

Feasibility of Using E-mail Counseling as Part of a Smoking-Cessation Program

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BACKGROUND: The need for more effective smoking-cessation interventions is firmly established. However, access to these services can be problematic in real life. E-mail messages may be a convenient alternative to deliver smoking-cessation interventions. The aim of this pilot study was to assess the effectiveness of incorporating tailored e-mail consultation messages in a smoking-cessation program for smokers willing to quit. **METHODS:** This pilot study examined the feasibility of integrating e-mail consultation messages in a smoking-cessation program for smokers willing to quit and with Internet access. At baseline, demographic data, smoking history and expired carbon monoxide (CO) levels were collected at a clinic visit. The subjects were provided with the specialist's e-mail address and instructed to prepare e-mail messages containing simple and clear information about their quitting progress. The counselor offered e-mail counseling throughout the smoking-cessation program. A 6-month follow-up visit was arranged, at which abstinence was reviewed. **RESULTS:** Of the 30 participants initially enrolled in the study, 21 (70%) attended the follow-up 6-month visit. E-mail counseling was more frequently offered (4–8 times) to the participants who completed the study, compared to those lost to follow-up (1–4 times). Comparisons with baseline exhaled CO values showed a significant within-group reduction at 6 months after smoking-cessation ($P < .001$) in the quitters, compared to smoking-cessation failures. Sustained smoking abstinence at 6 months was 37%. **CONCLUSIONS:** The integration of e-mail consultation counseling in a smoking-cessation intervention is feasible and effective. E-mail counseling as part of a smoking-cessation program warrants further evaluation. *Key words: smoking-cessation, e-mail, Internet, treatment, office intervention.* [Respir Care 2009;54(8):1033–1039. © 2009 Daedalus Enterprises]

Introduction

Cigarette smoking is a global epidemic that poses substantial health burden and costs.¹ With well over one bil-

lion smokers worldwide, tobacco use is the most important preventable cause of illness and premature mortality on the planet.² Cigarette smoke harms nearly every system of the human body, thus causing a broad range of diseases, many of which are fatal.^{3–5} Morbidity and mortality from a number of diseases diminish rapidly after quitting and life-long abstinence. Smoking-cessation is known to re-

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duce the risk of lung cancer, heart disease, strokes, chronic lung disease, and other cancers.^{6,7}

Because of the morbidity and mortality associated with tobacco use and the substantial benefits of cessation, it is vital to motivate tobacco users to cease their use of tobacco and to assist them in their cessation effort.⁸ In a recent meta-analysis it has been shown that physicians can contribute to reducing the prevalence of smoking in the

general population by providing smoking-cessation interventions.⁹

Unfortunately, too many smokers respond poorly to smoking-cessation efforts, with rather disappointing overall success rates of long-term abstinence.⁸ Although a wide spectrum of different strategies have been employed in an effort to improve smoking-cessation rates,^{10,11} it is acknowledged that smoking-cessation programs are time-consuming to both patients and physicians. Hence, many doctors and other health professionals feel discouraged about their advocating role in smoking cessation. In a recent systematic review it has been shown that almost 40% of primary-care physicians have negative attitudes toward advising smokers about cessation.¹² This can be resolved by implementing simplified (and effective) smoking-cessation approaches with a more efficient use of physicians' time.

The Internet contains a vast collection of medical resources and is an innovative channel for treatment delivery, offering the potential for a self-management approach to health promotion.¹³⁻¹⁴ There has been a persistent growth in, and access to, the Internet in recent years.¹⁵ Individuals appear to prefer Internet-delivered guidance for health-behavior change, because of its ready accessibility, convenience, and anonymity.¹⁶ Moreover, unlike clinic-based services for smoking cessation that can have poor access in real life (eg, city traffic, nuisance of parking, inconvenient clinic hours, long waiting lists), the Internet is available 24 hours a day, 7 days a week, and can provide a convenient medium for smoking-cessation interventions. For those smokers who are familiar with Internet technology, a smoking-cessation program based on tailored e-mail consultation can be easily implemented, thus optimizing patients' and physicians' time. Therefore, we designed a pilot study to assess the feasibility of incorporating tailored e-mail consultation messages in a smoking-cessation program for heavy cigarette smokers willing to quit. Part of the results have been previously reported as a letter to the editor.¹⁷

Methods

Study Population

Regular smokers (≥ 20 cigarettes/d for at least 10 y), consecutive attendees who booked for the first time with the call center of our clinic for smoking cessation were all invited to participate in the study at the time of their first consultation. Smokers with an exhaled breath carbon monoxide (CO) concentration of ≥ 10 ppm were recruited. Participants were also required to have unlimited Internet access, to provide a personal e-mail address, and to respond positively to the question "do you access your mailbox at least once a week?" Subjects with a history of

alcohol and illicit drug use, major depression, or other psychiatric conditions were excluded. The study protocol was approved by the local institutional ethics and review board.

