

Internet Technology based Research for Smoking Cessation in India-Hope of a New Era

SARIKA PALEPU¹, SUMIT MALHOTRA²

ABSTRACT

Tobacco smoking has been a rampant problem in India since decades. It poses a great burden on the socioeconomic life of the individuals and affects country's progress. Burden of smoking had been on a rise in India. Efforts to curb smoking cessation were made but desired results have not been achieved. In recent time, there is an increase in communicable and non communicable diseases due to smoking. Even second hand smoke imposes a huge burden on the health of the individuals. With failure of the existing strategies to curb the burden, novel methods in promoting smoking cessation ought to be considered. Thus, recent technological advancements can be given a focus. With the launch of digital India, internet based interventions for smoking cessation can be considered in the country. With the growing number of internet users, this method can be promising to yield beneficial results. These interventions are tailored, preserve anonymity and are easily accessible. Hence, this can be an effective medium to reach the masses. Interventions tapping internet as a medium are lacking in India. With many success stories of such interventions around the globe, consideration to conduct such trials can be done in the country. Focused conduct of trials overcoming the constraints of feasibility, acceptability and recruitment of participants is needed to achieve the desired success. With developing technology and changing demands of healthcare, effective internet based interventions are the need of the hour.

Keywords: Digital, Health, Interventions, Tobacco smoking

INTRODUCTION

The roots of tobacco cultivation dates back to ancient age 5000-3000 BC [1]. Since then, the consumption of tobacco is widely prevalent in the world. There had been a gradual evolution in the mode of delivery of tobacco from snuff in 18th century to cigar in 19th century and cigarette in 20th century. There was a rampant spread of tobacco use at the beginning of the 21st century with about one-third of adults in the world using tobacco [2]. This article makes an effort to focus on the extensive burden of tobacco, its effects on health and research done in internet based interventions with a view to explore its utility amongst range of tobacco cessation interventions in Indian context.

Burden of Smoking Globally

In 2015, more than 1.1 billion people in the world smoked tobacco [3]. According to World Health Organisation (WHO) report, tobacco use (smoking and smokeless) causes about six million deaths each year [4]. Among them, around 8,90,000 people die due to exposure to second hand smoke [5]. It is estimated that smokers die 10 years earlier than a non smoker on an average [6]. According to WHO estimates, prevalence of smoking was 22.1% globally in 2010 (men 36.9% and women 7.3%). This is estimated to decrease to 18.9% by the year 2025 (men 33.2% and women 4.7%) [7].

Burden of Smoking in India

Global Adult Tobacco Survey (GATS-1) report in India report in 2009-10, revealed that 34.6% of adults (47.9% males and 20.3% females) were using tobacco in any form. There were 275 million current tobacco users in the year 2009-10 [8]. As per GATS-2, report in 2016-17, 28.6% of adults use tobacco in any form. This shows that there was a 17% relative reduction in tobacco use from GATS-1 to GATS-2. As per GATS-2, 12.4% young population used tobacco in any form against 18.4% in GATS-1 [9]. National Family

Health Survey (NFHS)-3, revealed that tobacco use is more prevalent among men, rural population, illiterates, poor and vulnerable section of the society [10]. The GATS-1, India survey also showed that 52% of the adults (rural-58%, urban-39%) were exposed to second hand smoke at home. However, GATS-2 showed a tremendous decrease in exposure to second hand smoke to 39% [9,10]. GATS-1 also assessed about nicotine dependence among current smokers. It was seen that about 60% of daily smokers exhibited strong nicotine dependence by smoking within half an hour of waking. This implies the heavy burden of smoking and high dependence. On the contrary, 46.6% of current smokers planned to quit or at least thought of quitting which was an encouraging sign. As per a secondary analysis of the survey, many factors as age, gender, educational attainment, asset quintiles were significantly associated with smoking cessation [11].

Effects of Smoking on Health

Tobacco smoking has many adverse effects on health. Every year, nearly eight to nine lakh people die in India due to tobacco related diseases [12]. It increases the risk of death from both communicable and non communicable diseases [13]. Smoking has been associated with 38% of cancers, 34% of heart and circulatory diseases, 28% of respiratory illnesses, chronic obstructive pulmonary disease and cardiovascular diseases [14,15]. Among all lung cancer deaths globally, 90% in men and 80% in women are caused by smoking [16]. In India, over 50% of oral cancers are attributable to smokeless tobacco use [17].

