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Evaluating the effectiveness of a single telephone contact as an adjunct to a self-help intervention for smoking cessation in a randomized controlled trial

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This study evaluated the effects of including a single brief prequit telephone counseling session in a self-help program for smoking cessation conducted through the mail, by comparison with the effects of the self-help program alone. Volunteer participants from northwestern Spain ($N=228$) were randomly assigned to one of two groups: (a) the self-help-only group ($n=110$, mean age=37.4 years, pretreatment cigarette consumption=26.5 cigarettes/day) or (b) the telephone-support group ($n=118$, mean age=36.8 years, pretreatment cigarette consumption=27.7 cigarettes/day). Using a conservative data analysis method (missing data considered as treatment failures), we found that the point-prevalence abstinence rate was significantly higher in the telephone-support group than in the self-help-only group at the end of treatment (44.9% vs. 21.8%) and at the 3-month follow-up (39.0% vs. 26.4%). Likewise, sustained abstinence was significantly higher in the telephone-support group at the 3-month follow-up (33.9% vs. 13.6%), the 6-month follow-up (25.4% vs. 12.7%), and the 12-month follow-up (21.2% vs. 9.1%). The results of this randomized controlled trial indicate that both treatments are an effective aid for smoking cessation, and that a single brief telephone call before the quit date is a low-cost and effective procedure for improving abstinence rates in a mailed self-help program.

Introduction

Reduction of smoking rates requires interventions that can be offered to large numbers of smokers at a relatively low cost. Clinical treatments tend to have relatively high cost, so that there are strong arguments in favor of other options such as self-help interventions (Lancaster & Stead, 2004), which can be disseminated and used on a much wider scale than clinical interventions. Programs of this type aim to provide some of the benefits of intensive clinical interventions without the need to attend treatment sessions.

Clinical interventions for smoking cessation produce the highest abstinence rates, but they also produce the lowest participation rates (Lando, 2006).

By contrast, self-help interventions achieve lower abstinence rates, but they can reach a larger percentage of the eligible population than clinic interventions can. Velicer and Prochaska (1999) estimated that smoking clinics have only a 0.0003 impact on the population of smokers and self-help materials have a 0.0075 impact, which is four times greater.

Diverse approaches have been proposed to increase the efficacy of these interventions, including telephone support. Several studies have provided objective evidence in favor of the utility of telephone support for smoking cessation (Stead, Lancaster, & Perera, 2006), both for increasing abstinence rates and for reducing relapse rates. Increasing the intensity of an intervention by providing telephone support appears to increase quit rates, especially in the case of proactive calls from a counselor (Brown, Hunt, & Owen, 1992; Curry, McBride, Grothaus, Louie, & Wagner, 1995; Lando, Hellerstedt, Pirie, & McGovern, 1992; Míguez, Vázquez, & Becoña, 2002; Orleans et al., 1991; Ossip-Klein, Carosella, & Krusch, 1997; Prochaska, DiClemente, Velicer, &

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Rossi, 1993; Zhu et al., 1996). Telephone support seems to be an effective and lower-cost alternative to clinical attendance, which not only is costly in terms of time and resources, but also represents a barrier for many smokers who prefer a program that does not require travel to a clinic.

Previously applied programs of this type have varied in the length and number of telephone calls provided (ranging from one to six in published studies). It seems that multiple counseling typically gives better results than single counseling (Zhu et al., 1996), but more counseling evidently increase costs. Therefore, we were interested in assessing the effectiveness of lower-cost options, such as a single telephone contact.

The aim of the present study was to evaluate the effects of including a single brief pre-quit telephone counseling session in a self-help program, by comparison with the effects of the self-help program alone. "Brief call" is defined here as a cessation intervention that can be delivered by a counselor in fewer than 10 min (Fiore et al., 2000).

Method

Sample

A total of 228 smokers participated in this study (124 men, 54.4%; 104 women, 45.6%; mean age=37.1 years; mean reported pretreatment consumption=27.1 cigarettes/day, $SD=10.6$).

Subjects were randomly assigned to one of two conditions (Tables 1 and 2). The control group received only the self-help program ($n=110$). The telephone-support group received the self-help program plus the single telephone call ($n=118$).

