

THE FEASIBILITY OF IMPLEMENTING TEXT MESSAGING SYSTEM TO SUPPORT SMOKING CESSATION FOR SMOKERS IN HANOI

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ABSTRACT

The study was carried out to assess the feasibility of implementing text messaging system to support smoking cessation smokers in Hanoi. This was a pilot study done on 40 smokers in Hanoi. The participants received short message service texting within 6 weeks to get smoking cessation support. The study was an intervention one which compared the participants' smoking before and after the intervention done. The participants were interviewed directly with a questionnaire that includes the following contents: suitability of number/ content of messages, frequency/ time of sending messages, use of received messages, interaction with the program, satisfaction with the messaging system, and change in smoking behavior. The results showed that there were 82.5% reading/using text messages daily, 82.5% interacted with program – by 2-way text messaging; 90% of the participants found the messages useful; 97.7% were satisfied with the program. The researched subjects commented that the program was easy to use. 20% of the participants quit smoking/ waterpipe tobacco completely; 15% quit smoking but still smoke waterpipe tobacco. Smoking behavior changed positively compared to the initial survey; the statistical significance included the number of cigarettes/waterpipe tobaccos smoked a day, the status of smoking cigarettes/waterpipe tobacco ($p < 0.001$). The rate of research subjects who tried to stop smoking cigarettes/pipe tobacco in 4 weeks was quite high (52.5% before the intervention and 25% after the intervention). This study provided evidence of the feasibility of the use of a text messaging program to provide intervention supports in smoking cessation for Vietnamese people.

Key words: *smoking cessation; Interventions, adults; SMS texting, mhealth*

Received: 25/3/2020; Revised: 29/4/2020; Published: 29/4/2020

TÍNH KHẢ THI CỦA VIỆC TRIỂN KHAI HỆ THỐNG TIN NHẮN HỖ TRỢ CẢI THUỐC LÁ CHO NGƯỜI HÚT THUỐC TẠI HÀ NỘI

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TOM TẮT

Nghiên cứu này được thực hiện nhằm đánh giá tính khả thi của việc triển khai hệ thống tin nhắn (SMS) hỗ trợ cai thuốc lá. Nghiên cứu thử nghiệm trên 40 người hút thuốc lá tại Hà Nội. Đối tượng nghiên cứu nhận tin nhắn điện thoại hỗ trợ cai thuốc lá trong 6 tuần. Thiết kế nghiên cứu can thiệp, so sánh trước và sau can thiệp. Đối tượng nghiên cứu được phỏng vấn trực tiếp bằng bộ câu hỏi gồm: sự phù hợp số lượng/nội dung SMS, tần suất/thời gian gửi tin, sử dụng tin nhắn nhận được, tương tác với chương trình, hài lòng với chương trình tin nhắn; thay đổi hành vi hút thuốc. Kết quả nghiên cứu cho thấy: có 82,5% đối tượng nghiên cứu đọc/ sử dụng tin nhắn hàng ngày, 82,5% người tương tác với chương trình - SMS hai chiều, 90% người thấy tin nhắn hữu ích, 97,7% hài lòng. Đối tượng nghiên cứu nhận xét chương trình dễ sử dụng và 92,5% bạn bè người thân đều khuyến khích đối tượng tham gia sử dụng chương trình. Có 20% đối tượng nghiên cứu bỏ thuốc lá/thuốc lào hoàn toàn, 15% đối tượng nghiên cứu bỏ thuốc lá nhưng vẫn hút thuốc lào. Hành vi hút thuốc lá thay đổi tích cực so với khảo sát ban đầu. Có ý nghĩa thống kê bao gồm số lượng thuốc lá/thuốc lào hút/ngày, tình trạng hút thuốc lá/thuốc lào ($p < 0,001$). Tỷ lệ đối tượng nghiên cứu từng cố gắng cai thuốc lá/thuốc lào trong 4 tuần khá cao (trước can thiệp: 52,5%, sau can thiệp: 25%). Như vậy, việc áp dụng một chương trình SMS hỗ trợ can thiệp cai nghiện thuốc lá cho người Việt Nam là có tính khả thi.

