# Smart Phone Apps for Smoking Cessation - A Qualitative Study among Healthcare Providers in Chennai

Sree T. Sucharitha[1], Pradeep Rangasamy[2], Vaishikaa R.[3], Balaji S.M.[4], Bindu T.[5], Gunasekaran N.[6]

[1, 3] Department of Community Medicine, Tagore Medical College Hospital, Chennai, Tamilnadu, India. [2] Department of Psychiatry, Madha Medical College, Chennai, Tamilnadu, India. [4] Department Community Medicine, Thanjavur Medical College, Thanjavur, Tamilnadu, India [5] Department of Respiratory Medicine, Tagore Medical College Hospital, Chennai, Tamilnadu, India. [6] Department of General Surgery, Tagore Medical College Hospital, Chennai, Tamilnadu, India.

**ABSTRACT**

**BACKGROUND**

Majority of smokers are aware of health consequences due to smoking but reported inability to quit smoking in multiple studies. Reasons attributed to continued smoking include multiple causes like addiction, habit and stress, as well as face-valid causes such as disease, personality problems, weakness of character, etc. Tobacco cessation services promoted by World Health Organization (WHO) are typically to be initiated by the service provider and include brief opportunistic assessment for smoking cessation widely known as 5A' and 5R's for brief assessment. Health interventions are identified by WHO as an effective way to enhance the promotion of tobacco cessation as only three percent of smokers manage to quit without help of intervention. This study explored the awareness of smart phone apps for smoking cessation among private healthcare providers in Chennai.

**METHODS**

A qualitative, explorative study through one-on-one, personal interviews among 36 randomly approached and consenting healthcare providers primarily providing tobacco related health care services including dentists, psychiatrists, ear – nose - throat surgeons, general medicine, respiratory medicine, surgeons and obstetricians at six private teaching medical institutes was conducted from July 2020 to October 2020 in Chennai.

**RESULTS**

The results showed that majority of the healthcare providers lack awareness of smart phone-based apps for smoking cessation. However, a very small minority[3] who were aware were limited by social determinants of health of the clients such as perceived poor digital literacy, unaffordability of internet packages to recommend them.

**CONCLUSIONS**

The healthcare providers from various fields lacked the awareness of smart phone apps aiding with smoking cessation with the exception of a minor few[3] who acknowledged their existence but were engaged very minimally with these modalities.

**KEYWORDS**

Healthcare Providers' Awareness, Smart Phone Based-Apps, Smoking Cessation Apps, Tobacco Clients, Personal Interviews

*Corresponding Author:*
*Dr. Pradeep Rangasamy,*
*No. 15, Thirukulam Street,*
*Mamallapuram, Chengelpet - 603104,*
*Tamilnadu, India.*
*E-mail: pradeep.psyciatrist@gmail.com*

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## BACKGROUND

Tobacco in all forms is very harmful. Smoking tobacco is the most commonly adopted life-style habit among 1.3 billion tobacco users in the world, belonging predominantly to low- and middle-income countries (LMIC).[1] The global prevalence of tobacco use was set to be reduced by 30 % by the year 2025 relative to 2010 as per the WHO Global Action plan for the Prevention and Control of Non-Communicable Diseases 2013 - 2020.[2] As per the global trends reported by WHO, prevalence of tobacco use is trending downwards, and LMIC are projected to reach 13 % by 2025, compared to 22 % for other income countries. At global level, the prevalence of current tobacco smoking among males was 32.4 % and 5.5 % among females.[1] In a study by Holford et al. (2013), an estimated 8.0 million premature smoking-attributable deaths were due to collective tobacco control measures undertaken in US after first surgeon general's report in 1964.[3] India reports 267 million adults (12 % of global users) using tobacco in any form as per global adult tobacco survey-2 (GATS - 2).[4] About 28.6 % of Indians aged 15 years and above use tobacco in any form and among whom men are 42.4 % and women are 14.2 %. This includes - smokeless tobacco users (199.4 million), smokers (99.5 million).[5]

Tobacco use in any or use of multiple forms of tobacco is attributed to plethora of non-communicable diseases including cancers, oral cancers and cardio-vascular disease especially among 30 - 59 years age group leading to decrease in life expectancy by 11 years (women) and 12 years (men) and premature deaths.[6-8] Majority of smokers are aware of health consequences due to smoking but reported inability to quit smoking in multiple studies. Reasons attributed to continued smoking include multiple causes like addiction, habit and stress, as well as face-valid causes such as disease, personality problems, weakness of character, etc.[9,10] Tobacco cessation services promoted by World Health Organization are typically to be initiated by the service provider and include brief opportunistic assessment for smoking cessation widely known as 5A'and 5R's for brief assessment.[11]

