

Overcoming The Cravings Using Smoking Cessation Apps: A Review

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DOI: <http://dx.doi.org/10.21276/ijcmsr.2020.5.3.9>

How to cite this article: Shalini, Shakeeba Rashid, Rahul Srivastava, Bhuvan Jyoti. Overcoming the cravings using smoking cessation apps: a review. International Journal of Contemporary Medicine Surgery and Radiology. 2020;5(3):C30-C37.

ABSTRACT

There are approximately 1.3 billion smokers in the world. The death toll from consumption of tobacco is currently 5 million people a year; if current usage rates continue, the death toll will almost double, reaching nearly 10 million by 2020. A mobile phone-based application is being designed to support quitting of smoking through a range of interactions. Smoking cessation app provides behavioral support such as education, motivation and advice on how to quit successfully. This can be used either alone or in conjunction with pharmacological help and/or advice. The purpose of this article is to review the smoking cessation app as an ideal option for cessation of smoking habit.

Keywords: Smoking Cessation Apps, Tobacco, Smoking, Oral Cancer

INTRODUCTION

Tobacco is a green, leafy plant growing in warmer climes. After selection, it is washed, grinded and used in different ways. It is smokable in a cigarette, pipe, or cigar. It can be chewed (called smokeless tobacco) or sniffed through the nose (called snuff). Nicotine is one of the 4,000 chemicals in cigarettes and its smoke.¹

When nicotine is ingested it enters the bloodstream where it circulates across the body and passes through the blood-brain barrier to the brain. Once in the brain, it binds receptors called cholinergic receptors and activates them. Throughout the brain as well as in other areas such as muscles, heart, adrenal glands and other vital organs, these cholinergic receptors are present. Such receptors are normally stimulated by the neurotransmitter acetylcholine that is produced at nerve endings in the brain and the peripheral nerves. Since nicotine has a structure similar to acetylcholine, it can stimulate the cholinergic receptors. Nicotine, however, does reach the brain unlike acetylcholine and disrupts the usual workings of it.² Even after a few uses a person can become addicted to nicotine because the brain changes itself and establishes a level of nicotine tolerance that must be met by the user in order to retain the comfort. Once this comfort level has been established, a lack of nicotine in the brain will cause uncomfortable withdrawal symptoms to the user.³

Digital technologies have become ever more pervasive in young adults' everyday lives. According to recent statistics, young adults aged 18 to 29 lead the way in the use of mobile

phones, both those that run apps (65%) and those that do not (93%).⁴ Use of mobile phone apps has become a focused means for engaging young adults. Not only are young adults most likely to download apps, but they are also the most intense users of apps.⁵

Mobile phones have proved to be a ubiquitous mode of communication globally. Currently, mobile phones are owned by almost 80% of the world's population. More than 6.8 Billion mobile subscriptions are present globally, out of which 1.08 billion are smart phone users.⁶

Smoking cessation services internationally are using mobile phones to deliver support, particularly as adjuncts to other services. In 2014, the UK's National Health Service rolled out text messaging integrated into routine clinical practice and in 2013 almost half of US quitlines offered text messaging in addition to phone counseling services.⁷

The use of mobile phone apps for health interventions, such as for smoking cessation, offers many unique benefits compared to traditional approaches, most notably because individuals can access these interventions anytime and in everyday settings since assistance is immediately available when needed (e.g. helping in dealing with cravings). In addition, individuals have many opportunities to tap into various support networks via their mobile phones, such as through social media. Support networks include those which are intervention related (e.g. quit buddies and social networking sites associated with the intervention) and those related to their personal social networks (e.g. personal contacts).^{8,9}

SMOKING CESSATION APPS

Free android apps for smoking cessation were identified on 21 June 2012 using the ‘Play’ link on Google’s USA homepage (www.google.com) and on 1st January 2013 using Amazon’s USA homepage (www.amazon.com) and inputting several search terms including: ‘quit smoking’, ‘smoking cessation’, and ‘stop smoking’ in the search bar.¹⁰