Từ khóa: *cai thuốc lá; can thiệp; người trưởng thành; tin nhắn SMS; ứng dụng y tế điện thoại.*

Ngày nhận bài: 25/3/2020; Ngày hoàn thiện: 29/4/2020; Ngày đăng: 29/4/2020

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DOI: <https://doi.org/10.34238/tnu-jst.2020.05.2894>

1. Introduction

According to estimates from the 2015 smoking survey on adults (aged 15 and over), Vietnam is a country with the high rate of smoking in Asia [1]. The smoking rate in adults in Vietnam was 22.5%, of which, 45.3% was males, and 1.1% was females; in total there were 15 million adults smoking cigarettes and water-pipe tobacco [2]. Tobacco use is the leading, but interventional and preventable, common cause of many fatal diseases in the world. Tobacco use increases the risk of myocardial ischemia more than 2.5 times, lung cancer more than about 20 times, etc [3], [4]. The total cost of treatment and loss of ability to work due to illnesses and premature deaths in 5 common tobacco-related diseases including lung cancer, upper digestive-respiratory tract cancers, myocardial infarction, stroke, and COPDs is more than VND 23,000 billion per year [5].

In recent years, in Vietnam, the activities of preventing tobacco-related harms have made significant progress and achievements including communication activities on health education, building smoke-free environments, controlling sources of supplying tobacco products, setting up a fund to prevent tobacco harms from tobacco enterprises' revenues. However, activities to support smoking cessation have just been implemented in some Central and provincial hospitals [6], [7].

The rapid development of mobile medical technology has offered unprecedented opportunities to improve health services and bring them to more people. Mobile text-based short messaging (SMS) can provide smoking cessation assistance to people in the community, and the effectiveness of SMS programs has been reported in other countries in the world with different population groups [8]-[10]. There have been more and more studies proving the effectiveness of text-based smoking cessation interventions, but these have largely been done in western countries.

Some authors have studied the feasibility and acceptability of text messaging intervention programs on elderly people living in rural areas in the US; the results showed that 81% of the participants could read all the information and found that text messages very useful as a measure to support smoking cessation; the rate of smoking cessation in the intervention group decreased significantly [5], [10], [11], [12]. In Vietnam up to now, there have not been any research projects on the implementation of mobile phone-based messaging system to support smoking cessation.

Institute of Medical Research - Sociology (ISMS), New York University of Medicine (NYUSOM), and Hanoi Medical University have cooperated to implement the project of developing and testing the mobile phone-based message system to support smoking cessation in Nam Tu Liem District, Hanoi city. The study was carried out to assess the feasibility of implementing text messaging system to support smoking cessation smokers in Hanoi.

2. Research subjects and methods

2.1. Research subjects

Criteria for selecting participants: Participants are smokers (including cigarette/ware pipe dua users) who are 21 - 55 years old, smoke cigarettes (including water-pipe tobacco) daily and use 5 or more cigarettes per day; they are now living in Nam Tu Liem district; they wish to quit smoking/water-pipe tobacco; they consider or intend to quit in the next month; they own at least one mobile phone; they desire to receive mobile phone messages of support for quitting; they are not taking any quit smoking counseling or using nicotine patches or other smoking cessation medications.

Selection method: Medical collaborators (MCs) introduced the study through community meetings and offered invitations to participate in the study. Smokers were invited to come for the baseline survey, were

explained about the research carefully, agreed to participate in the study and met the criteria for selecting study subjects.

2.2. Research location

Ha Noi is a densely populated city with 29 districts. The research got support from the Nam Tu Liem District Health Center during the recruitment of participants. Nam Tu Liem District has an area of 32.27 km² and a population of 236,700 people (12/2017). Thus, the study was conducted in 2 wards of Nam Tu Liem District in Hanoi City [8].

2.3. Research design

The pilot study started from April to September 2018, delivering SMSs to 40 subjects to assess the feasibility of the text messaging system. The study included a baseline survey and a survey after 6 weeks of intervention.

Intervention description: The messaging system was designed based on two messaging systems: smokefree.gov/txt and Text2Quit with the technical support from Voxiva nc, tested in western countries and completely free. These two message libraries have been translated from English into Vietnamese in the right process. The total number of messages in the entire process was 188, divided into the following stages: The messages before the day of smoking was 34 messages; The day of quitting smoking: 4 messages; After the day of quitting smoking: 83 messages; Messages of tips: 22 messages; Daily survey messages: 1 message / day (Fig.1) [8].