Response rates in each group at each assessment point were as follows: At the end of treatment, the response rate was 100% (i.e., all subjects could be located). At the 3-month follow-up, response rates were 98.2% in the self-help group and 99.1% in the telephone-support group. At the 6-month follow-up, response rates were 98.2% in the self-help group and 98.3% in the telephone-support group. At the 12-month follow-up, response rates were 97.4% in the self-help group and 96.6% in the telephone-support group (i.e., three subjects in the self-help group and

Table 1. Demographic characteristics of participants.

Characteristic	Total ($N=228$)	Self-help ($n=110$)	Telephone ($n=118$)
Gender, n (%)			
Male	124 (54.4)	60 (54.5)	64 (54.2)
Female	104 (45.6)	50 (45.5)	54 (45.8)
Age (years), M (SD)	37.1 (9.6)	37.4 (10.0)	36.8 (9.2)
Marital status, n (%)			
Single	73 (32.0)	32 (29.1)	41 (34.7)
Married/living with partner	138 (60.5)	68 (61.8)	70 (59.3)
Divorced/separated/ widow	17 (7.4)	10 (9.1)	7 (5.9)
Education, n (%)			
Elementary	39 (17.1)	18 (16.3)	21 (17.7)
High school	106 (46.5)	53 (48.2)	53 (44.9)
College/university	83 (36.4)	39 (35.5)	44 (37.3)

Note. M , mean; SD , standard deviation.

Table 2. Smoking characteristics of participants.

Characteristic	Total ($N=228$)	Self-help ($n=110$)	Telephone ($n=118$)
Quit attempt last year? n (%)			
Yes	101 (44.3)	52 (47.3)	49 (41.5)
No	127 (55.7)	58 (52.7)	69 (58.5)
Reduced smoking last year? n (%)			
Yes	67 (29.4)	36 (32.7)	31 (26.3)
No	161 (70.6)	74 (67.3)	87 (73.7)
Stages of change, n (%)			
Precontemplation	2 (0.9)	0 (0.0)	2 (1.7)
Contemplation	162 (71.1)	79 (71.8)	83 (70.3)
Preparation	64 (28.1)	31 (28.2)	33 (28.0)
Cigarettes/day, M (SD)	27.1 (10.5)	26.5 (9.7)	27.7 (11.3)
Number of years smoking, M (SD)	19.5 (9.8)	19.9 (9.8)	19.2 (9.8)
Dependence (FTND score), M (SD)	5.5 (2.4)	5.5 (2.4)	5.6 (2.4)
Desire to quit smoking (scale: 0–10), M (SD)	8.9 (1.4)	9.1 (1.2)	8.7 (1.6)
Desire to undergo treatment (scale: 0–10), M (SD)	9.5 (1.1)	9.5 (1.0)	9.5 (1.2)

Note. FTND, Fagerström Test for Nicotine Dependence; M , mean; SD , standard deviation.

four in the telephone-support group could not be contacted). For the purpose of data analysis, we considered the subjects who could not be contacted as current smokers, with the same cigarette consumption as reported pretreatment.

Entrance criteria for subjects

Participants became aware of the program through advertisements in newspapers or on radio and local television, by word of mouth from other people who had participated in the program, or by directly requesting information from our university's Smoking Cessation Unit. To enroll in the program, smokers were required to supply personal details and daily cigarette consumption. They were then mailed information on the program; the treatment contract and pretreatment questionnaires were to be returned likewise by mail. To participate in the study, each candidate had to (a) reside in Galicia (northwestern region of Spain, with a population of more than 3 million), (b) have at least one permanent telephone contact number, (c) be at least 18 years old, (d) be a cigarette smoker, (e) smoke at least 10 cigarettes/day, (f) accurately fill out pretreatment questionnaires and scales, (g) agree to return feedback forms throughout the program, and (h) sign a treatment contract giving consent for participation and agreeing to the specified terms (i.e., they agreed to follow the treatment, to cooperate in the follow-up assessments, and to provide program-related information requested by mail, by telephone, or in person).

Measures

Demographic and consumption information. All participants completed a questionnaire on smoking history (Becona, 1994) and provided personal information (several alternative telephone numbers and addresses were requested). The subject characteristics recorded were gender, age, marital status, educational level, daily cigarette consumption before treatment, years of smoking, number of previous quit attempts, and strength of desire to stop smoking and undergo treatment (scale of 0–10).

Stages of change (Prochaska & DiClemente, 1983). We used a short scale to evaluate the stages of change. The precontemplation stage consisted of smokers who were not thinking about quitting within the next 6 months. The contemplation stage included those who were planning to quit within the next 6 months. The preparation stage included those who were planning to quit in the next 30 days and had had at least one 24-hr quit attempt within the past year.