It is seen that people who are exposed to second hand smoke are also at risk of developing health hazards. A study showed that parental smoking accounts for at least 17,000 admissions to hospital each year among children under the age of five [18]. It was also seen that infants of mothers who smoke have twice the risk of sudden infant death syndrome (cot death) [19]. Second hand smoke

also causes lung cancer, heart disease, nasal cancer, exacerbation of cystic fibrosis and cervical cancer in adults [19]. Literature shows that non smokers dwelling with smokers in the same house have 23% increased risk of heart disease [20]. These findings project the multipronged effects of smoking and second hand smoke.

The rampant spread of tobacco prompted the development of various cessation programmes and an effort to include few is made subsequently.

Initiatives in India for Smoking Cessation

In an effort to reduce tobacco related mortality in India, National cancer control programme has taken many initiatives. Provision of adequate information, education and communication material was done for raising awareness among people [21]. Strategy of "5As" to ask, advice, assess, assist and arrange was developed by National Cancer Institute to aid smoking cessation. Tobacco cessation clinics were started by Ministry of Health and Family welfare in accordance with WHO guidelines to evolve strategies for smoking cessation. However, the sustainability of these clinics was questionable. The major limitations of these clinics were that only a few number of tobacco users were accessing and very low proportion of tobacco users were from rural areas [22]. Adoption of cigarette and other tobacco products act in 2003 [23], M-power strategy and Framework Convention on Tobacco Control (FCTC) ratification in 2004 [24], and increased pictorial depiction of harmful effects over cigarette pack in 2015 also focussed towards cessation of tobacco smoking in the country [25]. Recently, M-cessation was launched under digital India initiative by Government of India. It aims at reaching out to those willing to quit tobacco use and support them towards successful quitting through text messages sent via mobile phones. This opens up a new era in the technological advancements towards concerted efforts in smoking cessation [26,27].

Although, committed efforts are made for smoking cessation in the country, persisting high adult prevalence of smoking insists search into alternate strategies [9]. In the existing technological world, utilisation of internet based media for improvising tobacco cessation behaviour seems a promising strategy. The internet has been discovered to be a popular gateway for delivering health behaviour change interventions in general [28] and individually tailored smoking cessation interventions in particular [29,30]. Using the internet to provide such programs may pose several advantages as it is highly accessible [31,32], can reach a large audience at minimal cost, and participation can be at any convenient time. Furthermore, internet based interventions can be highly individualised and personal, maintaining the identity of the participant. Smokers might not succeed the first attempt to quit and seeking help online may prevent them from feelings of failure and disappointment. Online interventions can also prevent from the development of negative intent of higher temptation to smoke and poorer abstinence outcomes. Furthermore, online interventions help initiate cessation among people who feel stigmatised and do not seek healthcare. Hence, an insight into the literature review regarding internet based interventions may pave a way for further planning and policy making to curb the prevalence of smoking in the country.

Existing Evidence on Internet based Interventions for Smoking Cessation

Evidences from various studies show that internet based interventions would promote smoking cessation. The cessation rates varied from 3.5% with basic internet intervention to 7.7% with enhanced internet intervention with tailored mechanism according to a study in United States [33]. According to another study in United Kingdom, the relative risk of smoking cessation was 1.36 [95% Confidence Interval (CI): 1.05 to 1.86] among participants of low socioeconomic status in the intervention arm as compared to information only website [34]. Active web