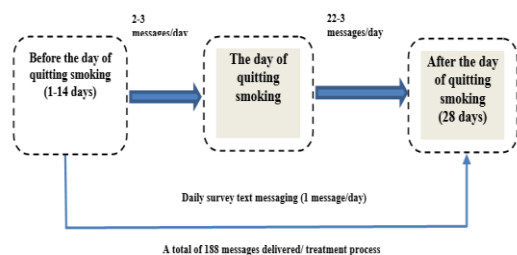


Figure 1. The process of sending messages and the number of messages delivered in 6 weeks

Data collection methodology:

- Baseline assessment: direct interviews using the questionnaires covering topics such as: demographics, smoking history, use of other addictive substances, family smoking policy, three top factors that make people want to smoke, social norms on tobacco use, level of confidence in quitting smoking, social behavior of smoking, and getting social support to quit and use mobile phones and text messaging features on mobile phones
- Assessment after 4 weeks of intervention: direct interview using the pre-designed questionnaires covering the following contents: Feasibility: 1) rate of the smokers with eligibility, 2) recruitment rate; 3) retention rate; Suitability: quantity / content of appropriate messages, frequency/time of delivering messages, use of received messages, interaction with the program (frequency of 2-way messaging feedbacks, responses to daily surveys, responses to weekend surveys), satisfaction with the text messaging system; Changes in smoking behaviors: Smoking cessation is measured by not smoking even once in the past 4 weeks and confirmed by measuring carbon monoxide level (CO <10 ppm), attempts to quit, attempts to cut down on smoking tobacco, water-pipe tobacco.

2.4. Data analysis

Stata 12.0 software was used to analyze data

2.5. Ethical issues in research

Subjects invited to participate in the study were fully explained about the content, purpose and rights of participants, and signed agreements to participate in the research. The study was approved by the ethics council of New York Medical University (NYUSOM), the Institute of Medical Research - Sociology (ISMS) and Hanoi Medical University.

3. Research results

3.1. Characteristics of participants

Table 1. *Characteristics of participants*

Features (N = 40)	n	%, mean (SD)
Gender		
Male	40	100
Female	0	0
Age (mean)		38.8 (\pm 10.7)
Marital status		
Married	33	82.5
Single/Never married	7	17.5
Education		
Junior Secondary School	11	27.5
Secondary School	15	40.0
Vocational education /College	6	15.0
University/Post-graduate	7	17.5
Occupation		
Civil servants	10	25.0
Working for foreign agencies	9	22.5
Business/freelance	14	35.0
Househusband wife)/ unemployed/students/retirement	7	17.5
Total household income / last 12 months (n=39)		
< VND 50 million	6	15.0
VND 50 million - < VND100 million	29	72.5
VND100 million - < VND 300 million	2	5.0
> VND 300 million	2	5.0
The first smoking time of the day after getting up		
< less than 5 minutes	6	15.0
5 - 30 minutes	14	35.0
31 – 60 minutes	4	10.0
> 60 minutes	16	40.0
Smoking status		
Smoking only cigarettes	17	42.5
Smoking both cigarettes and water-pipe tobacco	23	57.5
Mobile phone usage		
Using smartphones	34	85.0
Using ordinary mobile phones	6	15.0
Numbers of delivered/received messages/week		
1 - 10	7	22.5
11 - 50	24	60.0
> 50	9	17.5

Table 1 reveals that 100% of the participants were male; the average age was 38.8 years old, 82.5% married; most of them had the education level from high school up to university (40%, 15% and 17.5 %); 25% of the participants were civil servants and 35% of people were freelance traders. The family income from 50 million to <100 million accounted for the highest rate of 72.5%. 57.5% of smokers/pipe tobacco smokers; 85% of participants use smartphones; 60% send/receive 11- 50 messages /week.

3.2. *The feasibility*

The results in table 2 reveal that most research participants commented that the number of messages of the program was moderate (80%); the frequency of reading messages was 82.5%. They rated the overall experience of the text messaging program very positively; 90% rated the messages quite

useful/very useful; 82.5% interacted with the program; only 78.8% responded to the message in the correct syntax; the program satisfaction rate was very high with 97.5%.

