Factors in Smoking Cessation among Participants in a Televised Intervention

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This paper analyzes factors associated with smoking cessation during a 1-year period following a televised, self-help intervention among a sample of smokers who registered and participated in the program. Factors examined include readiness to quit smoking, extent of use of self-help materials, degree of exposure to the televised intervention, and environmental support for quitting from within the smoker’s household. Behavioral response immediately following the intervention appeared to persist over the year of observation. Of those who reported stopping smoking immediately following the intervention, fewer than half (about 10% of the total sample that was followed) were continuously abstinent at 12 months. The results indicate that environmental support when the individual is attempting to quit smoking is very important in differentiating between those who successfully quit and those who attempt but fail to sustain their abstinence. The results also suggest that an approach combining television and self-help may reach large populations of smokers and induce a substantial number to quit and remain abstinent.

INTRODUCTION

This article analyzes factors associated with cessation following a televised, self-help intervention among a sample of smokers who registered for the program, participated, and were followed for 1 year. Three sets of factors were considered: use of self-help in the form of the American Lung Association’s manual, Freedom from Smoking in 20 Days; exposure to a televised intervention, adapted from the Freedom from Smoking program; and environmental support from others in the smoker’s household as reported by the smoker.

Achieving widespread smoking cessation is important if mortality due to the major chronic diseases is to be reduced (1). To achieve large-scale behavioral change, interventions capable of reaching broad segments of the population at risk must be implemented. Effective public health measures that promote cessation among the general public should incorporate a broadly based strategy that can be introduced in community settings (2–4). It is generally believed that perhaps as many as 90% of all smokers wish to quit (5), although this percentage may be decreasing as more who desire to quit smoking succeed. Apparently self-help is the method of choice; surveys of smokers indicate that as many as two-thirds of

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those who wish to quit smoking would not be willing to attend a smoking cessation clinic (6, 7). According to the U.S. Surgeon General (8), of the 30 million former smokers who quit between 1974 and the time of the 1979 report, 95% had quit on their own.

Televised smoking cessation programs have successfully induced widespread cessation (9). Although televised public health interventions do not yield the very high rates of initial cessation reported by clinic programs, typically the latter rates are not sustained over time, so that the long-term results of the two approaches may not differ substantially (4). Televised initiatives have several advantages over face-to-face clinics (10). First, they can reach many smokers; hence, even if smaller percentages of participants quit, given the sheer numbers of smokers such programs can reach, they can have a sizable impact. Second, they contribute to public perception that the norms about smoking are changing and that community sentiment does not support smoking. Third, they are relatively economical because they are enacted in a format requiring minimal direct contact with the target audience. In contrast, the most effective clinical interventions require intensive face-to-face interaction, which is impractical in a public health approach (4). Finally, as already noted, few of those who want to quit smoking are willing to attend clinics.

The underlying principle of self-help programs is that change occurs as the individual selectively adopts behavior learned through direct experience and/or from observing others (11). However, as Wilson (12), Condiotte and Lichtenstein (13), Prochaska et al. (14), and others have shown, maintaining abstinence among initially successful participants after support from the program is removed is the most difficult part of the process. Effective self-help strategies must communicate approaches that teach maintenance skills aimed at reducing the risk of relapse and enhancing self-efficacy (15).

Self-help programs are usually offered in a written manual format (cf. Prochaska and DiClemente (16)). Early self-help studies incorporating manuals did not show any significant effects when compared with placebo (17–23). The few exceptions demonstrated that comprehensive and systematic manuals that incorporated strategies aimed at developing underlying behavioral skills to address temptation and deal with failure could be effective (24). Unfortunately, with one exception none of these early successful studies assessed the long-term effects of self-help smoking materials on maintenance in a public health setting (24, 25). The exception is the Davis et al. (25) evaluation of the ALA’s self-help manual, Freedom from Smoking in 20 Days. The Davis et al. study found that systematic materials incorporating maintenance produced higher rates of continued abstinence at 12 months than did materials not incorporating maintenance. However, the long-term, continuous abstinence rate achieved by the most successful combination of cessation and maintenance materials did not exceed 5%.