intervention group revealed higher rates of abstinence {Odds Ratio (OR)-2.64, 95% CI: 1.08-6.49} according to a study in South Florida [35]. A study by Pattern CA et al., suggested that internet based intervention was associated with a significantly greater reduction in average number of days smoked than counselling sessions ($p=0.006$) [36]. A study done in Norway showed clinically and statistically significantly higher repeated point abstinence rates in the intervention group (20% versus 7%, OR-3.43, 95% CI: 1.60-7.34, $p=0.002$) [37]. A review done to assess the efficacy of the internet based interventions stated that most of the studies (47%) reported statistically significant or improved outcomes of smoking cessation in the intervention group relative to a comparison group at the longest follow up [38]. A tailored web-based intervention study stated that at 90 days of follow up, the cessation rate was significantly higher in treatment group (24.1%) compared to control group (8.2%) ($p=0.002$) [39]. A study done in Switzerland, showed that computer tailored counselling program increased the rate of abstinence to 2.6 times more in the intervention group (5.8% vs 2.2%, $p<0.001$) [40]. A study done in Netherlands, showed that fully automated web-based smoking cessation program significantly increased 24-hour point prevalence abstinence (OR-1.85, 95% CI: 1.30-2.65), seven day point prevalence abstinence (OR-2.17, 95% CI: 1.44-3.27), and prolonged abstinence (OR-1.99, 95% CI: 1.28-3.09) rates after six weeks [41]. A study in Maastricht, Netherlands compared two web based interventions, Action Planning (AP) and Action Planning Plus (AP Plus). It was seen that abstinence rates were 22% in the control group, 33% in the AP program and 31% in the AP+ program. The AP program (OR-1.95, $p=0.005$) and the AP+ program (OR-1.61, $p=0.049$) were significantly more effective than control for smoking cessation [42]. Details about the trials are given in [Table/Fig-1].

Internet based Intervention for Smoking Cessation in India-Current Scenario, Constraints and Road ahead

There are various forms of tobacco cessation interventions that had been the subject of study in many research projects. Results from various recent studies in India show that individual or group counselling would be a favourable method for smoking cessation [43,44]. A study in Delhi has shown that pharmacotherapy along with physician's advice would aid in higher cessation rates [45]. Prevalence of smoking abstinence was reduced by twice in the arm which received interventions as face to face interviews, telephone counselling and also individual and group counselling according to a study done in rural Kerala [46].

An insight into the factors favouring smoking cessation in India is needed as they are varied and diverse. Intention to quit smoking was found to be dependent on low age group, unemployment and previous quit attempts according to a study done in various districts of Andhra Pradesh and Gujarat [47]. Education, socioeconomic status and occupation were found to significantly affect smoking cessation as corroborated by another study [48]. These associated factors should be accounted for in designing innovative tobacco control interventions.

India has a high burden of smokers and this group is a diverse heterogeneous population which needs to be targeted using variety of interventions. The usage of internet is increasing over the years in India. In urban India, rate of internet users has increased by 7% from October 2015 to October 2016. Similarly, enormous increase of 22% in internet users was seen in rural India from October 2015 to October 2016. This estimates that around 263 million people are internet users in urban India and 157 million in rural India. It is also estimated that urban internet users would increase to 275-285 million and rural users to 170-180 million by 2017 [49]. Hence, potential of this medium should be tapped in tobacco control and this novel intervention should be tested for its effectiveness in Indian cohort. However, challenges of reaching people through internet