Table 2. *Assessing the participants' overall experience with the program after 6 weeks*

Features	n	%
Number of messages received from the program		
Too small	1	2.5
Moderate	32	80.0
Too big	7	17.5
Frequency of reading messages		
Sometimes	7	17.5
Usually/Always	33	82.5
Frequency of applying the information from the program		
Sometimes	24	60.0
Usually/Always	16	40.0
The level of concern if others see the messages you receive from the program		
Worry-free	39	97.5
Worry a little / worry a lot	1	2.5
Overall overview of the usefulness of the messages		
A little useful	4	10.0
Quite useful/very useful	36	90.0
The level of your satisfaction with the program		
Unsatisfied	1	2.5
Satisfied/Very satisfied	39	97.5
Interaction with the program (2-way messages)	33	82.5
Feedback messages in the correct syntax (n = 33)	26	78.8

Table 3. *Assessment of participants' general experience of the program after 6 weeks of intervention*

Features	Agree/Strongly agree (%)	Mean Scores (Mean)
<i>Expect efficiency from the program (score range from 8 to 32)^a</i>		25.8
Messages to help with smoking cessation	95.0	3.15
Learn a lot via using the program	95.5	3.27
Text messaging program helps me gain confidence to quit smoking	97.5	3.10
The messages motivated me to quit smoking	97.5	3.27
The messages helped me deal with cravings for smoking	92.5	3.22
Get motivated to try to quit smoking	92.5	3.20
Trust the information in the messages	97.5	3.42
Feel the messages were designed suitably	92.5	3.12
<i>Expect attempts to quit smoking (score range 2-8)^b</i>		6.4
Use the text messaging program easily	95.0	3.17
The text messaging program was easy to use	97.5	3.2
<i>Social influences (score range 2-8)^c</i>		6.2
People who are important to me think that I should use the text messaging program	92.5	3.15
People who influence me think I should use the text messaging program	90.0	3.07
<i>Good conditions (score range 3-12)^d</i>		9.4
Have necessary knowledge necessary to use the program	92.5	3.07
The messages are easy to understand	92.5	3.17
Text messaging program suitable for my mobile phones	95.0	3.17
<i>Motivation for enjoyment (score range 5-20)^e</i>		14.9
The use of text messaging program was funny	87.5	3.02
Desire to use the text messaging program	87.5	3.17

Features	Agree/Strongly agree (%)	Mean Scores (Mean)
The use of text messaging program was boring	12.5	2.00
The messages bothered me	7.5	2.02
Using the text messaging program helped me entertain	62.5	2.67
<i>Values/price (score range 2-8)^f</i>		6.1
Worthy of the time I spent	92.5	3.07
The free messaging program has increased my possibility to use the program	85.0	3.05
<i>Habits (score range 2-8)^g</i>		5.8
Want to use the messaging program every day	85.0	2.82
The use of the messaging program has become natural	87.5	2.95
<i>Intended behaviors (score range 2-8)^h</i>		6.0
Want to continue to use the program if available	85.0	3.02
Will use the messaging program every day if the program is available	82.5	2.95

Table 3 reveals that most of research participants highly appreciate and have a positive view on the text messaging program for interventions in smoking cigarettes/water-pipe tobacco cessation. More than 95% of subjects expected to quit smoking after joining the program. More than 95% of smoking cessation made attempts; more than 90% rated the program facilitated smoking cessation. More than 85% of the participants found the program worthy of the time they spent, and wanted to continue using the program if available (85%). However, 7.5% thought the message bothered them.

3.3. Change in smoking behaviors after intervention

Table 4. The rate of total abstinence within 6 weeks (having not smoked in the past 7 days and CO breathing <10 ppm)

Features	n	%
Quit smoking cigarettes/water-pipe tobacco completely	8	20.0
Quit smoking cigarettes, but still smoke water-pipe tobacco	6	15.0
Still smoke both cigarettes and water-pipe tobacco	26	65.0

Table 4 shows that 20% of the participants quit smoking cigarettes/water-pipe tobacco completely; 15% stopped smoking cigarettes, but still continued smoking water-pipe tobacco. The percentage of participants still smoked cigarettes/water-pipe tobacco was 65 %.