Smoking cessation programs are also starting to use mobile phones, particularly as adjuncts to quitlines and Internet quit coaches, e.g. the NHS Stop Smoking Service’s ‘Together’ program (<http://gosmokefree.nhs.uk/what-suits-me/support-at-home/>) and the New Zealand Quitline ‘Txt2quit’ program (http://www.quit.org.nz/txt2quit/page/txt2quit_5.php).⁷

The Android and iPhone, two of the most popular smart phone devices, can both be used to access apps that target smoking cessation.¹⁰

Smart phones have powerful operating systems that can run computer programs or applications (apps), in addition to the standard features of mobile phones.^{5,6} Among smart phones, the iPhone is notable because since its release in 2007, third parties have been able to create apps for the iPhone operating system and distribute them to the public through a common online website, the Apple iTunes store. To date, the Apple iTunes store has released more than 100,000 iPhone apps, which have been downloaded by consumers more than 3 billion times.¹¹

Currently, there are more than 23,000 apps available on iTunes under the “health and fitness” or “medical” categories, and more than 200 of these purport to be for smoking cessation. Two recent content analyses of smoking cessation apps found that these apps did not typically adhere to evidence-based principles for smoking cessation or contain behavior change techniques (BCTs) that have been found effective in face-to-face support.¹²

The most popular smoking cessation app for iPhone and iOS devices is LIVESTRONG MyQuit Coach, and QuitNow is the most popular app on android, which lets you manage cravings and reveals how much money you have been investing, and how your health has improved since you quit.¹³ While those two stand out among the smoking cessation devices, there's a range of strategies available to help you quit. Several devices concentrate on nicotine monitoring, such as MyQuit Coach and Quit Smoking. Others, such as Quit It Lite and My Last Cigarette, focus on behavioral economics, such as avoiding adverse health effects or the non-smoking economic benefit. Some also exploit games or social, peer-reinforcement such as the Cessation Nation. Apps such as Craving to Quit and Quitter offer motivational content such as pictures of your family. "There are also apps like UCSF

Stop Smoking, QuitNow and NHS Quit smoking so you can set your target and try to stick to it.¹³

APPS AVAILABLE FOR QUIT TOBACCO/SMOKING

If patient is finally ready to leave tobacco behind forever, help is in the palm of his hand. Whether he is using an iPhone, Android or Windows Phone, a quit-smoking app offers up the virtual support to patient. Table 1 enlists various apps available for quit tobacco/smoking.¹⁴

QUIT SMOKING-QUIT NOW

Quit Now is a smoking cessation app that can help to track that since how long the person had quit, how much money was saved, and even the positive impact quitting has had on health. Quit Now has achievement badges as well, so a person can try to make quitting sort of fun.(Figure:1)

Quit now is a community of over two million wonderful people who have managed to quit smoking by receiving and giving help and encouraging messages using chat. Quit now will inform about the following:

- The time since last drag.
- The cigarettes that haven’t yellowed your fingers.
- The amount of money saved by not smoking so that the person can invest for his niece.
- The evolution of health improvements as per WHO indicators.

It enables the self-control by utilizing achievements that will be unlocked overtime. A person will be able to share his achievements on social network.^{15,16}

Quit Smoking LITE

Quit smoking Lite is a colorful and comprehensive application that encompasses statistics, health concerns,

