

TABLE 9.—Observed and expected deaths from lung cancer in nonsmoking women with smoking husbands

	Observed	Expected	Difference	Ratio	X ²	
Japan (Hirayama)	142	85.8	+56.2	+65.5%	36.81	Significant
U.S. (Garfinkel)	88	75.3	+12.7	+16.9%	2.14	Not significant
Greece (Trichopoulos et al.)	29	12.1	+16.9	+139.7%	23.60	Significant
Total	259	173.2	+85.8	+49.5%	42.50	Significant

SOURCE: Hirayama (21).

limitations in data and study design do not allow a judgment on causality at this time.

Summary

1. Mainstream and sidestream cigarette smoke contain similar chemical constituents. (Mainstream smoke is smoke that the smoker inhales directly during puffing. Sidestream smoke is smoke emitted from a smoldering cigarette into the ambient air.) These constituents include known carcinogens, some of which are present in higher concentrations in sidestream smoke than they are in mainstream smoke. Passive or involuntary smoking differs from voluntary cigarette smoking with respect to the concentration of smoke components inhaled, the duration and frequency of smoke exposure, and the pattern of inhalation.
2. In two epidemiologic studies, an increased risk of lung cancer in nonsmoking wives of smoking husbands was found. In these studies, the nonsmoking wife's risk of lung cancer increased in relation to the extent of the husband's smoking. In a third study, the risk of lung cancer among nonsmoking wives of smoking husbands was also increased, but the difference was not statistically significant.
3. Although the currently available evidence is not sufficient to conclude that passive or involuntary smoking causes lung cancer in nonsmokers, the evidence does raise concern about a possible serious public health problem.

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PART V. CESSATION OF SMOKING

PREVENTION IN ADULTHOOD: SELF-MOTIVATED QUITTING

Introduction

It has been observed that 95 percent of those who have quit smoking have done so without the aid of an organized smoking cessation program (33). Furthermore, most current smokers indicate a preference for quitting with a procedure they may use on their own and a disinclination to enter an organized, comprehensive program. In one survey of male smokers belonging to a prepaid medical group in California, respondents were asked to indicate in which of 10 approaches to smoking cessation they would be willing to participate (32). In order of popularity, subjects chose instructions (69 percent "yes" or "maybe" responses), medicine (66 percent), television programs (64 percent), and a book (53 percent). Group discussions (36 percent) and public health clinics (36 percent) were least popular. On average, the procedures that could be carried out totally alone (the book or television programs) received "yes" or "maybe" responses from 58 percent of those surveyed; those requiring the continuing, active involvement of others received "yes" or "maybe" responses from only 39 percent.

The preferences of smokers and the unaided efforts of most who have quit point clearly to the desirability of effective self-help programs in smoking cessation. Such programs would appeal to many who are unlikely to be reached by organized cessation clinics. Furthermore, self-help programs are more easily disseminated than are organized cessation clinics. With an estimated 50 million adult smokers in this country and an average of 30 participants in an organized clinic, 1.67 million clinics would be needed to treat all of the adult smokers. This staggering estimate dramatizes the desirability of a self-help approach.

Additional encouragement of self-help approaches arises from observations that comprehensive or complex interventions may be less effective in long-term behavior change than less comprehensive interventions. As noted by Franks and Wilson (9, p. 361), "'more' is not inevitably better—it could even be counterproductive." Several smoking cessation research reports have indicated that programs using a combination of treatments are less effective than the individual components of which the programs are comprised (e.g., 17,18). On the other hand, researchers cannot yet designate what cessation techniques are most helpful for what individual, so that offering a smoker a comprehensive package from which she or he may self-select may still be preferable to offering only single techniques.

The following sections review self-help approaches to smoking cessation and the attempts to identify motivational factors or

personal characteristics that predict success with self-help approaches. As used in this text, the term "self-help" refers to an individual's or group of individuals' efforts to quit smoking without the continuing assistance of professionals, trained leaders, or organizations (except for materials and occasional consultation). By this definition, programs that minimize therapist involvement but include group meetings or classes organized by people other than the members themselves are not considered as self-help procedures. They are discussed in the next section of this Part of the Report, which reviews long-term maintenance of smoking cessation.

Programs that involve mass media approaches, programs with no person-to-person contact with trained leaders or professionals, and programs with merely a single informational contact are included in this discussion. Oftentimes, single informational contacts provide only an instigation to cessation or a very specific, limited aid in cessation. Essentially, the individual is left to his or her own devices in quitting. As such, then, these interventions may be understood as self-help programs, in that they instigate efforts to quit that are otherwise unaided.