Flay (9) has demonstrated that media enhances the effects of self-help materials used alone. His review of media programs compared studies in which radio and televised interventions were used alone with studies in which self-help was used alone, and with studies in which broadcast media were combined with written self-help materials. The results of his analyses indicate that self-help measures,
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when introduced through a media format, can be twice as effective as when they are used alone. Moreover, when environmental support is added to such interventions, the effectiveness can be further enhanced.

Environmental support is a promising but underresearched influence on the smoking cessation process. Although it is variously defined, it generally includes whether there are others in the smoker's environment who smoke and whether the individual receives positive support for trying to quit smoking from others in that environment. The support helps the individual make the initial decision to quit and then to participate in the program. Environmental support can also help the individual maintain the initial abstinence, particularly during the most stressful periods immediately following the decision to quit smoking (26, 27).

However, the effects of environmental support or its absence occur mainly within the household. Overall, it would seem from the literature that quitting in an environment with no smokers, quitting with someone who is supportive, and in general having others who are interested in the behavior change can potentially enhance the likelihood of quitting and remaining abstinent following an intervention (28). However, there are exceptions. Shiffman (29), for example, found that the presence of another smoker in the household can encourage relapse. Colletti and Brownell (26), Mermelstein et al. (30), and Ockene et al. (27) found that in some cases quitting with another person in the household had negative effects.

THE INTERVENTION

This article reports data from one component of a large community intervention. The full intervention included a televised component, a self-help manual, and support groups offered in the community and at worksites. Results of the more intensive interventions at worksites and in the community are reported elsewhere (31-34). Our focus here is the response to the televised component in combination with the self-help manual in the absence of any of the face-to-face support components. The televised portion followed the ALA manual and involved 21 daily televised segments broadcast for 3 min during the early (4:30 PM), and 1 min during the late (10 PM), local news periods on the local NBC affiliate in Chicago. The station's health reporter narrated each segment as he took the audience day-by-day through the quit-smoking procedures outlined in the manual. Five volunteers, who were recruited by the participating health maintenance organization and the Chicago Lung Association (CLA) and represented different subgroups of the target population, had been filmed before the intervention began. The segments highlighted how these individuals dealt with different aspects of quitting. On the basis of ratings during January 1985, when the televised intervention was aired, and assuming that one-third of the population was smoking during that period, as many as 267,000 smokers could have watched some or all of the televised segments.

One week of televised promotions and displays in participating hardware stores preceded the broadcasts and encouraged smokers to register by completing a registration form obtained from over 300 local True Value Hardware stores in the Chicago MSA, from a participating PruCare (IMO) center, or at one of the over 100 corporate worksites. The registration form included a brief questionnaire
about current smoking habits, brand of cigarettes smoked, number of years
smoked, readiness to quit, expectations regarding the difficulty of quitting and
support from others, and reasons for wanting to quit smoking. The form also
requested the registrant’s name, address, and telephone number. Registrants sent
completed forms to the CLA, which mailed the manuals. Included in the manual
was a form that could be sent back to the CLA for the maintenance manual, A
Lifetime of Freedom from Smoking. About 50,000 manuals were distributed and
about 3,000 registration forms were received. Some of the registrants elected to
participate in the HMO programs, but about 2,000 simply requested a manual. A
sample of the latter are the basis for this analysis.