Fagerström Test for Nicotine Dependence (FTND; Heatherton, Kozlowski, Frecker, & Fagerström, 1991). The FTND consists of six items having two or four possible response alternatives. It is used to assess the smoker's level of nicotine addiction and has been validated by biological measures. This offers the advantage of not requiring biological measures, which the subject might find invasive. It has been adapted for use in Spain by Becoña and Vázquez (1998; $\alpha=.66$).

Smoking status. Three measures of nonsmoking—initial quit rate, nonsmoking prevalence at each follow-up, and sustained abstinence—were used to determine the effectiveness of the experimental conditions. Initial quit rate was based on responses to the question “Did you stop smoking after you got the materials in the last week of treatment?” Nonsmoking prevalence was based on responses to the questions “Have you smoked a cigarette in the last 7 days?” (3- and 6-month follow-ups) or “Have you smoked a cigarette in the last 30 days?” (12-month follow-up). Sustained abstinence at the 3-, 6-, and 12-month follow-ups was defined for each time point as no smoking since the end of treatment.

Treatment

The treatment used in the present study is an adaptation of a multicomponent behavioral program researchers have used in clinical settings (Becoña, 1993). The program's efficacy has been confirmed in different clinical and self-help studies (e.g., Becoña & Vázquez, 1997, 2001; Míguez et al., 2002). The treatment lasts 6 weeks and includes the following components: (a) self-monitoring and graphic representation of cigarette consumption, (b) information on smoking, (c) nicotine fading (nicotine content is reduced progressively over 3 weeks with respect to the starting level, by 30%, 60%, and 90%, and after this process, complete abstinence is suggested), (d) stimulus control procedure, (e) strategies to cope with abstinence syndrome, and (f) strategies to prevent relapse.

Procedure

Before treatment, demographic and cigarette consumption information was obtained with a self-report questionnaire mailed to all smokers who asked to participate in the program for smoking cessation ($N=236$). The 228 participants who met the inclusion criteria were randomly assigned to one of the two groups. One week before the start of the program, participants were sent a letter explaining program characteristics, together with instructions for recording cigarette consumption and for

graphical representation for the subsequent 7 days. At the start of the program, 1 week later, dispatch of the program materials commenced. Both groups received a total of six packages, at weekly intervals. Each package included an introductory letter with instructions for the tasks to be carried out during the week; a leaflet with detailed instructions on the tasks for that week based on program components (e.g., in the second week of treatment, stimulus control was introduced to reduce psychological dependence; that is, the subject would stop smoking in three situations in which he or she habitually smoked, and if by the third week the subject had been able to do this, he or she was asked to identify and stop smoking in another three situations); self-monitoring sheets; and the self-evaluation form to be completed and sent at the end of that week. Self-evaluation forms included questions about task fulfillment during that week (e.g., "Have you filled out the self-monitoring sheet every day this week?").

Subjects in the telephone-support group received a single 5- to 10-min telephone counseling call at the beginning of the fourth week. This was the only personal contact made. The person who made the call was an experienced smoking cessation counselor (Ph.D.). The aim of the call was to resolve possible difficulties or doubts in relation to the treatment, with the goals of increasing program adherence and of increasing motivation to quit in smokers who had reduced consumption. The call stressed the importance of carrying out tasks that had not yet been performed, in some cases because the subject was underestimating the tasks' importance. For example, some smokers did not complete the self-monitoring sheets correctly: Some did not use them at all, and others filled them out at the end of the day because they thought that the sheets served simply to record the number of cigarettes smoked daily. In such cases, subjects were reminded that the self-monitoring sheets provide useful information about their smoking behavior and cigarette consumption patterns; in addition, they help subjects to achieve gradual self-control of their smoking behavior, as long as information about each cigarette is noted immediately before it is smoked. Only in this way does self-monitoring fulfill its function.

The beginning of the fourth week was chosen because at the end of this week subjects were required to fix a quit date. In addition, we have observed previously (Míguez & Becona, 2004; Míguez et al., 2002) that in programs of this type without personal contact, toward the end of the treatment period a subset of smokers are not able to further reduce their consumption and remain with reduced consumption but without quitting entirely. At this stage they typically readjust their goal, to that of remaining with reduced consumption. These subjects may thus

benefit from a little push (e.g., for a therapist to point out to them that they are ready to quit, that they are not going to have a bad time, and that they should select a day from the coming 7 days on which to give up).