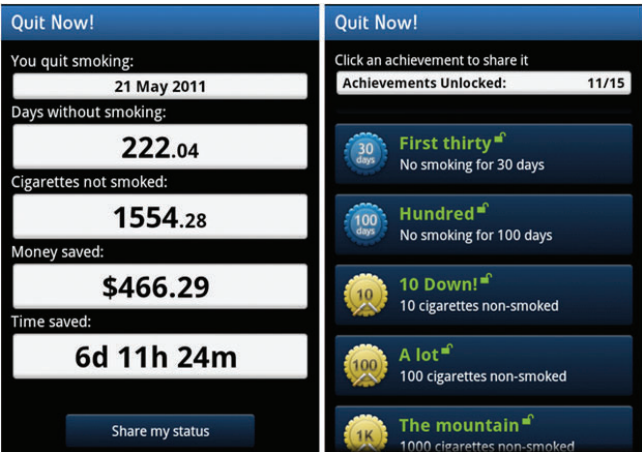


Figure-1: Quit Now smoking cessation app

S.No.	Android	i tunes	Windows
1	Quit smoking-quit now	LIVESTRONG My quit coach	Kick Smoking
2	Stop! Quit smoking-LITE	Quit It Lite	Stop Smoking
3	Quit smoking: Cessation Nation	My last cigarette	Quit smoking
4	Get rich or die smoking	UCSF/SFGH stop smoking	Smoke free
5	Time to quit smoke	Quitter	Quits

Table 1: Various apps available for quit tobacco/smoking

awards trophies as reinforcement, and allows to share on facebook or SMS to keep your friends updated or ask for encouragement. The app encourages the person with a real-time display of money saved, time saved by not smoking, and the number of non-smoked cigarettes. Quit smoking Lite smoking app has following features:

- Saved money and time can be seen.
- Display the number of cigarettes not smoked.
- Customize app with profile pictures and color themes.
- **Community - System:** Talk and help to other quitters.
- **Diary:** Quitter can share his thoughts and feelings with his diary.
- **Motivating achievement system:** Watch the progress of your achievements.
- **Achievement Generator:** It helps to build personal achievements.
- **Share achievements:** Quitter can share his achievements with the community or via SMS or email
- **Amazon Wish List:** Import public Amazon wish list.
- **Emergency Button:** Help to see morbid pictures or scientific articles on the problems of smoking. Weak moment? Press the button.^{17,18,19}

Quit smoking: Cessation Nation

Cessation Nation is a special Android app which helps patient to connect to a much larger social community of quitters through facebook. Cessation Nation is a virtual community built to help people quit smoking and to come together to support them. This online forum is a place where, through others and their experiences, current and former smokers can get help. Motivational calculator of app shows the amount of money saved as well as health progression.^{20,21} This app has many screens packed with information and has received a 4.7/5.0 rating and featured in Healthline.com in their list of top quit smoking apps of 2013. It has the usual numbers and statistics since quitter has stopped smoking, as well as games to distract while quitter fights his cravings. They have a “vibrant” facebook community as well that offers support for every one trying to stop smoking.^{22,23}

GET RICH OR DIE SMOKING

Almost 4,200 reviews with a 4.7/5.0 rating has been given to “Get rich or die smoking” app. It is ad free and includes

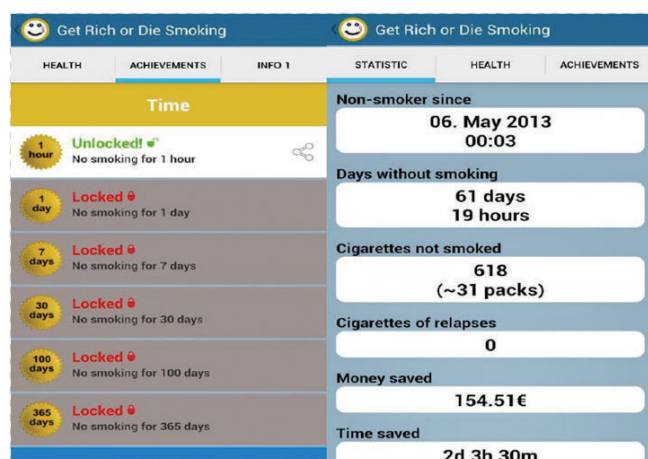


Figure-2: Get rich or Die smoking app

extensive screens and lots of color. Along with relapse button, it provides chat community, personalization for smoking habits with lots of configurations as well as a sophisticated reward system.(Figure:2)