Study Design and Procedures

This observational study consisted of 2 office-based visits: a baseline visit and a final follow-up visit at 6 months. At the baseline (visit 1), a detailed smoking history was taken and individual pack-years calculated (pack-years = [total number of years of cigarettes consumption \times total number of cigarettes smoked per day]/20) together with scoring of their level of nicotine dependence by means of a standard Fagerstrom test of nicotine dependence questionnaire,¹⁸ which consists of 6 questions with individual scores to assess the dependence on nicotine, with a higher score suggesting addiction and the need for nicotine replacement. Subjective ratings of depression were assessed with the Beck depression inventory,¹⁹ which is a 21-question assessment relating to depression symptoms, cognitions, and physical symptoms. Additionally, exhaled CO was measured (Micro CO, Micro Medical, Rochester, United Kingdom). Participants were instructed on how to prepare to stop smoking and to set a quit date within the next 7 days; they were prescribed with medications for nicotine dependence and craving tailored to their individual needs. They were also issued with specific booklets on smoking cessation covering a range of topics and techniques to teach the smoker to manage smoking triggers, social pressure to smoke, withdrawal symptoms, emotional distress, and weight control (courtesy of the Italian Ministry of Health, Istituto Superiore della Sanità).

Participants were provided with the contact e-mail address of the same specialist in smoking cessation who was in charge at baseline. The specialist counselor had to have a minimum of 3 years experience in smoking-cessation counseling in patients with different degrees of tobacco addiction. Participants were educated about the importance of maintaining frequent interaction and asked to time their first e-mail consultation within 1-3 days from the set "quit date." Furthermore, they were instructed to prepare e-mail messages containing simple and clear information about their progress in the smoking-cessation effort, occurrence of withdrawal symptoms or side effects from medications, adherence to medication, high-risk situations (ie, triggers to smoke), and any concerns related to their quitting efforts. Confidential responses to a smoker's e-mail request of assistance, with an emphasis on encouragement, motivation, and reward for the smoking-cessation effort, were provided by the specialist within 48 hours. Unrestricted e-mail counseling was offered throughout the smoking-cessation program, with no provision of telephone or e-mail prompts to encourage interaction.

Participants were invited to attend for a final follow-up visit at 6 months (visit 2), during which abstinence was reviewed objectively by measuring the concentration of exhaled CO.

Study Efficacy Measures

The primary efficacy measure was sustained smoking abstinence (defined as complete abstinence from smoking) at 6 months.²⁰ Exhaled CO level was measured to verify smoking status biochemically. Participants who self-reported giving up smoking with an exhaled CO concentration of ≤ 5 ppm at the final follow-up visit at 6 months were defined as quitters. Those smokers who failed to meet these criteria (smoking abstinence and exhaled CO of ≤ 5 ppm) were categorized as smoking-cessation failures (relapsers).

A secondary efficacy measure of the study was smoking reduction, defined as the self-reported reduction of daily cigarette smoking by at least 50% at the final follow-up visit at 6 months, compared with baseline, verified by a reduction in exhaled CO concentration from baseline.²¹

Basic demographics (age, sex), health behavior (comorbidities), and psychosocial variables (age of initiation of smoking, smoking years and pack-years, and smokers in the household) were also collected.

Statistical Analyses

Comparisons of exhaled CO followed a normal distribution and were expressed as mean \pm SD. Within-group comparisons of exhaled CO before and after smoking-cessation counseling were tested with the paired Student's *t* test. All analyses were performed using statistics software (SPSS, SPSS, Chicago, Illinois), and a *P* value of $< .05$ was considered significant. Of note, participants lost to follow-up were included in the statistical analysis on an intention-to-treat analysis as smoking-cessation failures.