With fast digitalization of the modern world, mobile phone-based applications, popularly known as 'apps' have successfully supplemented, if not ousted, the treatment and follow up modalities in health care sector. Studies suggest that phone technology can induce intended behavioural change in individuals.[12,13] It is estimated that mHealth market would witness more than 38.5 % CAGR in the upcoming years from 2019 to 2025.[14] Being easily downloadable, low cost, fast connectivity and having a large user base, mobile apps have played a significant role to skyrocket mHealth use among the mobile phone users.[12] About 100 thousand mHealth apps are currently available which are downloaded and used but evidence-based studies about its implication with regards to lifestyle or behavioural changes remain limited.[15]

World Health Organization identified mHealth interventions as an effective way to enhance the promotion of tobacco cessation as only three percent of smokers manage to quit without help of intervention.[12,16-18] Looking deeper into smoking cessation treatment with mobile phone intervention, there are various studies conducted with the effects of tailored text messages and apps to promote quitting.[19-20] The efficiency of these modalities majorly proved positive even after 6 months of abstinence.[14,21]

Smart phone apps for smoking cessation remains an understudied research area in LMIC countries including India and currently to our knowledge qualitative studies eliciting health care provider's levels of awareness, current practices about use of smart phone apps for smoking cessation among clients using tobacco are not available. Understanding this will help specialists design better mHealth interventions to effectively address any existing gaps.

### Objective

To assess the awareness of smart phone apps for smoking cessation among multi-disciplinary private healthcare providers in Chennai.

## METHODS

We conducted a qualitative, explorative study through one-on-one, personal interviews among 36 randomly approached and consenting healthcare providers primarily providing tobacco related health care services including dentists, psychiatrists, ear - nose - throat surgeons, general medicine, respiratory medicine, surgeons and obstetricians at six private teaching medical institutes from July 2020 to October 2020, in Chennai. Institutional Research Committee approval was obtained: TMCH / IRC / 2019 / 059 and personal interviews[23] and phone interviews[13] were conducted by principal investigator (PI) with pre-scheduled appointment. The perceptions of care providers who were aware and promoting apps were compared with those unaware of the apps. A semi-structured interview guide was developed after review of literature with a combination of both of closed and open ending questions.

### Survey

*Recruitment of Survey Participants*

Qualified medical and dental multi-disciplinary healthcare providers working in private settings were approached to participate in this study after obtaining oral informed consent. Purposive, convenient sampling with snow-balling technique was used to recruit study participants. Multiple visits were made to the private settings to conduct the interviews on different days to accommodate the working schedules of the participants according to the convenience so as to not disturb their patient-care related activities. Professional networks and personal contacts were leveraged to reach out to multi-specialty professionals and potential subjects were invited to participate in interviews by personal request by principal investigator (STS). A diverse pool of 52 professionals were contacted during the study period for interviews and were excluded from the study either due to disinterest to participate in the study or due to time constraints.

*Interview Guide*

Interview guide was developed after extensive review of literature and adapted to regional context. The pilot testing was conducted on a sample of three care providers from different specialties and changes were made accordingly. The finalized version of the interview guide had a combination of both open and closed ended questions.

*Interview Procedure*

Multi-disciplinary healthcare providers at six private tertiary care teaching institutions in Chennai were approached through personal visits during working hours during the months of July - October, 2020. After explaining the objectives of the study, consenting care providers were interviewed if they provided services to clients consuming tobacco either in smoking or smokeless forms. Interviews were semi-structured in nature and were conducted with the help of interview guide, with a short list of questions and typically lasted for 15 - 20 minutes. Three interviews especially with psychiatrist, ENT and female dentist professional were up to a duration of 35 - 40 minutes due to the rich insights provided by the participants. If the study participants refused to participate in the study, the investigators thanked them for the time provided. At the conclusion of the successful interviews, subjects were requested for any references to any potential contacts among peers from same specialty or from a different specialty and were actively followed up through phone calls or text messages. Additional efforts were taken to reach out and recruit multi-disciplinary care providers to document diverse care experiences towards women tobacco users. Healthcare providers who were having private clinical practice (non-institution based) were recruited through snowballing sampling and were phone interviewed with similar protocol. All the interviews were audio recorded with consent and additionally notes were taken wherever necessary. Because we expected diverse different experiences due to multi-specialty professional backgrounds of the study participants, we continued to reach out to a greater number of professionals in the above specialities and tried to achieve a gender balance to recruit equal number of respondents from both genders. After completing, 36 interviews across the disciplines the authors agreed that recruitment for further interviews may be concluded as no additional insights were being drawn from the interviews. All the interviews were audio recorded with informed consent and additional note was taken by PI. After completion of the interview, PI also conducted a brief recap of the interview and confirmed the discussion points with the participants and included any modifications to the content. This particular segment took around 5 - 10 minutes which allowed for consolidation of the interview discussion.