METHODS

Sample

Because of budgetary limitations, all those who requested manuals could not be
interviewed. From the 2,000 individuals who registered to receive a manual, a
simple random sample of 1,354 was selected for interview by telephone. Inter-
views were conducted immediately following the intervention (Wave 1), at 3
months (Wave 2), and at 12 months (Wave 3). At Wave 1, 252 respondents (18%)
reported that they did not actually participate in the intervention; 163 (12%) either
refused, could not be contacted, or were unavailable due to lack of a telephone;
and 948 (70%) had received and read the manual at least once or had seen at least
one broadcast and agreed to be interviewed. At Wave 2, 96% of the participants
at Wave 1 (908/948) agreed to be interviewed again. At Wave 3, 92% (832/908) of
those interviewed at Wave 2 were reinterviewed. Overall, 88% of the participants
interviewed in Wave 1 were interviewed at all three waves.

Measures

*Smoking status* is the dependent variable in this analysis. At each wave follow-
ing the intervention, the respondent was asked whether he/she smoked and, if so,
on the average how many cigarettes were smoked per day. In Wave 1, all respon-
dents who smoked were asked whether they had quit smoking for at least 24 hr
since the intervention; in Waves 2 and 3, those who were smoking were asked
whether they had quit smoking for at least 24 hr since the preceding interview.
Smoking status at each wave was defined as “quitter” if the respondent was not
currently smoking, “attempter” if the respondent was currently smoking but had
quit for at least 24 hr since either the intervention or the last interview, or
“smoker” if the respondent had made no attempt to quit.

We attempted to contact participants who reported that they were abstinent at
3 months to schedule appointments to collect saliva cotinine. However, only 40%
agreed to provide saliva samples. Most simply did not want to be bothered by a
stranger coming to their homes. Some who reported being abstinent may have
refused because they were actually still smoking. Moreover, although the proce-
dures for obtaining saliva were followed exactly as instructed, some samples were
not analyzable due to inadequate amounts of saliva. For these reasons, the data
reported here are based on self-reports and may overestimate the actual rate of cessation. As a result, they should be interpreted with some caution.

The independent variables in the analysis were divided into three classes: readiness to quit, environmental support, and exposure to the intervention. Readiness to quit at Wave 1 was assessed by number of times the respondent had been able to quit smoking for 6 months or more before the intervention, as reported during the Wave 1 interview, and by the respondent's anticipated difficulty in quitting and the number of years that the respondent had been smoking as reported on the registration form obtained prior to the intervention. At Wave 2, readiness to quit was measured entirely by variables obtained in the Wave 1 interview. These included the individual's expressed self-confidence in being able to quit or remain abstinent and whether the respondent had been classified as a quitter or attempter at Wave 1. In Wave 3, readiness to quit was assessed from expressed self-confidence in being able to quit or remain abstinent at Wave 2 and also whether the respondent had been an attempter or quitter at Wave 2.

Environmental support was assessed using three questions that focused on the support that a participant received from others in his/her household during the intervention. These questions were asked only at the immediate post-test (Wave 1); however, since we were interested in their long-term effects, they were included as variables in each wave of the analysis. Three pieces of information were obtained during the Wave 1 interview and used in the Wave 1 analysis. They were (a) the number of nonsmokers in the respondent's household, (b) whether the respondent received support from other household members to stop smoking, and (c) whether the respondent had done the intervention with someone else in the household who had successfully quit smoking. At Wave 2, the number of nonsmokers in the household at the time of the intervention and whether the respondent had tried to quit smoking with another household member who had successfully quit as measured in Wave 1 were significant and therefore were added to the Wave 2 model. At Wave 3, the number of nonsmokers in the household at the time of the intervention, as reported in Wave 1, was still significant and was added to the Wave 3 model.

Exposure to the intervention was assessed by the third subset of variables. At the immediate post-test, respondents were asked how frequently they referred to the manual during the broadcast of the intervention and how many televised segments they had viewed. As part of the Wave 2 and Wave 3 interviews, respondents were again asked whether they had used the Freedom from Smoking manual, and a question about whether they had written for and used the ALA's maintenance manual, A Lifetime of Freedom from Smoking, which was offered as part of the intervention, was added. At both Waves 2 and 3, respondents were also asked whether they had tried other smoking cessation programs since the intervention.