It also provides facility for tracking and sharing positive effects on health and achievements via SMS, e-mail, facebook and other applications. ‘Get rich or die app’ has following features:

- Sophisticated reward system.
- Configuration of smoking habits, quit time, etc.
- Chat community.
- Relapse button and detailed statistics.
- 2 Widgets displaying progress.
- Several currencies supporting system.
- Management of products.
- Automated product picture loading system (Internet), via Camera or loaded from gallery.
- Enable trophies (time, money, cigarettes, products).
- Positive effects monitoring.
- Quitter can share his achievements via SMS, email, facebook etc.
- Info screens about money and time saved by smoking.
- Available in various languages.^{22,24}

For those persons who want to quit smoking, this application was created.

Analyzation of saved money, smoked cigarettes, time passed after quitting smoking can be done with help of this application. Achievements can be displayed more conveniently by customizing widget to the desktop.

This application has over 1,300 reviews (4.5/5.0) and over 2,700 Google+. It has a colorful UI, with this app quitter can create a widget for his screen that shows up to-to-date information on how long it has been since he smoked, the number of cigarettes he hasn’t smoked, and the money he has saved and has ‘always on’ display to remind his statistics.^{22,25}

I-Phone Apps

LIVESTRONG My quit coach

This one calls itself “Europe’s No.1 Quit Smoking App.” It has hypnosis program, videos, motivational and informative articles and an interactive section. The LIVESTRONG.COM MyQuit Coach application helps to quit smoking through personalized plan. Through a physician approved,



Figure-3: My Quit Coach smoking cessation app

interactive app, quitter can evaluate his current status, set attainable goals and adjust preferences according to needs and finally be able to stop smoking.^{22,26}

For quitting smoking, it is the most complete tool in the market. To combat smoking habits it offers real time charts. (Figure:3) It tracks trigger hours and provide graphic representation of smoking pattern changes overtime. My QuitCoach provides information for following:

- Number of cigarettes.
- Number of cravings.
- Average cigarette intake per day.
- Average cravings per day.
- Total cigarettes smoked.
- Total cravings.
- Money spent and saved.
- Damage caused by each cigarette.
- Longest quit period.²⁷

Quit It Lite

This app helps ex-smokers to stay quit and encourages smokers to quit smoking through tiny motivating program. It monitors the quitter by tracking money saved and cigarette not smoked. It ranks and text the benefit of quitting. (Figure:4) Quit it lite app has following features:

- Total money saved.
- Number of cigarettes not smoked.
- Define goals.
- Achievements accomplished and shared.
- Estimation of consumed tar.
- Shows the benefits of quitting.²⁸

My Last Cigarette

This app is gaining popularity around a while and one of best way to quit smoking. This app has been around for a while, and it still manages to be one of the best ways for people to quit, gaining popularity even as new apps hit the market. The cost of this app is \$0.99, but it can be worth it for the help it provides. It helps to quit smoking by inspiring through daily motivational messages. Differences are being created by choosing healthy options based upon medical facts about smoking and quitting smoking. Motivation for quitting once and for all comes in a great way for quitters.^{32,33} After entering the personal details person can watch his statistics updated in real time, every second. (Figure:5) There

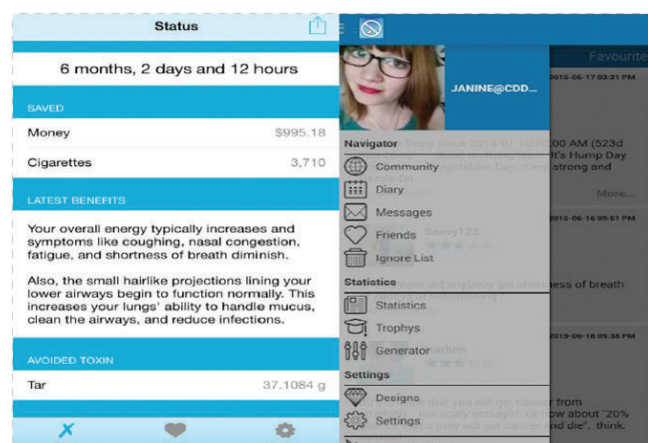


Figure-4: Quit It Lite smoking cessation app

are following features of this app:

- Read nicotine level.
- Read expected cravings.
- All estimates are based on the most current medical and statistical information.
- Motivational quote or medical fact per day
- Deaths since you quit readout.
- Blood carbon monoxide level.
- Increase life expectancy readout.
- Read the time person has been a nonsmoker.
- Read number of cigarettes not smoked.
- Risk of heart attack compare to risk before.
- Risk of lung cancer compare to risk before.
- Money saved.
- Expected circulatory improvement.
- Expected lung function improvement.
- Readouts updated every second and are based upon personal past smoking habits.^{30,31}

UCSF/SFGH stop smoking

It is app- based version of a US National Cancer Institute resource developed by the University of California San Francisco (UCSF). This app helps to quit and stay quit by discovering between smoking, mood and day to day life. This Stop Smoking self-help program is delivered via the mail and online. According to studies quit rates delivered are comparable to quit rates for the nicotine patch.

This application is part of a broad-based effort at UCSF and SFGH. This app has following features:

- Track smoking habits, mood and healthier activities.
- Monitors activities that influence smoking.
- Helps to quit and stay quit through proper guidance.^{32,33}

Quitter

Quitter is the ultimate tool for mobile to quit smoking. It determines real reasons behind. It helps to quit smoking habits through motivational character's messages, built-in achievement system, and social network. It shows the money

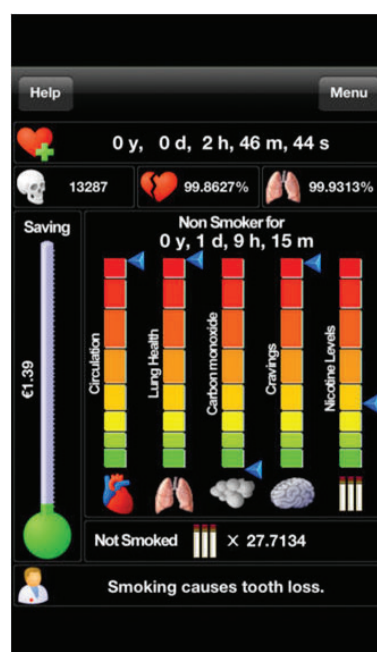


Figure-5: My Last Cigarette smoking cessation app

saved, time since last cigarette smoked.(Figure:6) Person can also upload inspiring images and posts on facebook and other social networking sites/apps. Quitter app is available for iPhone and iPad. Its main features include:^{34,35}

1. Tracking of cravings and relapses – One of the most important features of this app is tracking when, where, and why a relapse occurred. When quitter have, or give into, a craving, he will be able to open the Quitter app and immediately add an entry into the system for a date, time, GPS location, and a selectable reason for why it occurred.

2. Statistical Aggregation and Display – Another major focus of the app by using a series of graphs, charts, and lists, app will show enough information to help and understand the root cause for smoking habits.

3. Messages – This application will display messages periodically that are designed to incite the desire to quit. These messages contain publicly available health information, encouraging comments, graphical images, and other various things that may help inspire to quit.

4. Achievements – Quitter app comes stockpiled with an achievement system for progress. The more cravings quitter resists and the longer he goes without a cigarette, the more achievements will unlock.

