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Mobile Health Interventions for Tobacco Cessation: Evaluating the Role of Text Messaging and Smartphone Applications- A Review

Dr. Vignesh Devaraju
Harvard School of Dental Medicine

Abstract: ***Tobacco use remains a major global public health challenge, contributing to millions of preventable deaths annually through cancers, cardiovascular diseases, chronic obstructive pulmonary disease, and other smoking-related conditions. Innovative and accessible cessation strategies are essential to reduce tobacco dependence and its associated health burden. This article examines the effectiveness and cost-effectiveness of mobile health interventions, particularly text messaging programs and smartphone applications, in supporting smoking cessation. Evidence suggests that mobile-based interventions can increase accessibility, overcome barriers such as cost and transportation, and provide personalized support through reminders, motivational messages, and self-monitoring tools. Text messaging interventions have demonstrated favorable cost-effectiveness, while smartphone applications offer scalable opportunities for behavioral change despite concerns regarding quality and regulation. Policymakers should promote evidence-based mobile cessation programs, evaluate existing applications, and support the development of effective digital tools to enhance tobacco control efforts and improve population health outcomes.***
Keywords: Tobacco Cessation, Mobile Health (mHealth), Smoking Cessation, Tobacco Control.

I. INTRODUCTION

Tobacco use and addiction most often begin during youth and young adulthood. Youth use of tobacco in any form is unsafe.Approximately 36.5 million American adults smoke cigarettes, with statistics showing greater prevalence among those living below the poverty level. Consequently, 4.6 million middle and high school students are exposed to harmful tobacco product constituents, including nicotine. Nicotine exposure during adolescencecan have adverse consequences for brain development, causing addiction and might lead to sustained tobacco use. For this reason, comprehensive and sustained strategies are needed to prevent and reduce the use of all tobacco products among youths in the United States.[3]

Interventions to encourage smoking cessation must be assessed not only for effectiveness but also in terms of value for money. Existing smoking cessation interventions have shown to be cost effectivewhich includes group counseling, one to one counseling, telephone counseling and medications such as nicotine replacement therapy and varenicline. There are not much previous cost effectiveness evaluations of smoking cessation interventions utilizing mobile devices. The intervention could be effective in all socio economic groups, younger and older smokers.[4]

II. BACKGROUND

There are estimated to be approximately 1 billion tobacco smokers worldwide, amounting to approximately 30% of men and 7% of women. About 6 million people die every year from tobacco use and this number is projected to reach about 1 billion by 2030.Tobacco smoking increases the risk of contracting a wide range of diseases many of which are fatal. Most smoking related deaths arise from cancers mainly lung cancer, COPD and cardiovascular diseases. Smoking is also an important risk factor for stroke, blindness, deafness, back pain, osteoporosis, and peripheral vascular disease leading to amputation.Stopping smoking at any age is beneficial compared with continuing to smoke. For some diseases, the risk can be reversed while for others the risk is approximately frozen at the point when smoking stopped. [2]

III. ISSUES

The key issues on which policymakers should focus relies on whether smoking cessation mobile text messages and smoking cessation apps are cost effective. They should advocate for:

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1) To advocate for text based smoking interventions through mobile phones and new smoking cessation apps which help tobacco users to quit smoking.
2) As there are number of smoking cessation apps available in the market policymakers should address the authenticity, credibility and evaluate the contents of all existing smoking cessation apps and revise the existing smoking cessation apps based on evidence based principles.

There are evidencesdemonstrating that mobile phone based technologies can support smoking cessation.Social networks have been found to play a key role in young adults smoking cessation success. Use of internal sensors in mobile phones provides reliable contextual data that enables tracking of health behaviors, as well as the delivery of interventions that are tailored to specific contexts. These features enabled by mobile phones are a clear advancement over websites and short message service (SMS) text messaging programs.[1]

IV. DISCUSSION

Tobacco users can access apps or text messages in their own time. Many apps are even available to users free of charge. Perceived barriers to treatment such as lack of transportation to a treatment center, schedule/timing conflict and cost can be overcome with the use of mobile phone health interventions.[5]

The first option could be text based smoking cessation intervention. The cost of text based support per smoker is the sum of three elements:cost of enrolling smokers including the cost of collecting information about age, gender education, cost of text messages including the cost of setting a short code, and any royalty paid for use of the intervention. In a study conducted by Guerriero C et al in United Kingdom showed the cost of text messages per smoker was £16.12 which includes the cost of setting up a short code which was £0.06/participant, and the cost of sending the messages was £14.51and the study proved that text based support is likely to be a cost-effective means of encouraging smoking cessation and should be considered for inclusion in smoking cessation services.[4]

Cost effectiveness can be measured in terms of cost per quitter, cost per life year gained, and cost per quality-adjusted life year (QALY) gained for smoking related diseases like lung cancer, stroke, myocardial infarction, chronic obstructive pulmonary disease and coronary heart disease. The incremental cost-effectiveness ratio can also be determined. Later, multivariate sensitivity analysis could be done to check the feasibility of these smoking cessation apps and text messages.[1]

Another option could be through smoking cessation mobile phone apps. The lifetime incremental costs and benefits of smoking cessation mobile phone app could be estimated from a government perspective using a Markov model for economic evaluations of smoking cessation interventions. Advantages include to reach out vast majority of people, public health monitoring, eliminate printing costs, make updating easier, and can include interactivity and tailored intervention features, sending them reminders and motivational messages, these apps can also process, organize and graph self monitoring data to help users understand their progress.