Statistical Analysis

A multiple endpoint logistic regression analysis based on maximum likelihood methods using the CATMOD procedure in SAS was carried out on data obtained at each wave. Each analysis incorporated three comparisons: quitters/smokers,
attempters/smokers, and attempters/quitters. Initially bivariate analyses were carried out to identify those variables that were potential predictors. As part of these analyses, the demographic characteristics of the participants were examined and no differences in smoking behavior at any wave associated with these characteristics were found. They were therefore not included in the multivariate analyses. Variables found to be related to smoking status in univariate analyses were included in the logistic regression analysis. When variables that are not associated with the outcome variable are included in a regression model, their effect may be to increase the computed variance of the regression coefficients for other variables with which they are correlated and that are associated with the outcome variable. The net effect may be to mask or reduce the observed associations of these other variables with the outcome.

The advantage of logistic regression is that it provides data on the pattern of variables that differentiate the categories of the dependent variable. Thus, the important results in the following tables are the patterns of relationship between the dependent and independent variables. Odds ratio estimates and their 95% confidence intervals were calculated. Those ratios for which the confidence interval does not include 1.0 are considered statistically significant at α = 0.05.

RESULTS

Before discussing the comparisons, we briefly summarize the characteristics of the 948 intervention participants who were initially interviewed. Their mean age was 47 years and they were predominantly female (40.8% male). Those employed tended to have either white-collar (25.2%) or upper-level blue-collar (27.5%) occupations, but 34.5% were not in the labor force. For education, 88.4% had at least completed high school, including 20.4% who were college graduates or postgraduates. They tended to be heavy smokers, with 29.8% smoking between 1 and 1.5 packages of cigarettes per day and 36.2% smoking more than 1.5 packs per day. The participants had been smoking for an average of 37 years. Before the intervention, 30% had at some time quit for at least 6 months.

At the Wave 1 interview immediately following the intervention, 20.6% of the participants had quit smoking, 23.3% had attempted to do so, and 56.1% continued to smoke. Table 1 presents the comparisons for quitters/smokers, attempters/smokers, and quitters/attempters, giving the odds ratio estimates and their 95% confidence intervals for each comparison. Quitters and attempters expressed greater readiness to quit than did the continuing smokers, who also seemed to be more habituated. Smokers had been smoking longer than either quitters or attempters, and attempters and quitters were more likely to have quit at least once for more than 6 months. Before the intervention, both attempters and quitters anticipated greater difficulty quitting than did the smokers, perhaps reflecting a more realistic expectation of the cessation process.