At the end of the treatment, and at the 3-, 6-, and 12-month follow-ups, data were collected on the subjects' smoking status, by mail or by telephone. Telephone interviews were conducted by a trained interviewer who was blind with respect to the group to which each subject belonged. To improve the reliability of these self-reports of smoking status, all follow-up questionnaires and interviews commenced with a reminder that the subject might at some time be asked to undergo a carbon monoxide test (thus creating a bogus pipeline effect; Murray & Perry, 1987).

Data analyses

All analyses were performed using SPSS v. 12.0. We compared baseline characteristics of the two randomized groups using chi-square tests for discrete variables and *t* tests for continuous variables. To analyze smoking cessation outcomes of this randomized trial, for each result (end-of-treatment evaluation and 3-, 6-, and 12-month follow-ups) an overall chi-square test was carried out to compare the two groups. We used repeated-measures analysis of variance to evaluate trends in cigarette consumption over time in each subject group.

Results

Demographic, consumption variables, and abstinence rates

Tables 1 and 2 show baseline demographic and consumption characteristics for each group. The randomization process appears to have yielded comparable groups, given that no variable was significantly different between the two groups.

Tables 3 and 4 show point-prevalence abstinence and sustained abstinence rates in the two groups. Sustained abstinence rates were consistently higher in the telephone-support group than in the self-help

Table 3. Point-prevalence abstinence (%).

Outcome	Group		χ^2	<i>p</i> value
	Self-help (<i>n</i> =110)	Telephone (<i>n</i> =118)		
End of treatment	21.8	44.9	13.57	.000
3 months	26.4	39.0	4.10	.043
6 months	30.9	34.7	0.38	.538
12 months	22.7	33.1	3.01	.083

Table 4. Sustained abstinence (%).

Outcome	Group		χ^2	p value
	Self-help (n=110)	Telephone (n=118)		
3 months	13.6	33.9	12.77	.000
6 months	12.7	25.4	5.89	.015
12 months	9.1	21.2	6.41	.011

group. Point-prevalence rates were significantly higher only at end of treatment and at 3 months.

Number of cigarettes smoked daily

Another indicator of change in smoking behavior evaluated in the present study was the reduction in the mean number of cigarettes per day at the end of the treatment and at each of the follow-ups, by comparison with pretreatment consumption, among subjects in each group. Both groups showed reductions in mean consumption in all periods evaluated. Taking into account the time course of consumption in each sample at the different time points, we found that mean consumption in the self-help group was 26.5 cigarettes/day before treatment, 12.3 at the end of the treatment and at 3 months, 11.6 at 6 months, and 13.7 at 12 months. Mean consumption in the telephone-support group was 27.7 cigarettes/day before treatment, 9.5 at the end of the treatment, 11.1 at 3 months, 11.2 at 6 months, and 11.6 at 12 months. Repeated-measures analysis of variance indicated that the factor time (pre-, posttreatment, 3-, 6-, 12-month follow-ups) had a significant effect on consumption, $F(4, 226)=133.43$, $p<.001$, as did the interaction between time and treatment, $F(4, 226)=2.68$, $p<.05$.

Discussion

The present study assessed whether a single brief telephone contact from a counselor improves the efficacy of a mailed self-help smoking cessation program. In a previous study (Míguez et al., 2002), we found that it was helpful to provide smokers with regular telephone support (six calls at weekly intervals). This support significantly improved abstinence rates, both at the end of treatment and at subsequent follow-ups. The main drawback of this intervention was the cost of the frequent telephone calls. Therefore, in the present study we minimized this cost by making a single call, with the aim of assessing the difference in results with respect to a greater number of contacts, and of assessing whether this brief intervention before the quit date is sufficient to increase the abstinence rates obtained in the self-help program.

The single call in the fourth week of treatment significantly improved point-prevalence abstinence in the short term (at the end of treatment and at the 3-month follow-up). More important, the single call significantly improved sustained abstinence at all times. Thus, like other randomized controlled trials of this type (e.g., Míguez et al., 2002; Orleans et al., 1991; Zhu et al., 1996), this study indicates that telephone support is a useful component of smoking cessation programs. A brief telephone intervention before the quit date increased the abstinence rates of the self-help intervention, though not as much as when a larger number of contacts was made (e.g., Míguez et al., 2002). However, meaningful comparison of the present results and results obtained in previous studies is difficult, because of differences among studies (e.g., volunteers or nonvolunteers; procedure used; method of telephone support; number, length, and time distribution of calls). The present study suggests that the effectiveness of telephone support may result from the call reinforcing the subject's desire to quit.