5. Social Networking – This app also focus on the use of social network for motivation. Person can share his quitting progress with face book and show that how he is doing in relation to quitting smoking.³⁴

Lorien C. Abroms LC in 2011 conducted a study to examine the content of the 47 iPhone applications (apps) for smoking cessation that were distributed through the online iTunes store, as of June 24, 2009 and he concluded that iPhone apps for smoking cessation rarely adhere to established guidelines for smoking cessation. It is recommended that current apps be revised and future apps be developed around evidence-based practices for smoking cessation.¹¹

WINDOWS

Kick Smoking

This app helps to kick the smoking habit. This allows setting up savings goals, resist cravings and offer encouragement by



Figure-6: Quitter smoking cessation app

keeping a track of the health benefits. It resists craving with help of app craving timer. There are following features of this app:

- Record the time when you became smoke free.
- Record money saved
- Record the number of cigarettes not smoked.
- Record the number of cravings resisted
- Push notifications! Get notified every time you unlock a new milestone!
- Live Tiles surface key metrics, updated every 30mins.
- Health benefits you should experience.
- View a timeline of expected health benefits.
- Set savings goals
- Share progress with your friends.³⁶

Stop Smoking

Stop Smoking helps to quit smoking by giving valuable feedbacks on number of cigarette smoked per day. There is "I Smoke" button for smoking and "I don't smoke" button for not smoking to tell the application that person really want to smoke but successfully avoided it. Missed cigarette can also be added. (Figure:7) This app is free of cost.³⁷

Smoke Free

It calculates the time since quitting and allows sharing results through the social networks. This app has following features:

- Time since not smoked.
- The money saved.
- The number of cigarette not smoked.
- Improvement in health.
- Earn badges for progress.
- Share successes with friends.
- Record cravings in a diary

This is a science built application which delivers proven techniques to stop smoking in a beautifully clear and very human way.(Figure:8) The calculator tells life regained, last time smoked, saved money. Bar shows improvement of health and how cravings for cigarettes are decreasing over time. It helps to quit smoking through the information provided by user. Tens of thousands of people do it successfully each month and help others by sharing achievements.^{37,38}

Effectiveness Of Cessation Apps

Shahab, L. published a report on systemic review of the



Figure-7: Stop Smoking cessation app

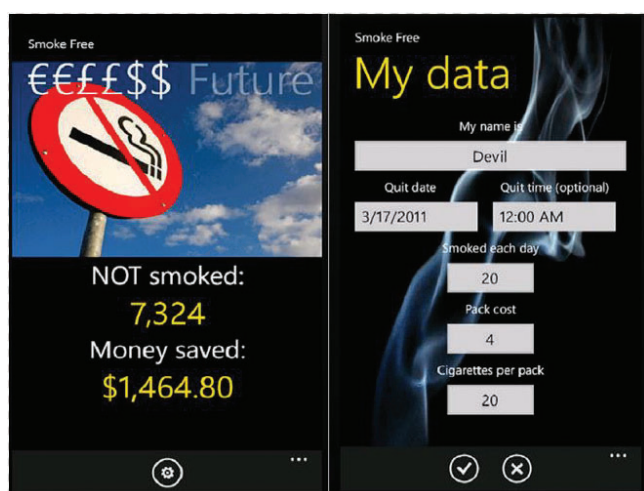


Figure-8: Smoke Free cessation app

literature on the online support for smoking cessation. He examined the efficacy and acceptability of online, interactive interventions for smoking cessation and identified the treatment effect moderators and mediators. A systematic review and meta-analysis of the literature of 18 years was conducted, finding eleven relevant randomized controlled trials. Data were extracted and risk ratios and risk differences estimated with a random effects model. He concluded that interactive, web-based interventions for smoking cessation can be effective in aiding cessation but more research is needed to evaluate the relative efficacy of interactive web-based interventions compared with static websites.³⁹