Quitters are distinctive from both attempters and smokers in the extent of their environmental support. Quitters were more likely than either smokers or attempters to report that there were no other smokers in their households. They were also more likely than the others to report having gone through the intervention with another member of their household who had also successfully quit. Finally, the
TABLE 1
MULTIPLE LOGISTIC REGRESSION ANALYSIS COMPARING QUITTERS, SMOKERS, AND ATTEMPTERS: WAVE 1 (N = 948)*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Quitters/smokers</th>
<th>OR 95% CI</th>
<th>Attempters/smokers</th>
<th>OR 95% CI</th>
<th>Quitters/attempters</th>
<th>OR 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readiness to quit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous attempts (6 months vs never)</td>
<td>1.40 (1.05,1.87)*</td>
<td>1.86</td>
<td>(1.42,2.44)*</td>
<td>0.75</td>
<td>(0.55,1.03)</td>
<td></td>
</tr>
<tr>
<td>Anticipated difficulty (very vs somewhat or none)</td>
<td>1.57 (1.22,2.01)*</td>
<td>1.58</td>
<td>(1.26,1.98)*</td>
<td>0.99</td>
<td>(0.77,1.28)</td>
<td></td>
</tr>
<tr>
<td>Number of years smoking (25 vs 5 years)</td>
<td>0.72 (0.53,0.98)*</td>
<td>0.67</td>
<td>(0.48,0.95)*</td>
<td>1.07</td>
<td>(0.74,1.51)</td>
<td></td>
</tr>
<tr>
<td>Environmental support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers in household (all vs some)</td>
<td>1.46 (1.20,1.79)*</td>
<td>0.97</td>
<td>(0.82,1.15)</td>
<td>1.51</td>
<td>(1.21,1.88)*</td>
<td></td>
</tr>
<tr>
<td>Quit with someone in household (yes vs no)</td>
<td>2.98 (2.03,4.37)*</td>
<td>0.85</td>
<td>(0.49,1.46)</td>
<td>3.51</td>
<td>(2.11,5.85)*</td>
<td></td>
</tr>
<tr>
<td>Received support from others in household (some vs none)</td>
<td>1.40 (1.15,1.70)*</td>
<td>1.14</td>
<td>(0.96,1.35)</td>
<td>1.23</td>
<td>(0.99,1.35)</td>
<td></td>
</tr>
<tr>
<td>Exposure to intervention</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refer to manual (daily vs 1/week)</td>
<td>1.66 (1.23,2.23)*</td>
<td>1.67</td>
<td>(1.27,2.19)*</td>
<td>1.05</td>
<td>(0.81,1.38)</td>
<td></td>
</tr>
<tr>
<td>Total viewing (15 vs 5 segments)</td>
<td>1.35 (0.98,1.86)</td>
<td>1.49</td>
<td>(1.11,2.00)*</td>
<td>0.91</td>
<td>(0.64,1.30)</td>
<td></td>
</tr>
</tbody>
</table>

* Quitters: N = 195 (20.6%); attempters: N = 221 (23.3%); smokers: N = 532 (56.1%).
* Significant at α = 0.05.

quitters were more likely than smokers to report receiving support from others in their household in their attempts to quit smoking. Although quitters were somewhat more likely than attempters to receive support from others in their households, the odds ratio is only marginally significant.

Quitters and attempters differed from the smokers in their exposure to the intervention. Both groups were more likely than the continuing smokers to have referred to the manual daily and to have viewed at least 15 segments of the televised intervention.

At Wave 2 (3 months after the intervention), 21.0% of the participants reported having quit, 17.5% had made an attempt, and 61.5% had been smoking continuously since Wave 1. When consistency across Waves 1 and 2 is examined, 13.4% had been abstinent at both waves, 8.9% had attempted at both waves, and 42.3% had never tried to quit smoking.

Table 2 presents the results of the Wave 2 comparisons. The similarity between quitters and attempters in readiness to quit and use of intervention materials observed in the Wave 1 analysis is no longer present. Quitters are distinctive from both attempters and smokers in that at Wave 1 they had expressed confidence about their ability to remain abstinent whereas the attempters and smokers had expressed less confidence about their ability to quit. Some effects of environmental support in the form of having no smokers in the household at the time of the
<table>
<thead>
<tr>
<th>Variables</th>
<th>Quitters/smokers</th>
<th>Attempters/smokers</th>
<th>Quitters/attempters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR 95% CI</td>
<td>OR 95% CI</td>
<td>OR 95% CI</td>
</tr>
<tr>
<td>Readiness to quit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attempted at Wave 1 (yes vs no)</td>
<td>0.87 (0.68,1.10)</td>
<td>2.06 (1.69,2.51)*</td>
<td>0.42 (0.32,0.55)*</td>
</tr>
<tr>
<td>Confidence at Wave 1 in ability to quit (very vs none)</td>
<td>3.95 (2.33,6.70)*</td>
<td>1.18 (0.84,1.66)</td>
<td>3.35 (1.84,6.09)*</td>
</tr>
<tr>
<td>Environmental support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers in household at time of intervention (all vs some)</td>
<td>1.44 (1.17,1.76)*</td>
<td>1.14 (0.94,1.38)</td>
<td>1.63 (1.27,2.10)*</td>
</tr>
<tr>
<td>Quit with someone in household (yes vs no)</td>
<td>1.95 (1.36,2.81)*</td>
<td>1.82 (0.84,3.92)</td>
<td>3.55 (1.62,7.78)*</td>
</tr>
<tr>
<td>Exposure to intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refer to original manual (yes vs no)</td>
<td>1.07 (0.88,1.29)</td>
<td>1.77 (1.39,2.26)*</td>
<td>0.56 (0.44,0.72)*</td>
</tr>
<tr>
<td>Refer to maintenance manual (yes vs no)</td>
<td>1.70 (1.25,2.32)*</td>
<td>0.55 (0.32,0.95)*</td>
<td>3.09 (1.75,5.47)*</td>
</tr>
</tbody>
</table>