Results

A total of 87 consecutive regular smokers (≥ 20 cigarettes/d for at least 10 y) were assessed. Of these smokers, 30 (34%) met eligibility requirements and consented to participate in the study. Of the 57 smokers who were not eligible, 6 had exhaled CO levels less than 10 ppm, 4 had major depression, 2 had a history of alcoholism, 32 did not have Internet access, 10 were unable to provide a personal e-mail address, and 3 were not interested in the program. Standard smoking-cessation was offered to all these smokers in our clinic, as recommended by current guidelines.²²

The mean age for the 30 subjects enrolled was 45 years, of whom 23 (76%) of the subjects were male (Table 1). Participants recruited currently smoked a mean of 28

cigarettes/d (range 20–50 cigarettes/d), the mean \pm SD exhaled CO level was 29 ± 13 ppm, smoked for a mean of 29 years (range 12–45 y), with a mean age at smoking initiation of 16 years (range 12–20 y), and with a mean pack-years of 40 (range 12–74). Seventeen (57%) were living with at least one smoker in their household. The average baseline scores of the Fagerstrom test of nicotine dependence and Beck depression inventory were 7 (range 4–9) and 10 (range 2–29) respectively.

Of the 30 participants initially enrolled in the study, 21 (70%) returned for their 6-month follow-up. The first request for e-mail consultation was sent to the specialist-in-charge within 1–3 days from the set “quit date” from 19 (90%) of the 21 participants who completed the study, whereas only 4 (44%) of the 9 who were lost to follow-up requested their first e-mail consultation in time. E-mail counseling was more frequently offered (4–8 times) during the first 4–6 weeks of the cessation program to the 21 participants who completed the study, whereas those who were lost to follow-up requested help via e-mail only 1–4 times. Of the 21 who completed the study, 7 (33%) solicited help via e-mail 4 times, 4 (19%) 5 times, 4 (19%) 6 times, 5 (24%) 7 times, and one (5%) 8 times.

It is not known whether the participants who were lost to follow-up made a quit attempt; however, they were coded as smoking-cessation failures. Sustained smoking abstinence at 6 months was demonstrated in 11 (37%) of 30 participants in our cessation program (Table 1). Comparisons with baseline exhaled CO values showed a significant and substantial reduction at 6 months after smoking-cessation ($P < .001$) (Figure 1A) in all who completed the 6-months follow-up ($n = 21$) in the quitters. For those who quit smoking ($n = 11$), the mean exhaled CO readings at baseline decreased from 31 ± 14 ppm to 3 ± 2 ppm (see Fig. 1B) at 6 months ($P < .001$). For those who failed to relapse ($n = 10$), a nonsignificant reduction in the mean exhaled CO readings at baseline was observed ($P = .13$), their levels being decreased from 26 ± 16 ppm to 19 ± 15 ppm (see Fig. 1C) at baseline and at 6 months, respectively.

Smoking reduction at the final follow-up visit at 6 months was observed in 6 out of the 10 smoking-cessation failures. For these tobacco smoke reducers the mean of 26 cigarettes/d (range 20–35 cigarettes/d) decreased significantly, to 8.3 cigarettes/d (range 4–15 cigarettes/d) ($P < .001$). Likewise, their mean exhaled CO levels at baseline were reduced from 24 ± 13 ppm to 10 ± 5 ppm at 6 months ($P < .001$). The number of e-mail counselings was similar for relapsers and reducers (4–8 times vs 4–7 times).

Discussion

The need for more effective smoking-cessation interventions is firmly established, and in an effort to improve

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Table 1. Participants' Smoking Status at Baseline and at 6-Month Follow-up After Integrated E-mail Counseling

Subject No	Therapy	E-mail Messages (n)	Cigarettes/d at Baseline	Exhaled CO at Baseline (ppm)	Cigarettes/d at 6 months	Exhaled CO at 6 months (ppm)	Outcome
1	Refused	1	20	18	ND	ND	Lost
2	B+NRT	4	25	58	20	50	Relapsed
3	B+NRT	6	30	31	0	4	Quit
4	B+NRT	5	25	46	0	4	Quit
5	Refused	2	30	36	ND	ND	Lost
6	B+NRT	6	30	41	0	4	Quit
7	B+NRT	7	20	19	7	9	Reduced
8	B+NRT	4	20	12	ND	ND	Lost
9	B+NRT	2	20	22	ND	ND	Lost
10	B+NRT	4	25	30	0	1	Quit
11	NRT	3	40	40	ND	ND	Lost
12	B+NRT	7	45	36	0	4	Quit
13	NRT	3	30	34	ND	ND	Lost
14	B+NRT	1	40	32	ND	ND	Lost
15	B+NRT	5	25	32	4	6	Reduced
16	B+NRT	5	24	41	0	2	Quit
17	B+NRT	6	30	11	15	8	Reduced
18	Refused	7	20	10	0	0	Quit
19	B+NRT	3	21	25	ND	ND	Lost
20	B+NRT	4	35	13	0	1	Quit
21	NRT	4	20	12	10	14	Relapsed
22	Bupropion	5	35	44	10	18	Reduced
23	B+NRT	7	23	23	4	7	Reduced
24	Refused	1	29	38	ND	ND	Lost
25	B+NRT	4	35	49	0	3	Quit
26	Refused	6	20	10	20	15	Relapsed
27	B+NRT	4	20	10	0	4	Quit
28	Refused	7	50	38	0	3	Quit
29	B+NRT	4	25	32	20	38	Relapsed
30	NRT	8	35	16	35	25	Relapsed
Mean ± SD			28	29 ± 13	7	10 ± 13	
Range			20–50		0–35		