### Statistical Analysis

The audio content from the interviews was of transcript verbatim and was read independently by two authors (STS, RP) and codes were developed to identify common themes. The two authors presented data and codes with the research team and finalized the codes with discussions and consent.

## RESULTS

The study participants characteristics are summarized in Table 1.

| Characteristics | | Count (N) | % |
|---|---|---|---|
| Gender | Male | 18 | 50 % |
| | Female | 18 | 50 % |
| Age (Years) | Mean ± SD | 31.5 ± 10.6 years | |
| Specialty | Dentistry | 9 | 25.0 % |
| | ENT | 7 | 19.4 % |
| | Medicine | 2 | 5.6 % |
| | OBG | 2 | 5.6 % |
| | Psychiatry | 7 | 19.4 % |
| | Respiratory Medicine | 6 | 16.7 % |
| | Surgeon | 3 | 8.3 % |
| Work Experience | < 10 years | 15 | 41.6 % |
| | > 10 years | 21 | 58.3 % |

***Table 1. Characteristics of the Study Participants (N = 36)***

| Characteristics | | Count (N) | % |
|---|---|---|---|
| Tobacco related services | Counselling | 19 | 52.8 % |
| | Counselling and prescribing NRT | 4 | 11.1 % |
| | Counselling prescribing and F-Up | 8 | 22.2 % |
| | Counselling and surgery for tobacco growths | 3 | 8.3 % |
| | Surgery only | 1 | 2.8 % |
| | Surgery and referral for cessation | 1 | 2.8 % |
| | Setting smoking quit dates with clients | 26 | 72.2 % |
| Aware of smoking cessation apps | Yes | 3 | 8.3 % |
| | No | 33 | 91.6 % |
| Recommended smoking cessation apps | Yes | 1 | 2.7 |
| | No | 35 | 97.2 |
| Clients to whom apps were recommended smoking cessation apps | Men | No | |
| | Women | Yes | |

***Table 2. Tobacco Related Services, Awareness and Recommendation of Smoking Cessation Apps by Care Providers in the Study (N = 36)***

### Qualitative Content Results

The taped interview content was transcribed, analyzed and the major goal was to enlist the broad themes that emerged from content analysis. The following major themes emerged from the interviews with the participants conducted during the study period. As majority of the participants were lacking awareness about smoking cessation apps rich in-depth insights could not be elicited beyond these themes.

### Awareness about Smartphone Smoking Cessation Apps

Most of our interviewees lacked awareness about smoking cessation apps and the verbatim responses from the transcriptions of the interviews from diverse multi-specialty professionals were presented as below:

"No, am not aware." (Pulmonologist)

"No no…I am not aware." (ENT Surgeon)

"No, no." (Orthodontist)

"No". (Psychiatrist)

"Mam I didn't know such ones exist." (Public Health Dentist)

### Recommendation of Smart Phone Smoking Cessation Apps in Clinical Practice

Three respondents i.e., pulmonologist, dentist and psychiatrist were aware of the apps but female dental practitioner recommended to female clients who were consumers of smoking tobacco products.

"No" (ENT Surgeon)
"No no…I haven't" (Orthodontist)
"Right now, I have not recommended. No" (Pulmonologist)
"We don't get patients of such high educational qualifications here." (Pulmonologist)
"Nods head negatively" (Dentist)
"Silence (implies No)" (Orthodontist)
"No, not yet" (Psychiatrist)
"Yeah, I know of such apps but I never did recommend." (Pulmonologist)

### Recollection of Smoking Cessation Apps

Interviewees were unaware of the specific smoking apps recommended to the clients as it was revealed as below:

"But I don't know the app name. I just remember telling her you can find these app on internet".

### Aptitude Towards Smartphone-Based Apps

Participants in this study shared different perspectives about the scope of recommending smoking apps for the clients seeking services in their clinical practice.