Review of Self-Help Approaches

In reviews of manuals for smoking cessation published prior to 1978, little success was reported when such manuals were used without guidance or appreciable input from a clinician or group leader (12, 13). The one exception was a study conducted in West Germany in which subjects used on their own a behavioral treatment manual, directions for behavioral contracting, or a combination of the two. These led to a 50 percent abstinence rate at a 15-month followup, with no differences among the treatments (20, as cited by 12). This report provides some optimism regarding the potential impact of self-help approaches.

In their comparison of several manuals for smoking cessation to be used either with or without therapist contact, Glasgow et al. (14) compared the books of Danaher and Lichtenstein (6) and Pomerleau and Pomerleau (27) with the "I Quit Kit" of the American Cancer Society (1). All subjects paid a \$15 deposit (returnable). Half of the subjects were given the materials with no other contact and were told that the program would be most effective if used on their own. The remaining 50 percent of the subjects, who were told that working with a therapist would facilitate use of the materials, met in small groups (four to six subjects) with a therapist for eight sessions. At the conclusion of treatment, the subjects' self-reports of abstinence indicated that the two books were more effective when used with a therapist than when used alone. In contrast, the "I Quit Kit" tended to be slightly more effective when used alone than with a

therapist. Analysis of abstinence data based on carbon monoxide levels showed a parallel trend.

At a 6-month followup, those using the books still tended to do better in the therapist-administered program, whereas those with the "I Quit Kit" tended to do slightly better when using it alone. These trends were statistically significant when based on self-report data and of borderline significance ($p < 0.10$) for abstinence determined by carbon monoxide testing. Self-reported abstinence rates at the 6-month followup ranged from 0 percent with the therapist-administered "I Quit Kit" and the self-administered use of the Pomerleau and Pomerleau book to 24 percent in the therapist-administered use of the Pomerleau and Pomerleau book. For all those who used materials without therapist administration, the self-report data indicated a 7 percent abstinence rate (3 of 41 subjects) at 6-month followup.

These data of Glasgow et al. (14) are sobering regarding the potential of self-help approaches. However, several considerations should be kept in mind. Because some subjects were to be in therapist-administered treatments, solicitations placed little emphasis on the possibility of self-help procedures. The deposit and the failure to emphasize self-help in solicitations may have kept individuals eager for a self-help program from being encouraged to join. Furthermore, subjects were rather heavy smokers, reporting a pretreatment mean of 32 cigarettes smoked per day and an average smoking history of 19 years. Thus, selection factors may have lessened the impact of the procedures employed.

Subjects reported the extent to which they actually read the treatment manuals and the percent of five critical activities they actually completed. Therapist-administration led to higher rates of completion of the books, whereas subjects in both programs with the "I Quit Kit" read approximately equal amounts of their materials. For percent of activities completed, therapist-administration was found related to compliance with all three manuals. Subjects working with therapists reported completion of 66 percent of the activities suggested, but those working alone reported completion of only 41 percent. These measures of adherence were correlated with self-report of number of cigarettes smoked per day at posttreatment ($r = -0.42$ and -0.43 for material read and activities completed, respectively) and followup ($r = -0.42$ and -0.24). These findings are unusual in the behavioral medicine literature, as correlations between outcome and reports or observations of adherence to specific treatment recommendations have not often been noted. The indices of adherence were somewhat broad—extent of book read and percent of critical activities completed. As such, they may have been as much a behavioral measure of motivation as of the impact of any single program element. Their correlations with outcome may reflect the

importance of participant effort rather than of actual number of pages read or activities carried out.

Minimal Interventions

In addition to procedures used by individuals without assistance, two classes of minimal interventions may also be considered within the field of self-help: those including brief exhortation and advice on quitting, and those with mass media or public education approaches.

The influence of simple advice to quit was found significantly related to percentage reduction in smoking in a study reported by Raw (28). Forty smokers attending a chest clinic were interviewed just after seeing a physician and questioned as to whether or not the physician had advised them to quit smoking. Half of them were also provided with information regarding the risks of smoking and the benefits of cessation. A higher percentage reduction in smoking at 3-month followup was obtained among those subjects reporting physicians' directions to quit (39 percent) compared with those not so advised (17 percent). Thus, simple information or encouragement (or, perhaps, remembering such) may be instrumental in changing smoking behavior among some people. Since reductions in smoking rate may be short-lived and fluctuating, it is unfortunate that cessation rates were not reported.