* Quitters: N = 191 (21.0%); attempters: N = 159 (17.5%); smokers: N = 558 (61.5%).
* Significant at α = 0.05.

intervention and having quit with someone in the household who also quit successfully still differentiated the quitters from the other groups. Quitters also differed from the other groups in their greater likelihood of having used the maintenance manual.

Attempts differed from smokers and quitters in the persistence of their efforts to stop. Attempts at Wave 2 were more likely than either quitters or smokers to have been attempts in Wave 1. Attempts were also more likely than either quitters or continuing smokers to refer back to the original manual, but they differed from the quitters in that they did not obtain or use the maintenance manuals.

At Wave 3 (12 months after the intervention), 25.4% of those interviewed were abstinent, 25.2% had attempted to quit, and 49.4% were still smoking. When continuity over the year of data collection is examined, 10% of those interviewed had been abstinent for the year.

The patterns in response to Wave 3, as shown in Table 3, resemble those found in the analysis of Wave 2 data. As in Wave 2, persistence characterizes the attempts. Compared with the quitters and smokers, they more often had been attempters at Wave 2. If they were not already abstinent at Wave 2, quitters at 12 months were more likely than smokers to have attempted at Wave 2. However, since the odds ratio for the quitter/attempter comparison is less than 1.0, attempters at Wave 3 were most likely to have attempted in the previous wave. Attempters also differ from both quitters and continuing smokers, as they did in Wave 2,
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TABLE 3
MULTIPLE LOGISTIC REGRESSION ANALYSIS COMPARING QUITTERS, SMOKERS, AND ATTEMPTERS: WAVE 3 (N = 832)*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Quitters/smokers OR (95% CI)</th>
<th>Attempters/smokers OR (95% CI)</th>
<th>Quitters/attempters OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readiness to quit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attempted at Wave 2 (yes vs no)</td>
<td>1.39 [(1.07,1.80)*</td>
<td>2.00 [(1.60,2.50)*</td>
<td>0.69 [(0.54,0.89)*</td>
</tr>
<tr>
<td>Confidence at Wave 2 in ability to quit (very vs none)</td>
<td>3.17 [(1.77,5.68)*</td>
<td>1.18 [(0.80,1.75)</td>
<td>2.68 [(1.41,5.10)*</td>
</tr>
<tr>
<td>Tried other smoking cessation programs (yes vs no)</td>
<td>1.26 [(0.94,1.69)</td>
<td>1.42 [(1.09,1.86)*</td>
<td>0.89 [(0.66,1.20)</td>
</tr>
<tr>
<td>Environmental support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonsmokers in household at time of intervention (all vs some)</td>
<td>1.18 [(0.99,1.42)</td>
<td>0.86 [(0.72,1.03)</td>
<td>1.39 [(1.12,1.73)*</td>
</tr>
<tr>
<td>Exposure to intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refer to original manual (yes vs no)</td>
<td>0.84 [(0.69,1.02)</td>
<td>1.36 [(1.13,1.63)*</td>
<td>0.61 [(0.49,0.76)*</td>
</tr>
<tr>
<td>Refer to maintenance manual (yes vs no)</td>
<td>1.90 [(1.37,2.62)*</td>
<td>0.74 [(0.46,1.19)</td>
<td>2.56 [(1.59,4.14)*</td>
</tr>
</tbody>
</table>

*a Quitters: N = 211 (25.4%); attempters: N = 210 (25.2%); smokers: N = 411 (49.4%).