CO = carbon monoxide
 Refused = refused pharmacotherapy
 ND = no data available
 Lost = lost to follow-up
 B+NRT = bupropion plus nicotine replacement therapy
 Relapsed = smoking-cessation failure
 Quit = had entirely quit at 6 months
 Reduced = reduced cigarettes per day
 NA = not applicable

smoking-cessation rates a spectrum of different strategies have been proposed.^{10,11} However, it is a fact that successful smoking-cessation is time-consuming to both patients and physicians, and access to these services can be problematic in real life, including city traffic, nuisance of parking, inconvenient clinic hours, and long waiting lists.

With these barriers in mind, we examined the feasibility of implementing personalized e-mail messages to deliver a smoking-cessation intervention. Participants were not only enthusiastic about participating in a smoking-cessation program integrated with personalized e-mail counseling, but

were also able to adhere to the program and to complete at least 4 counseling sessions, with an overall quit rate of 37% at 6 months. Moreover, 60% of those who relapsed in this study managed to reduce their cigarettes per day to a significant level. The high quit rate in our study reflects the likelihood that e-mail messages, allowing for tailored counseling in real-world, real-time situations, provided an optimal level of support. In the present study, retention at follow-up visits was satisfactory, with only 9 participants (30% of the total) not returning for follow-up at 6 months. This is in agreement with the notion that drop-outs from