S. No.	Authors/year of study	Place of study	Study design/Sample size	Main findings
1	Graham AL et al., [33] 2005-2008.	United States of America	Three group randomised controlled design-Quit Using Internet and Telephone Treatment (iQUITT) study 679 participants aged 18 years and older were allocated to Basic Internet (BI), 651 to Enhanced Internet (EI), and 675 to Enhanced Internet and Proactive telephone counselling (EI+P).	At 18 months, the 30-day multiple point prevalence abstinence rate across all follow up intervals was 3.5% (BI), 4.5% (EI), and 7.7% (EI+P), with EI+P significantly outperforming BI and EI.
2	Brown J et al., [34] 2011-2013.	United Kingdom	Randomised controlled trial-stop advisor study 4613 participants of 18 years and older.	Stop advisor helped participants with low socioeconomic status stop smoking compared with the information-only website (primary outcome: RR 1.36, 95% CI 1.00-1.86; p=0.0499; secondary outcome: RR-1.32, 1.03-1.68, p=0.0267).
3	Simmons VN et al., [35].	Florida, United States	Four arm, randomised design web smoke intervention 331 smokers of 18-24 years of age.	Web-smoke group had significantly higher abstinence rates than the web-nutrition group at seven days (OR=3.39, 95% CI=1.05-11.00, p=0.042) and after six months (9.8%; OR=2.64, 95% CI=1.08-6.49, p=0.034). Abstinence rates did not differ among other groups.
4	Patten CA et al., [36].	United States of America	Randomised controlled trial 139 participants of 11-18 years age.	The 30-day, point prevalence smoking abstinence rates have not shown significant treatment difference among two groups. Stomp out smokes was associated with a significantly greater reduction in average number of days smoked than brief office intervention (p=0.006).
5	Brendryen H et al., [37] 2006.	Oslo, Norway	Two-arm randomised controlled trial-Happy Ending (HE). 290 participants of 18 years or older age.	Participants in the intervention group reported clinically and statistically significantly higher point abstinence rates than control participants (20% versus 7%, OR=3.43, 95% CI=1.60-7.34, p=0.002).
6	Walters ST et al., [38] 2006.	-	Review article 11 to 65 years.	Of eligible studies, 9 (47%) reported statistically significant outcomes at the longest follow up, relative to a comparison group.
7	Swartz LH et al., [39] 2000-2001.	United States of America	Randomised controlled trial-"1-2-3 smokefree" programme 351 subjects over 18 years of age.	At follow up, the cessation rate at 90 days was 24.1% (n=21) for the treatment group and 8.2% (n=9) for the control group (p=0.002). Using an intent-to-treat model, 12.3% (n=21) of the treatment group were abstinent, compared to 5.0% (n=9) in the control group (p=0.015).
8	Etter JF et al., [40] 1998-1999.	French-speaking part of Switzerland	Randomised controlled trial 2934 participants.	Abstinence was 2.6 times greater in the intervention group than in the control group (5.8% vs 2.2%, p<0.001). The program was effective in pre-contemplators who were not motivated to quit smoking at baseline (intervention vs control, 3.8% vs 0.8%; p=0.001).
9	Smit ES et al., [41] 2009-2010.	Maastricht, Netherlands	Randomised controlled trial 1123 respondents.	Computer-tailored program significantly increased 24-hour point prevalence abstinence (OR=1.85, 95% CI: 1.30-2.65) p-value=0.001, seven day point prevalence abstinence (OR=2.17, 95% CI: 1.44-3.27) p-value<0.001, and prolonged abstinence after six weeks (OR=1.99, 95% CI: 1.28-3.09) p-value=0.002.
10	Elfeddali I et al., [42].	Netherlands	Randomised controlled trial with three arms: the control group, the Action Planning (AP) group and the Action Planning plus program (AP plus)-Stay Quit for You (SQ4U) study 2031 participants of 18 to 65 years.	The AP program (OR=1.95, p=0.005) and the AP+ program (OR=1.61, p=0.049) were significantly more effective than the control condition for smoking cessation.

[Table/Fig-1]: Global studies on internet based interventions for smoking cessation.

*OR- Odds ratio, RR- Relative risk, CI- Confidence interval

will prevail owing to poverty, lack of awareness, difficulty to reach in hilly terrain and hard to reach areas and questionable accessibility among individuals of low socioeconomic profile. Nevertheless, web-based interventions are viable means of delivering evidence-based smoking cessation [38]. However, evidence of research into such strategies does not exist in India [50]. Internet based interventions are convenient from the users perspective, because they can be accessed at any time, and they also offer a greater level of anonymity. These interventions would be the effective medium to reach audience who might not otherwise seek support, due to limited healthcare provision or difficulty in accessibility or possible stigmatisation.

Several considerations during design and conduct of such studies are needed. Operational feasibility of a web-based intervention is the critical constraint and should be given highest priority. Expert

research team is required in implementing the intervention. Proper identification of technology according to the needs of the population is a prerequisite. Protocols required for configuring and testing the software should be developed appropriately. Real time testing of the software is essential prior to implementation. During the implementation phase, focus is needed on handling the technical problems, training of subjects and timely testing of the website. During the post-implementation phase, maintenance, testing and updating of website ensuring 24/7 access is needed. Reframing the website based on feedback from users is essential [51].

Trials should ensure randomisation accurately to enhance the representativeness and increase external validity. Optimum care needs to be taken in the selection of participants with a focus to overcome volunteer bias. The bias can be addressed by

recruitment of participants through non internet based media and including all the participants irrespective of their will for smoking cessation. Study methodology needs a focus into the issue of random allocation with maintenance of allocation concealment in light of preventing selection bias. Robust planning to interpret cessation rates in long term with supporting evidence from biochemical analysis needs to be done. Biochemical verification can be assessed by collection of saliva samples and assessing for anabasine and cotinine levels. Finally, interpretation of results should be done with caution. Greater scientific rigour is required in all aspects related to design, conduct and analysis of such internet based trials in field of tobacco cessation.