* Significant at α = 0.05.

in their use of the original cessation manual rather than the maintenance manual. It is striking that at both Waves 2 and 3 they used the maintenance manual less than even the continuing smokers, who had no use for maintenance. Finally, compared with smokers, the attempters were more likely to have tried other smoking cessation programs, a comparison irrelevant for the quitters.

The quitters at Wave 3 again were more likely to report confidence at Wave 2 in their ability to remain nonsmokers than were the smokers in their ability to quit smoking. The difference in confidence between quitters and attempters remains significant. The effect of having no other smokers in the household at the time of the intervention is still apparent in the comparison between quitters and attempters; but the effect of that measure on the difference between quitters and smokers is no longer significant, since the confidence interval includes 1.0.

DISCUSSION

Although estimates vary, about 30% of the adult population is currently smoking (35). Achieving cessation among the remaining smokers is likely to present complex problems that will be difficult to address through traditional methods. A recent review of the existing data on current smokers (36) indicates that continuing smokers are disproportionately low in socioeconomic status, black, female, in blue-collar and service occupations, and poorly educated. Continuing smokers are also likely to include a high percentage of heavy smokers and individuals who
have been able to quit for at least 24 hr on several occasions but who have always started smoking again. The participants in this intervention appear to be similar to the population of smokers described by Novotny et al. (36) in that they were heavy smokers (66% smoked more than a pack of cigarettes per day). Thirty percent had previously quit at least once for more than 6 months. However, they did not have a low socioeconomic background (53% in white-collar or upper-level blue-collar occupations and 88% with at least a high school education), which probably reflects the "upscale" flavor of the channel on which the intervention was broadcast.

Flay (9) has reviewed 56 mass media programs that addressed smoking cessation, 25 of which were classified as "televised self-help clinics." This review indicates that such clinics can be a promising approach to large-scale smoking cessation. When combined with written self-help materials or with social support in the form of face-to-face contact, their effectiveness can surpass those of any of these interventions alone. Flay's review showed the expected average 1-year prevalence of abstinence to be about 16% among those exposed to a televised intervention, 19% when television is supplemented with written materials, and 24% when social support is added. When continuous nonsmoking is the expected outcome, viewing a televised intervention alone is about as effective as using written materials alone—4% of those exposed to either form of intervention can be expected to remain continuously abstinent for 1 year. An average 1-year continuous abstinence of 8% can be expected to result from interventions combining television and written materials, which increases to 11% when social support is added. The spontaneous abstinence rate in the population without intervention is generally estimated to be between 1 and 4% (37-39). Face-to-face interventions have been estimated by several reviewers to produce immediate cessation rates on the order of 80-100% and continuous cessation at follow-up between 20 and 30% (40-45).

Overall, the data from our project indicate that change in smoking behavior following the intervention surpassed these estimates from other studies. Prevalence of nonsmoking at each wave varied from 21% at Waves 1 and 2 to 25% at Wave 3. Continuous abstinence at Wave 3, 1 year after the intervention, was 10%.

The results of this analysis indicate most strongly the importance of environmental support at the time of the intervention in making and sustaining the initial decision to quit smoking. The comparisons between the attempters and the quitters are most instructive on this issue. There were no differences between these two groups in their levels of participation in the intervention. Both groups were more likely than the continuing smoker groups to include participants who viewed many segments of the program and who used the manual regularly and to include individuals who, at some time before the current intervention, had made previous attempts to stop and had been successful for longer than 6 months. Yet the quitters at each wave had experienced the greatest amount of environmental support at the time of the intervention. On the other hand, the continuing smokers had been smoking longer than the quitters and the attempters, suggesting that their habituation may have been stronger.