"No, I don't. I am aware they are there, I never recommended. My patients are usually rural and, you know, in lower strata, so I don't think they would be." (Pulmonologist)

"No, not really, not. No, no. The reason is I never felt I know what is going towards artificial intelligence. Whether it could be apps, it could be anything, I still believe there can never be artificial intelligence interference. So, I feel the human touch the human care, the eye to eye contact, or the communication is very important" (Dentist)

"Not yet, but may be that's a very good suggestion" (Psychiatrist)

## DISCUSSION

To our knowledge, this is the first qualitative study to explore and document the awareness and practices related to smartphone-based smoking cessation apps by multi-disciplinary healthcare providers from India. Healthcare providers, across diverse specialties are uniquely placed to address this deadly addiction among clients and can trigger 40 % of clients to make a quit attempt and help 2 - 3 % quit successfully with brief advice.[22] Quitting smoking remains a challenge for clients with high relapse rates and thus relapse prevention remains the core strategy for many of the cessation programs.[23-25]

Mobile technology has evolved exponentially in the recent times and can complement relapse prevention during the early weeks of quit attempts when it was documented to be the most vulnerable period for relapses to occur.[26] Though text-message based interventions for smoking cessation have been evaluated widely in the developed world, however app-based interventions for the same have been found to be limited with positive results only documented up to 6 months.[21] In two studies, smoking cessation app adherence was found to be two times and four times likely to achieve cessation respectively in comparison to conventional treatment only.[27,28] No studies have been found from developing countries assessing the utility and effectiveness of smoking cessation apps in review study of eight studies. Traditionally these studies have been reported from global North and lack of studies from developing countries including India cannot merit the similar comparison though mobile technology is also widely used in low and middle-income countries. Small sample sizes and inconclusive results are the common pitfalls of the RCTs, and large trials are the need of the hour to establish the efficacy of the apps.[29-33]

Leveraging smartphone technology for smoking cessation is identified with multiple beneficial factors such as proximity to users, cost effectiveness, instant, interactive support, etc.[34,35,36] Doctors in this study from multiple-disciplines lacked awareness about smoking cessation apps in general. However, in a survey among 264 providers in US, 76.9 % agreed that apps hold promise to help smokers in quitting.[37] Though we attempted a qualitative study with natural probing method, in-depth insights from care providers were not forthcoming due to gaps in the awareness about the apps. According to the latest GATS-2 survey, 36.3 % of the existing tobacco smokers attempted to quit and there is an increased recognition for promoting mCessation services in tobacco cessation in India.[38] In a 2015 study evaluating the effectiveness of mCessation programme in India, 66 % reported quit attempts after 6 months and 77 % reported the programme was helpful or very helpful to quit tobacco.[39]

The setting of the clinical practice of the participants remains private however the clientele seeking services belong to the socio-economic strata of lower middle class and middle class. The digital divide could be major setback for recommending mHealth interventions for smoking cessation. In a New York study (2014) it was found that healthcare providers act as gatekeepers to health information and maintain scepticism about the effectiveness of mhealth apps due to perceived lack of evidence.[40] The most popular apps after reminder apps about follow-up appointments with clinicians or medication are health and wellness apps also termed as health life apps. These apps are generally recommended by clinicians and are used by patients.[43] Juhi Jain et al. in their study assessed the perception and experiences with health apps among smart-phone users including college students, working professionals, home makers and elderly citizens in urban area of New Delhi (2017). The study found that respondents in the age group of 20 - 30 years were aware and were using health apps, and majority of the other respondents lacked awareness and motivation to sue health apps.[41] The reasons for lack of motivation were mentioned by the participants as the continuous use of app requires lot of time and after a period of time the task becomes tedious and boring. The authors concluded that health care costs can be reduced if the mHealth interventions are adequately leveraged in promotion of health behaviours by improving the consumer attitudes and increasing the adoption of the health apps.

In a study among male college students, majority expressed satisfaction in receiving health promotional text

messages, but health apps usage was not explored.[42] Utilization of mHealth app for improving sports and health habits was studied among undergraduate students in mixed-methods study with positive perceptions and attitudes.[43]

In our study, there appeared to be a knowledge and awareness gap about the scope and potential of utilization of mHealth interventions for smoking cessation among the care providers. The version-2 of mTobacco cessation platform with average quit rates of 7 %, also delivers integrated voice response (IVR) in 12 languages, is under consideration to be integrated in primary health care.[40]

Given the potential for the mCessation measures, research identified strong governance measures, investment in phones and rigorous training on these devices to improve their acceptability in developing countries.[41]

## CONCLUSIONS

This study presents novel qualitative data collected from private healthcare providers representative of various fields. We conducted interviews which lacked the awareness of smart phone apps aiding with smoking cessation. The findings show that with the exception of a minor few who acknowledged their existence but were engaged very minimally with these modalities, majority are completely unaware of these technology-assisted tools to support client cessation goals. There appears to be a missed opportunity to tap into this technology and also a huge gap in the study of smoking cessation and the influence of mobile phone-based apps from India that require our immediate research focus and further analysis for this awareness gap among healthcare providers.

To the best of our knowledge this was the first qualitative study undertaken to explore the awareness about smoking cessation apps among healthcare providers in Chennai, Tamil Nadu. Though purposive convenient sampling was utilized in this study, we believe that these findings can be utilized to undertake large cross-sectional studies in the future.

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