CONCLUSION

The study explored the viability to use Internet as a medium for smoking cessation. With efforts for digitalisation of India and increased usage of internet in urban and rural India, internet based interventions can be a potential medium to reap the benefits of behavioural change and augment smoking cessation. Internet based interventions have shown a considerable effect on smoking cessation in various nations. Research is naïve in this field in India. Focus can be laid upon for promoting research in this arena as it yield promising benefits across the nation.

REFERENCES

- [1] Gately I, La Diva Nicotina. The story of how tobacco seduced the world. Simon and Schuster, London, 2001.
- [2] WHO global report. The History of Tobacco. Available at <http://www.who.int/tobacco/en/atlas2.pdf>. [Accessed on 10th January, 2017].
- [3] Prevalence of tobacco smoking. Available at <http://www.who.int/gho/tobacco/use/en/>. [Accessed on 13th January, 2017].
- [4] WHO global report on trends in prevalence of tobacco smoking 2015. Available at http://apps.who.int/iris/bitstream/10665/156262/1/9789241564922_eng.pdf. [Accessed on 10th January, 2017].
- [5] Tobacco Key facts. Available at <http://www.who.int/mediacentre/factsheets/fs339/en/>. [Accessed on 21st January, 2017].
- [6] Jha P, Ramasundarahettige C, Landsman V, Rostron B, Thun M, Anderson RN, et al. 21st-century hazards of smoking and benefits of cessation in the United States. *N Engl J Med*. 2013;368(4):341-50.
- [7] WHO global report on trends in tobacco smoking 2000-2025. Available at <http://www.who.int/tobacco/publications/surveillance/reportontrendstobaccosmoking/en/>. [Accessed on 11th February, 2017].
- [8] Global adult tobacco survey. Available at: http://www.who.int/tobacco/surveillance/gats_india/en/. [Accessed on 11th February, 2017].
- [9] Global adult tobacco survey, GATS -2, India Highlights. Available at http://www.searo.who.int/india/mediacentre/events/2017/gats2_india.pdf?ua=1. [Accessed on 14th February, 2017].
- [10] Morbidity and Health Care. Vol. 1. Mumbai: IIPS; 2007. International Institute for Population Sciences (IIPS) and Macro International. 2007. National Family Health Survey (NFHS-3), 2005-06: India; pp. 426-28.
- [11] Srivastava S, Malhotra S, Harries AD, Lal P, Arora M. Correlates of tobacco quit attempts and cessation in the adult population of India: secondary analysis of the Global Adult Tobacco Survey, 2009-10. *BMC Public Health*. 2013;13(263):01-08.
- [12] Reddy KS, Gupta PC. Report on Tobacco Control in India. Ministry of Health and Family Welfare, 2004, Government of India, New Delhi. Available at http://www.who.int/ctc/reporting/Annex6_Report_on_Tobacco_Control_in_India_2004.pdf. [Accessed on 20th January, 2017].
- [13] Finucane MM, Stevens GA, Cowan MJ, Danaei G, Lin JK, Paciorek CJ, et al. National, regional, and global trends in body-mass index since 1980: systematic analysis of health examination surveys and epidemiological studies with 960 country-years and 9.1 million participants. *Lancet*. 2011;377(9765):557-67.
- [14] Tobacco explained. The truth about the tobacco industry...in its own words. Available at <http://www.who.int/tobacco/media/en/TobaccoExplained.pdf>. [Accessed on 13th January, 2017].
- [15] IARC working group on the evaluation of carcinogenic risks to humans. Tobacco smoke and involuntary smoking. *IARC Monogr Eval Carcinog Risks Hum*. 2004;83:01-1438.
- [16] A global epidemic of addiction and disease. Tobacco: deadly in any form or disguise. World Health Organization. WHO Tobacco Free Initiative. Available at: http://www.who.int/tobacco/communications/events/wntd/2006/Report_v8_4May06.pdf. [Accessed on 14th February, 2017].
- [17] Pednekar MS, Gupta PC, Yeole BB, Hébert JR. Association of tobacco habits, including bidi smoking, with overall and site-specific cancer incidence: results from the Mumbai cohort study. *Cancer Causes Control*. 2011;22(6):859-68.
- [18] Royal College of Physicians. Smoking and the Young: A Report of a Working Party of the Royal College of Physicians. London. Royal College of Physicians. 1992.
- [19] Health Effects of Exposure to Environmental Tobacco Smoke, Report of the Office of Environmental Health Hazards Assessment, California, 1997. Available at <https://oehha.ca.gov/media/downloads/air/report/exec.pdf>. [Accessed on 10th January, 2017].
- [20] Law MR, Morris JK, Wald NJ. Environmental tobacco smoke exposure and ischaemic heart disease: an evaluation of the evidence. *BMJ*. 1997;315(7114):973-80.
- [21] Ministry of Health and Family Welfare, Government of India. Available at <http://www.mohfw.nic.in/National%20Programme%20for%20Tobacco%20Control.html>. [Accessed on 5th March, 2017].
- [22] Varghese C, Kaur J, Desai NG, Murthy P, Malhotra S, Subbakrishna DK. Initiating tobacco cessation services in India: challenges and opportunities. *South-East Asia J Public Health*. 2012;1(2):159-68.
