

I'm bored
I'm tipsy
I can't concentrate

Overcome your old desires.
Whether you're stressed, angry, tipsy or bored, you'll get the tools you need to get through it without reaching for a smoke.

Track your break-up progress.
See how long you've gone without a smoke, when you're most vulnerable to cravings and where these cravings are happening.

Break-Up Stats

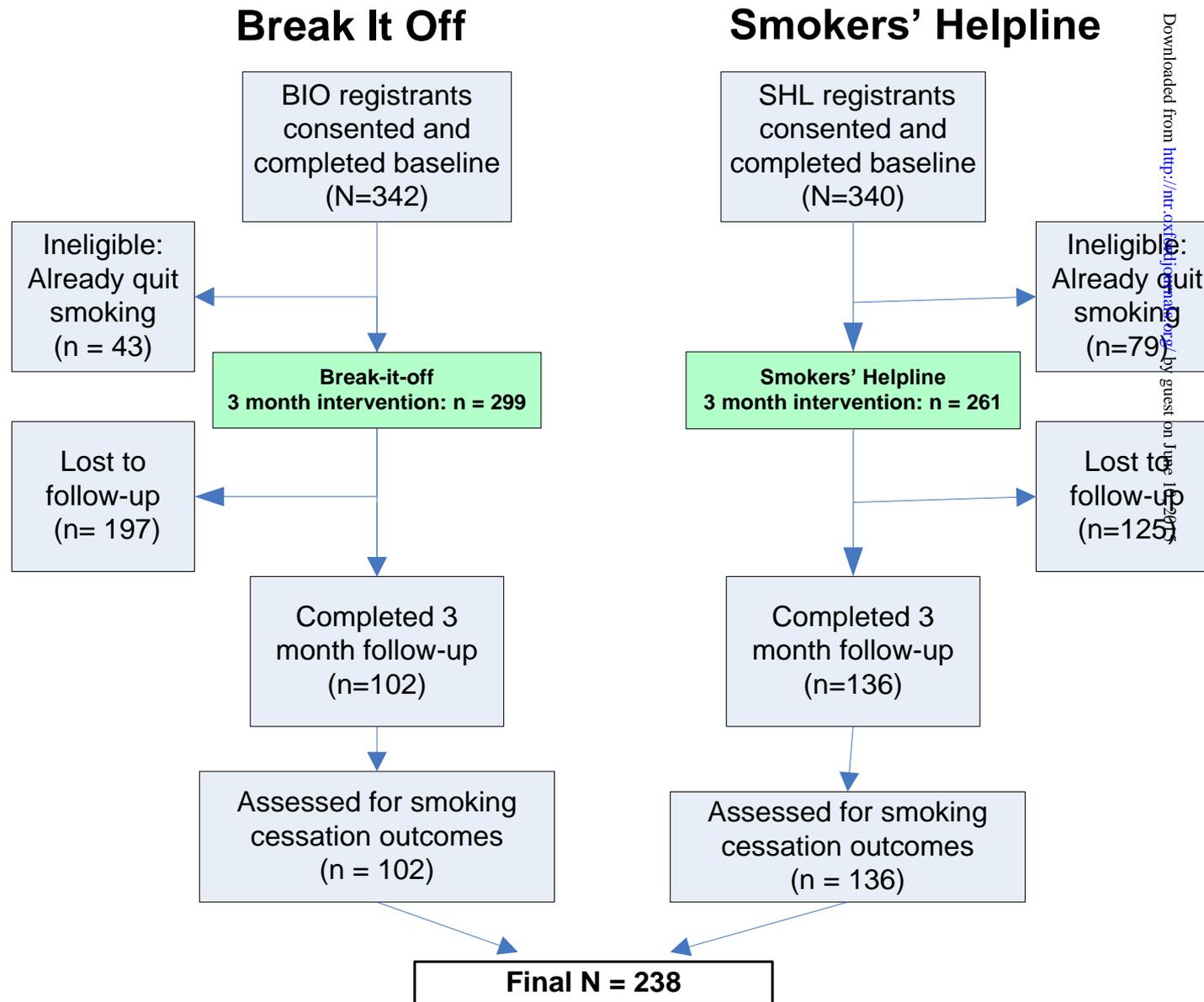
haven't smoked in	I've dumped	I've saved
19 days	114 cigarettes	\$57 so

I'm Stressed
Smoking won't calm you down. It never did. It'll just go behind your

Get real-time break-up stats. **Deal with slip-ups.**

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Figure 2. Break It Off smartphone app page



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Figure 3. Participant flow-diagram of Recruitment and Data Collection