Bennett ME reviewed and evaluated free Android apps for smoking cessation available for download from Google Play and Amazon's USA homepage in January 2013. Apps were reviewed; those targeting smoking cessation were identified and examined to ensure that they targeted tobacco smoking and were focused on quitting. Remaining apps were independently rated by three reviewers for 24 clinical strategies for smoking cessation. He concluded that android apps for smoking cessation have some strengths, they would benefit from incorporating a broader range of strategies for helping people quit smoking.¹⁰ Buford et al conducted a randomized controlled trial of a computer-generated ageing intervention to promote smoking cessation among young adult smokers within a community pharmacy setting and it was concluded that demonstrating the detrimental effects on facial physical appearance using a computer generated simulation may be both effective and cost-effective at persuading young adult smokers to quit.⁴⁰ Recently in 2015, Baskerville NB et al determined the effectiveness of an evidence-informed mobile phone app for smoking cessation, Crush the Crave, on reducing smoking prevalence among young adult smokers. This study provided the evidence to move forward on decision making regarding the inclusion of technology-based mobile phone interventions as part of existing smoking cessation efforts made by health care providers.⁴¹

In 2016 Whittaker R et al determined the efficacy of mobile phone-based smoking cessation interventions increase smoking cessation in people. Randomized or quasi-

randomized trials were done. Participants were smokers of any age who wanted to quit. Studies were those examining any type of mobile phone-based intervention for smoking cessation and included any intervention aimed at mobile phone users, based around delivery via mobile phone, and using any functions or applications that can be used or sent via a mobile phone.⁷

Smart phones and Delivery of Smoking Cessation Applications

The smart phone's portability makes apps available to consumers anytime and anywhere, which saves time and offers more privacy and anonymity. App stores are not ordinary Web-based stores. They attract millions of users who seek apps for their smart phones. The largest are the Google Play (previously known as the Android Market) and the Apple App Store. In 2009, after nine months in business, the Apple App Store had uploaded one billion apps to its users. In 2012, Apple users had downloaded 40 billion apps, up from 15 billion in 2011. Android users downloaded 25 billion apps in 2012, up from 10 billion in 2011.⁴²

The World Wide Web has become a major and prominent source of health knowledge, with over 3 million public websites and over 1.4 billion web pages. With the vast amount and dynamic nature of information on the World Wide Web, it is not surprising to find that over 75% of those online use search sites to navigate the Web. However, the amount of results returned from a search is often overwhelming. For example, 115000 results were found with the search terms "teen quit smoking" in Google.

Of the several thousand search sites or directories, only a few are of high popularity as indicated by their audience reach and time spent on them. Although Google will provide up to a thousand results from a query, few users are likely to examine them all, position ranking in Web-search results, especially on the first few pages, is an important determinant of information accessibility by users.⁴³

Smartphone-Based Smoking cessation Apps - Why??

There are various advantages of internet-based smoking cessation interventions like anonymous online chat groups, bulletin discussion boards, and email, where sensitive personal health issues can be discussed by health consumers more easily instead of face-to-face in self-help groups.⁴⁵ Smartphone smoking cessation apps have following features:

- (1) Available at arm's reach.
- (2) Visually-engaging design.
- (3) Video and audio capabilities.
- (4) Unrestricted text capabilities.
- (5) Access without cellular or internet connection.
- (6) Immediate access to intervention content.
- (7) Optimized to smart phone screen size.
- (8) Content sharable via social media.
- (9) Tracking progress anywhere and anytime.

Smartphone apps can also aid interactive self-monitoring by letting users add data about their health in various ways, including question and answer forms, text writing, and audio or video recordings. These apps can process, organize, and graph this self-monitoring data to help users understand their progress. Using this data can help the users in every step

of their quitting journey, providing text information about quitting, letting them see how many days they are nicotine-free, providing diaries for their quitting attempts and craving triggers, and sending them reminders and motivational messages.^{42,44}

CONCLUSION

Smart phones are increasingly the device with which lower income and minority populations access the internet, making smart phone apps an important public health tool and an obvious modality for delivering population-based smoking cessation interventions. On the smart phone, intervention and smoking cessation help comes in the form of apps. Smoking cessation programs include accessibility, personalization, and convenience—content can be viewed on-demand. Reaping the technological capacities of mobile devices in future app development will be all the more helpful in people stopping to smoke.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 15-05-2020; **Accepted:** 08-06-2020; **Published online:** 09-08-2020