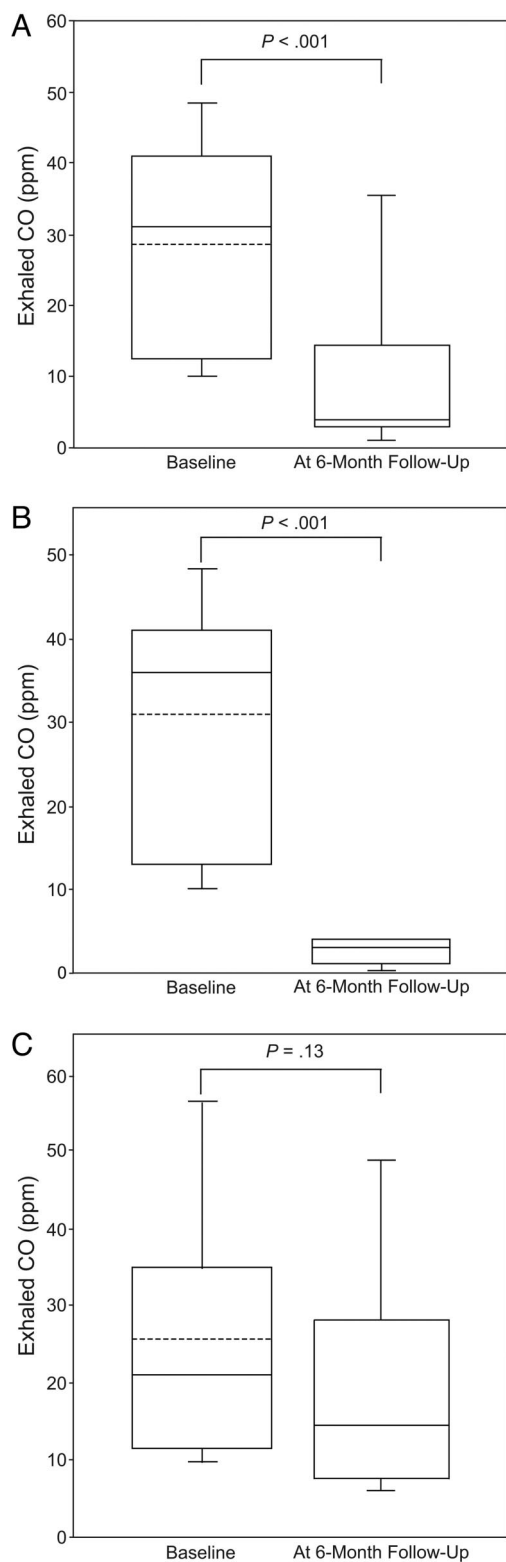


Fig. 1. A: Effect of smoking-cessation or smoking reduction on exhaled carbon monoxide at 6 months. A: All who completed the 6 months follow-up ($n = 21$). B: Subjects who had completely quit smoking at 6-months follow-up ($n = 11$). C: Subjects who had relapsed by the 6-months follow-up. The solid lines indicate the medians, and the dotted lines the means.

smoking-cessation trials are common, with attrition rates of about 20–50% being reported.^{23–25}

Personalized e-mail counseling has seldom been utilized for behavioral health-care delivery, with only a few published studies using this specific approach, and these have been limited to weight-loss programs,²⁶ stress-management plans,²⁷ and drinking behavior modification,²⁸ with variable efficacy. Akin to telephone quit lines, a growing number of sites on the Internet offering smoking-cessation help have been implemented to promote smoking rates and are easily accessible.²⁹ However, quit rates for Internet-based interventions are rather modest, and additional procedures are needed to improve efficacy.^{30,31} Some authors have suggested that adding an automated e-mail messaging system sending educational messages to a static Web-based smoking-cessation program may enhance quit rates,³² and others have shown that automated e-mail messages can improve smokers' motivation to quit,³³ but no long-term efficacy data are available.

Most effective Internet interventions are structured programs that involve intensive multi-component features (eg, Web site plus face-to-face interaction).^{34,35} Our study was designed to assess the feasibility and efficacy of integrating tailored e-mail consultation messages with an office-based smoking-cessation program. The results of this pilot study suggest that this integration is feasible and effective, allowing for tailored counseling and maximizing the level of support. It is well known that when participants in traditional smoking-cessation counseling lapse (ie, smoking a single cigarette while quitting), full relapse often follows.³⁶

The strategy of providing unrestricted e-mail counseling addresses this issue by allowing participants to receive prompt assistance when help is most needed in order to prevent a full-blown relapse. That this might be the case is supported by the observation that participants who completed the study requested e-mail counseling more frequently, compared to dropouts. Likewise, 90% of those who completed the study requested their first e-mail consultation within 1–3 days from the set “quit date,” compared to 44% of those lost to follow-up. Additionally, the benefit of instituting tailored e-mail consultations is to have simplified access to smoking-cessation services in a potentially cost-effective manner by reducing the number of office visits and thus save money.³⁷ Moreover, the asynchronous nature of e-mail counseling is generally appreciated³⁸ and was perceived as an advantage by our staff; smokers contact doctors when assistance is needed, and physicians respond at their earliest convenience.

Because of its design, there are a number of limitations that must be considered when interpreting the findings of this pilot study. By inclusion criteria, our study participants were ready and willing to quit, thus limiting generalizability of the findings. Some other characteristics of the

sample limit generalization of the findings; all participants were regular smokers, with a rather elevated level of nicotine dependence; their subjective ratings of depression were low; participants were all adults, with a mean age of 45 years. Also, exclusion of patients with major depression and a history of alcoholism may decrease the generalizability of the study results. However, we doubt that this is the case in the context of our study population, given that this problem refers to only approximately 7% (6 out of 87) of the smoker population screened for this study. Another related drawback of the study is the computer literacy of participants; out of the 87 consecutive regular smokers screened for the study, only about 50% declared regular use of the Internet. The relatively small size of the sample and the lack of study controls are also limitations.

Conclusions

Our study adds to the body of knowledge on the effectiveness of different Internet-based strategies for smoking-cessation and behavioral change. In particular, this pilot study is the first to show that integrating personalized e-mail messages within an existing smoking-cessation program is a promising strategy that appears to be feasible and effective, can simplify access to smoking-cessation, elicits a more efficient use of physicians' and patients' time, and is likely to maximize the level of support in a potentially cost-effective manner. Larger controlled studies are needed to confirm the importance of integrating personalized e-mail counseling into smoking-cessation programs.

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The right to a smoke-free environment is spreading in public places
World Health Organization photo, 1980
Images from the History of Medicine
Courtesy of the National Library of Medicine