- [23] The Cigarettes and Other Tobacco Products (Prohibition of Advertisement and regulation of Trade and Commerce, production, Supply and Distribution) Act, 2003; An Act enacted by the Parliament of Republic of India by notification in the Official Gazette. (Act 32 of 2003). Available at <https://www.tobaccocontrollaws.org/files/live/India/India%20-%20COTPA.pdf>. [Accessed on 6th March, 2017].
- [24] WHO Framework for convention on tobacco control. Available at <http://apps.who.int/ctc/implementation/database/parties/india>. [Accessed on 16th March, 2017].
- [25] Ministry of Health & Family Welfare. Available at <http://pib.nic.in/ndagov/ReferenceMaterials/min7.htm>. [Accessed on 15th January, 2017].
- [26] Digital India. Power to Empower. Available at <http://webcast.gov.in/digitalindia/>.
- [27] Press Information Bureau, Government of India, Ministry of Health and Family Welfare. Available at <http://www.pib.nic.in/newsite/PrintRelease.aspx?relid=134503>. [Accessed on 12th January, 2017].
- [28] Griffiths F, Lindenmeyer A, Powell J, Lowe P, Thorogood M. Why are health care interventions delivered over the internet? A systematic review of the published literature. *J Med Internet Res*. 2006;8(2):e10.
- [29] Lustria ML, Cortese J, Noar SM, Glueckauf RL. Computer-tailored health interventions delivered over the Web: review and analysis of key components. *Patient Educ Couns*. 2009;74(2):156-73.
- [30] Shahab L, McEwen A. Online support for smoking cessation: a systematic review of the literature. *Addiction*. 2009;104(11):1792-04.
- [31] Sun P, Unger JB, Palmer PH, Gallahe P, Chou CP, Baezconde-Garbanati L, et al. Internet accessibility and usage among urban adolescents in Southern California: implications for web-based health research. *Cyberpsychol Behav*. 2005;8(5):441-53.
- [32] Internet World Stats. Usage and population statistics. Available at: <http://www.internetworldstats.com/stats.htm> [Accessed on 15th January, 2017].
- [33] Graham AL, Cobb NK, Papandonatos GD, Moreno JL, Kang H, Tinkelman DG, et al. A randomized trial of Internet and telephone treatment for smoking cessation. *Arch Intern Med*. 2011;171(1):46-53.
- [34] Brown J, Michie S, Geraghty AW, Yardley L, Gardner B, Shahab L, et al. Internet-based intervention for smoking cessation (StopAdvisor) in people with low and high socioeconomic status: a randomised controlled trial. *Lancet Respir Med*. 2014;2(12):997-1006.
- [35] Simmons VN, Heckman BW, Fink AC, Small BJ, Brandon TH. Efficacy of an experiential, dissonance-based smoking intervention for college students delivered via the internet. *J Consult Clin Psychol*. 2013;81(5):810-20.
- [36] Patten CA, Croghan IT, Meis TM, Decker PA, Pingree S, Colligan RC, et al. Randomized clinical trial of an Internet-based versus brief office intervention for adolescent smoking cessation. *Patient Educ Couns*. 2006;64(1-3):249-58.
- [37] Brendryen H, Drozd F, Kraft P. A digital smoking cessation program delivered through internet and cell phone without nicotine replacement (happy ending): randomized controlled trial. *J Med Internet Res*. 2008;10(5):e51.
- [38] Walters ST, Wright JA, Shogog R. A review of computer and Internet-based interventions for smoking behavior. *Addict Behav*. 2006;31(2):264-77.
- [39] Swartz LH, Noell JW, Schroeder SW, Ary DV. A randomised control study of a fully automated internet based smoking cessation programme. *Tob Control*. 2006;15(1):07-12.
- [40] Etter JF, Perneger TV. Effectiveness of a computer-tailored smoking cessation program: a randomized trial. *Arch Intern Med*. 2001;161(21):2596-601.
- [41] Smit ES, de Vries H, Hoving C. Effectiveness of a web-based multiple tailored smoking cessation program: a randomized controlled trial among dutch adult smokers. *J Med Internet Res*. 2012;14(3):e82.
- [42] Elfeddali I, Bolman C, Candel MJ, Wiers RW, de Vries H. Preventing smoking relapse via web-based computer-tailored feedback: a randomized controlled trial. *J Med Internet Res*. 2012;14(4):e109.
- [43] Savant SC, Hegde-Shetiya S, Agarwal D, Shirhatti R, Shetty D. Effectiveness of individual and group counseling for cessation of tobacco habit amongst industrial workers in pimpri, pune-an interventional study. *Asian Pac J Cancer Prev*. 2013;14(2):1133-39.
- [44] Pimple S, Pednekar M, Mazumdar P, Goswami S, Shastri S. Predictors of quitting tobacco-results of a worksite tobacco cessation service program among factory workers in Mumbai, India. *Asian Pac J Cancer Prev*. 2012;13(2):533-38.
- [45] Singh P, Kumar R. Assessment of the effectiveness of sustained release Bupropion and intensive physician advice in smoking cessation. *Lung India*. 2010;27(1):11-18.
- [46] Jayakrishnan R, Uutela A, Mathew A, Auvinen A, Mathew PS, Sebastian P. Smoking cessation intervention in rural kerala, India: findings of a randomised controlled trial. *Asian Pac J Cancer Prev*. 2013;14(11):6797-802.