Another consistent difference found mainly in later waves is that the successful
quitters were more likely than the attempters to use the maintenance materials. The attempters were more likely to try other smoking cessation programs or to refer back to the original manual, which does not provide information about maintenance.

The continuing smokers were least likely to report either environmental support or a strong readiness to quit. They made less use of the intervention materials both to begin with and in the 12 months following the intervention.

A relationship between self-confidence in one's ability to remain a nonsmoker and success is evident in these data. At each wave, the self-confidence of quitters in their ability to remain nonsmokers, as expressed during the interview at the preceding wave, significantly distinguished them from attempters or smokers, who were less confident of their ability to quit smoking.

Overall, this analysis indicates that a televised self-help intervention can result in sustained cessation. However, such interventions are most likely to be successful when the environment contains nonsmokers or individuals attempting to quit. These data then are consistent with those from other studies that reported that successful quitters are likely to live in households with no other smokers (36). Those who quit with another member of the household were also more likely to be successful than were those who did not have another quitter in their household. The literature is controversial on this issue, and further research is probably needed (26, 27, 30). It would also seem that there is a subgroup of smokers, those whom we have described as attempters, who are willing to participate in these programs but who lack sufficient environmental support during the intervention to succeed. Finally, the influence of the maintenance manual used in conjunction with this intervention is consistent with the findings of Davis et al. (25) and suggests that interventions such as the one described here need to give more emphasis to maintenance.

The purpose of this article is to examine factors associated with differences in response to this televised smoking intervention. Although we have tried to provide a context for the results reported using data summarized by Flay (9) on results from other smoking interventions, clearly this is not an experimental design and the results are subject to the limitations of the design that was used. Thus, the level of certainty is not the same as would result from a valid control or comparison sample selected from the target population. As a result, it is not possible to address the question of how those who participated in this intervention differ from the population of smokers who may have been exposed, and the comparisons are suggestive but not conclusive.

It would appear, for example, that the characteristics of participants are closely related to the characteristics of those who view the evening news on the intervention channel. Thus, in the absence of a control population, issues of selection cannot be resolved.

These limitations suggest that future studies of this type should have designs that allow preintervention measures on those who register and some opportunity to examine the population of smokers in the target community prior to the intervention. Clearly new studies recognize these needs, and projects such as COMMIT sponsored by the National Cancer Institute are designed with appropriate
controls and premeasurement. However, in large urban communities, randomization and classic controls may not be possible due to cost and the likely difficulty in finding an appropriate control community. For such studies, other designs will be required.

Another potential weakness of this paper is that the reported cessation rates are based on self-reports and were not validated biochemically. Individuals who participate in minimal interventions such as the one described here do so because they do not want the intensive interaction that accompanies face-to-face interventions. Therefore, their reluctance to participate in even a minimally invasive procedure like providing a saliva sample should be interpreted in this context. However, it is important to recognize that the cessation rates reported here may be overstated due to misreporting.

The results suggest, however, that televised interventions can be targeted to reach components of the population that are at greatest risk for continued smoking. It would appear feasible to select a channel whose viewing audience is most like the target sought for the intervention and then to tailor the content of the intervention to that audience. The results also confirm again that an intervention combining television with self-help materials is likely to be effective. Although it is not possible to say what percentage of the population would have quit in the absence of any intervention over the same time period, the 10% continuous 12-month cessation rate is better than that which has been found in other interventions. This may reflect the fact that the audience for this channel is highly educated and "upscale" socioeconomically. It is also important to note that demographic characteristics such as age, race, education, and income did not differentiate among the three comparison groups used in the analysis. Finally, studies seeking biochemical validation of the behavior should consider assessment procedures that are minimally invasive, since there appears, at least in this sample, to be considerable resistance to these procedures.

REFERENCES