Table 5. Change in smoking behaviors after 6 weeks of interventions

Features	Baseline survey (n, %, Mean \pm SD)	After 6 weeks (n, %, Mean \pm SD)	p
Number of cigarettes smoked/day, average	18.0	3.0	<0.001
Number of water-pipe tobacco smoked/day, average	11.8	2.0	<0.005
Frequency of smoking cigarettes now			
Sometimes	2.5	53.8	<0.001
Every day	97.5	46.2	
Frequency of smoking water-pipe tobacco now			
Sometimes	34.8	56.3	
Every day	65.2	4.4	< 0.1
No cigarette use/quit attempts made over 4 weeks after the program started		21 (52.5%)	
No water-pipe tobacco use/quit attempts made over 4 weeks after the program started		10 (25%)	

Table 5 reveals that the changes were statistically significant in the number of cigarettes smoked/day, smoking status (p <0.001); the number of cigarettes smoked per day (p <0.005), current status of water-pipe tobacco smoking (p <0.1). There were 52.5% of participants who

tried to quit smoking cigarettes and 25% who tried to stop smoking water-pipe tobacco within 6 weeks participating in the program.

4. Discussion

4.1. Feasibility

Most subjects participated in the reading and using messages programs every day (82.5%). The level of interaction of research participants with the program was very high, which is similar to the results found in other studies [12], [13]. Our results once again show that text messaging-based smoking cessation intervention programs are highly feasible, because the messages in the program are directly delivered to the smokers for the sake of smoking cessation [11], [12]. The relatively high interaction between research participants and the intervention program could be due to the average age group in the study was only 38.8 (+ 10.7), and most research participants have smartphones (85%); 90% of them found the messages useful / very useful; 82.5% interacted with the program via 2-way messages, but only 78.8% responded to the messages with the correct syntax; 97.6% were satisfied with the program. The participants found the program easy to use. Overall, the study proves that a text messaging-based support program for smoking cessation is likely to be accepted in Vietnam.

4.2. Change in smoking behaviors

Although the result of quitting is not the main objective in this study, there are still 8 participants who completely quit smoking cigarettes/water-pipe tobacco (20%), 6 participants who quit smoking cigarettes, but still smoked water-pipe tobacco (15%). Our results are similar to those carried out in some other countries in the world [12] and [14]. After 6 weeks of intervention, 65% still smoked. However, smoking cigarettes/smoking waterpipe tobacco behaviors have changed positively compared to the baseline survey; statistical analyses include the number of cigarettes smoked/day ($p < 0.001$),

smoking status ($p < 0.001$), number of cigarettes smoked per day ($p < 0.005$), waterpipe tobacco smoking ($p < 0.1$). The rate of research participants who tried to quit smoking cigarettes/ water-pipe tobacco within 6 weeks was quite high.

5. Conclusion

This study demonstrated the advantages of applying a supportive messaging program to help a group of smokers in Hanoi to quit smoking, and showed that a program can be designed to meet all the needs of interventions for all groups of smokers in other areas. It might suggest that there should be a need to expand this smoking cessation intervention program: They rated the overall experience of the text messaging program very positively; 90% rated the messages quite useful/very useful; 82.5% interacted with the program; only 78.8% responded to the message in the correct syntax; the program satisfaction rate was very high with 97.5%. Most research participants commented that the number of messages of the program was moderate (80%); the frequency of reading messages was 82.5%. Most of research participants highly appreciate and have a positive view on the text messaging program for interventions in smoking cigarettes/water-pipe tobacco cessation. More than 95% of subjects expected to quit smoking after joining the program.

The text messaging-based support program for smoking cessation can be used as an independent intervention supporting method or used to supplement or combine with other services, such as group counseling and telephone counseling. More than 95% of smoking cessation made attempts; more than 90% rated the program facilitated smoking cessation. More than 85% of the participants found the program worthy of the time they

spent, and wanted to continue using the program if available (85%). However, 7.5% thought the message bothered them. 20% of the participants quit smoking cigarettes/water-pipe tobacco completely; 15% stopped smoking cigarettes, but still continued smoking water-pipe tobacco. The percentage of participants still smoked cigarettes/water-pipe tobacco was 65%. There were 52.5% of participants who tried to quit smoking cigarettes and 25% who tried to stop smoking water-pipe tobacco within 6 weeks participating in the program ($p < 0.001$). Although this study provides evidence of feasibility, future large-scale studies will be needed to evaluate the effectiveness of the program in other areas and across the country.

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