- [47] Panda R, Venkatesan S, Persai D, Trivedi M, Mathur MR. Factors determining intention to quit tobacco: exploring patient responses visiting public health facilities in India. *Tob Induc Dis.* 2014;12(1):1.
- [48] Sarkar BK, Arora M, Gupta VK, Reddy KS. Determinants of tobacco cessation behaviour among smokers and smokeless tobacco users in the states of Gujarat and Andhra Pradesh, India. *Asian Pac J Cancer Prev.* 2013;14(3):1931-35.
- [49] Internet IAMAI in India-IMRB Report-2016 An IAMAI & KANTAR IMRB Report. Available at <http://bestmediainfo.com/wp-content/uploads/2017/03/Internet-in-India-2016.pdf>.
- [50] Balhara YP, Verma R. A review of web based interventions for managing tobacco use. *Indian J Psychol Med.* 2014;36(3):226-35.
- [51] Horvath KJ, Ecklund AM, Hunt SL, Nelson TF, Toomey TL. Developing internet-based health interventions: a guide for public health researchers and practitioners. *J Med Internet Res.* 2015;17(1):e28.

PARTICULARS OF CONTRIBUTORS:

1. Senior Resident, Department of Community Medicine and Family Medicine, All India Institute of Medical Sciences, Bhubaneswar, Odisha, India.
2. Associate Professor, Department of Centre for Community Medicine, All India Institute of Medical Sciences, New Delhi, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Sumit Malhotra,
B-3/84 A, Lawrence Road, New Delhi-110035, India.
E-mail: drsumitaiims@gmail.com

Date of Submission: **Jun 04, 2017**
Date of Peer Review: **Aug 10, 2017**
Date of Acceptance: **Nov 06, 2017**
Date of Publishing: **Jan 01, 2018**

FINANCIAL OR OTHER COMPETING INTERESTS: None.