These results from Spain are not directly comparable with results obtained in most studies in the United States (Fiore et al., 2000), given the marked cultural differences that exist between the two countries and the higher proportion of smokers in the Spanish population. Meaningful comparisons can be made only with studies that have considered volunteer participants who have requested treatment themselves, and that have been based on nicotine fading (e.g., Orleans et al., 1991). In addition, the higher quit rates obtained in the present study, compared with those observed by other researchers who have examined similar low-intensity interventions, may have any of several possible causes. First, the treatment used is an adaptation of a multi-component behavioral program used in clinical settings in our region for 22 years. The majority of smokers who request participation know someone who has participated previously and thus know what it comprises. The program therefore has high credibility, and participants come to it with high confidence in its efficacy. Furthermore, subjects are likely to have valued the counseling call somewhat differently than did subjects in previous studies: The mailed treatment program is absolutely free, by contrast with pharmacological smoking cessation treatments, which are not free in Spain. Thus smokers who request treatment are highly motivated and are typically grateful for the services offered. The additional direct subject contact is generally interpreted positively as a sign of interest and concern and is an aspect of the program that participants value highly.

In the present study, subjects at the different time points (end of treatment and 3-, 6-, and 12-month

follow-ups) consumed on average fewer cigarettes than before treatment. Previous studies of self-help programs using nicotine fading also found a reduction in cigarette consumption (Becoña & Vázquez, 2001; Cummings, Emont, Jaén, & Sciandra, 1988; Míguez et al., 2002; Orleans et al., 1991). These subjects remain at risk for smoking-associated disease, although these risks may be lower with declining cigarette consumption (Gilpin & Pierce, 2002). Reduced consumption may be advisable, at least in the short term, for those subjects who failed in their attempts to quit smoking, and for those who wish not to quit but intend to cut down consumption. All in all, the aim is to reduce harm to the extent possible.

A few limitations in the present study imply that our results should be interpreted with some caution. Previous studies have reported that smoking cessation results based on self-help reports need to be interpreted conservatively because of a high implicit demand on subjects to report positive changes. Nevertheless, it seems unlikely that our results were affected to any great extent by this type of bias, given our use of a bogus pipeline technique. In fact, unlike in clinical studies in which biochemical verification is required (West, Hajek, Stead, & Stapleton, 2005), in self-help interventions such as that presented here, in which there is no face-to-face contact with participants and data are collected by mail or telephone, some experts (e.g., Benowitz et al., 2002) consider that biochemical validation is not needed, particularly when participants believe that the veracity of their self-report will be evaluated biochemically. Furthermore, in self-help treatments, verification of self-reports is more difficult and costly, since a member of the research team typically will have to travel to each participant's home. In line with this, numerous previous evaluations of the efficacy of self-help interventions or telephone counseling for smoking cessation have been based exclusively on self-reports (e.g., Borland, Segan, Livingston, & Owen, 2001; Boyle et al., 2005; Britt, Curry, McBride, Grothaus, & Louie, 1994; A. L. Davis, Faust, & Ordentlich, 1984; S. W. Davis, Cummings, Rimer, Sciandra, & Stone, 1992; Gilbert & Sutton, 2006; Lando et al., 1991; Ossip-Klein et al., 1997; Prochaska et al., 1993; Rimer et al., 1994).

The present study did not include an untreated control group, but it seems unlikely that the inclusion of such a group would have affected the results appreciably. In fact, in a randomized controlled trial carried out previously in Spain, continuous abstinence of control subjects maintained on a waiting list for 6 months was less than 1% (Becoña & Vázquez, 2001).

Certain issues remain to be researched in this field. For example, to date, the majority of studies of the

efficacy of telephone support have been carried out in the United States, and further research is needed to ensure that the findings of these studies can be generalized to other countries with marked cultural differences.

In conclusion, the present results show that a single brief telephone call is an effective adjunct in a mailed self-help smoking cessation program. A single call has low economic cost and increases the efficacy of the self-help program. However, more research is needed to determine the optimal number of telephone calls required for maximum cost-effectiveness. In addition, future research should aim to identify subsets of smokers who may benefit most from telephone support.

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