Disadvantages in smoking cessation mobile apps and text messages could be costs of building mobile app, resources required, its maintenance, costs to maintain the server, costs of the moderator for the social networking component.

V. RECOMMENDATIONS

The proliferation of the smart phone and the advent of mobile health interventions have made treatment for smoking cessation and other conditions more accessible than ever before.[5]Text messages on mobile phones has already shown some promise in helping people quit smoking and modify other health behaviors. Whereas, limited data exists regarding smoking cessation mobile app quality, content and intervention cost effectiveness. So, I strongly recommend policymakers to advocate for text based smoking interventions through mobile phones.Promote and develop new cost effective smoking cessation apps and revise existing apps based on evidence based principles, as well as evaluate and regulate such mobile applications, to build understanding of how smart phones can be effective in helping people quit smoking. Innovative and scalable interventions are needed to further alleviate the public health implications of tobacco addiction.

VI. CONCLUSION

Smoking cessation apps are being downloaded more than 700,000 times every month worldwide. Almost half of smokers are using smoking cessation apps to support their quit attempt. If such apps support behavior change they could definitely confer a considerable benefit to public health considering the significant risks of smoking. Many studies have demonstrated the usefulness of mobile technology in supporting smoking cessation.[6]

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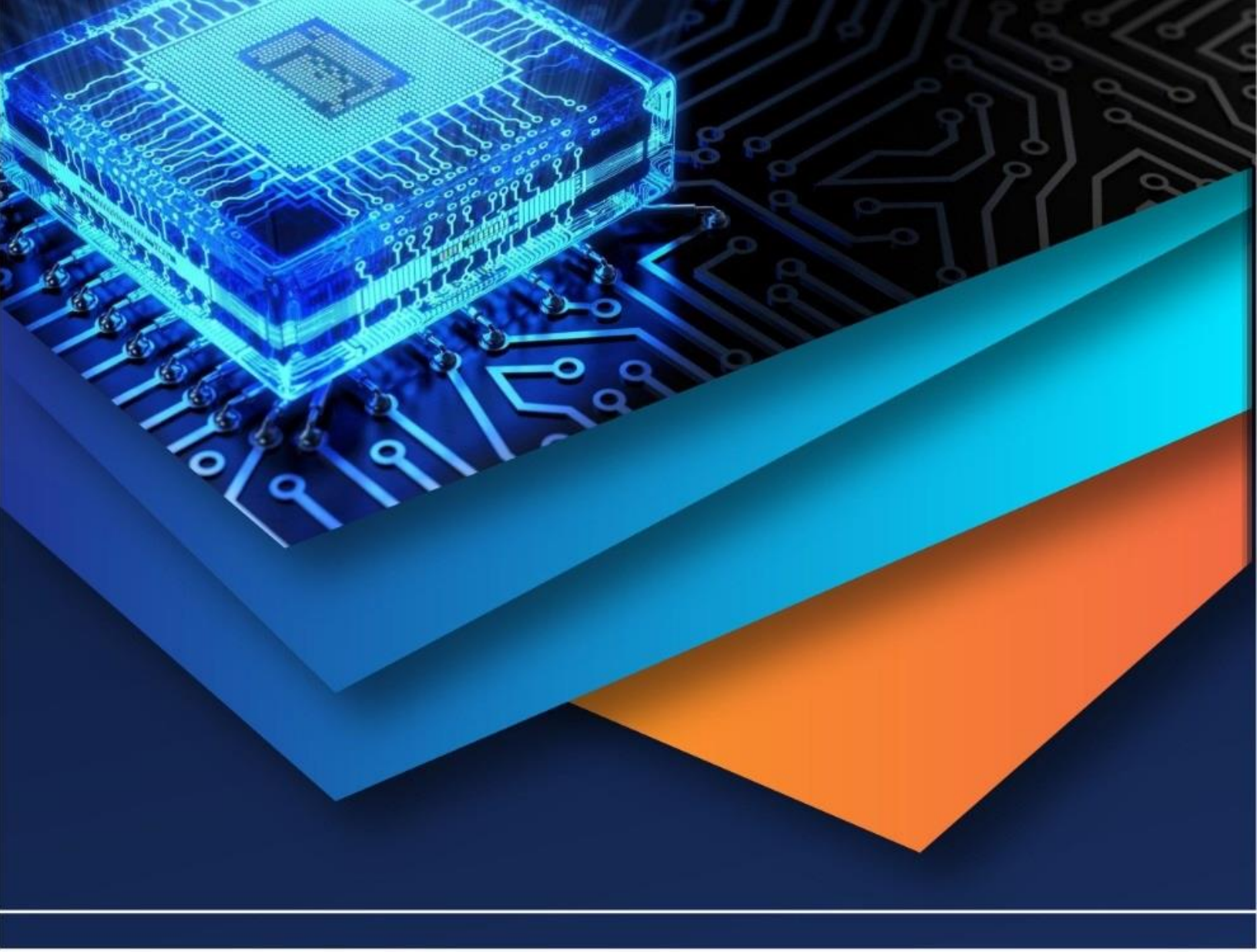
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