Several findings from this study shed light on the issue of motivation. First, Raw found that greater percentage reduction at 3-month followup occurred when the interviewer wore a white coat at the time of his interview with patients, irrespective of whether he was advising them to quit. Thus, the authoritative nature of the whole procedure seems to mediate its impact. A questionnaire measure of subjects' motivation to quit at the time they arrived at the chest clinic was correlated with percentage reduction ($r = 0.43$). The attempt to motivate quitting through information on the health risks of smoking and benefits of quitting was ineffective, leading only to a 20 percent reduction in smoking at the 3-month followup in comparison with a 36 percent reduction among those not receiving the instructions intended to be motivating. This difference was not significant.

A more controlled version of a physician-effected minimal intervention trial was conducted in the offices of 28 general practitioners, involving 2,138 cigarette smoking patients (31). Self-reports of smoking status were collected via mailed anonymous questionnaires identified by numerical code. Patients received one of four treatments: group 1, none (non-intervention controls); group 2, questionnaire-only controls; group 3, physician-advice to quit smoking; and group 4, physician-advice to quit smoking, an informational leaflet, and a warning that a followup would be performed. The advice to

quit was delivered during 1 to 2 minutes of the visit in the physician's own style. At 1-month followup, a greater percentage of patients reported attempting to quit smoking in the two physician-advice groups than in the remaining two groups. Patients in group 4 demonstrated a higher rate of trying to quit (17.2 percent) compared with the combined control groups, and a slightly higher rate of quitting (7.5 percent versus 3 percent). However, the percentage of patients attempting to quit that actually succeeded was not significantly different among the four groups. Thus, physician advice, with or without the leaflet, had no effect upon the success rate of those attempting to stop. The increased motivation to quit was strongest in the first month after the visit to the physician, persisted through the 3-month followup, and was enhanced in the leaflet plus followup warning condition. A measure of the intervention's effectiveness was taken to be the percentage of patients in each group who had stopped smoking within 1 month of the physician visit, and who were still abstinent at 1-year followup. Those percentages were: group 1, 0.3 percent; group 2, 1.6 percent; group 3, 3.3 percent; and group 4, 5.1 percent ($p < 0.001$). Furthermore, physician advice resulted in a significantly lower relapse rate 1 year later among those who had quit at 1 month. There was no differential benefit derived from the leaflets over the longer term.

This study indicates the potential for truly minimal (e.g., 1 to 2 minute) interventions by physicians. The authors point out that the collective efforts of all general practitioners (in the United Kingdom) working in this manner would produce more ex-smokers annually than would intensive smoking cessation clinics which, although obtaining much higher success rates than the 5 percent reported here, reach far fewer smokers and incur far greater costs.

Another study of a relatively minimal intervention that included screening and advice to quit smoking carried out in a medical setting was reported by Rose and Hamilton (29). Following screening those at high cardiorespiratory risk, those men at risk who also smoked were assigned either to "normal care" or to the intervention. The general practitioners of those in "normal care" received a full report of the screening. The men assigned to the intervention were invited by letter to an appointment with a physician to review their screening and the high risk posed for them by smoking. The 15-minute appointments included a review of the benefits of cessation as well as the risks of smoking. Subjects were scheduled for a second appointment the following week, by which time they were to decide if they wished to quit. They were given two booklets reviewing why and how to stop, but were told the decision was up to them.

At the second interview, decisions were reviewed, the importance of quitting rather than cutting down was emphasized, and the men were given a card for recording daily consumption, to be returned by

mail after 3 weeks. Further 15-minute sessions were scheduled 10 weeks and 6 months later with continued contact by record card and personal letter as needed. Thus, this intervention included more contact between physician and patient than probably meets the self-help criterion. However, the subjects were given little direct aid in quitting other than advice, two brief manuals, and a possibly highly motivating interaction with a physician.

Followup was conducted by clinic staff, and a questionnaire was completed in person or returned by mail. No objective validation of subjects' self-reports was made. The authors encouraged truthful reporting through the use of "impersonal" and "standardized" followup procedures to "avoid pressure to . . . deny or underestimate continued smoking" (29, p. 277). However, such an austere climate may heighten the tendency to disclose desirable outcomes, and thereby encourage over-reporting of abstinence. Response rates 1 year after the screening were 81 percent for the intervention group and 86 percent for the "normal care" subjects. Of these, 39 and 9 percent, respectively, reported no cigarette consumption. Three years after the screening, response rates were 64 and 70 percent and abstinence rates were 35.5 and 14.5 percent in the intervention and the "normal care" groups.

With regard to predictors of abstinence, smoking less than 20 cigarettes per day, non-inhaling, use of filter tips, and previous attempts to stop, increased chances of success. On the other hand, marital status of "other than married," and neuroticism as measured by the Eysenck Personality Inventory, decreased probability of success.

While not clearly within the category of self-help approaches, the interventions reported by Raw (28), Russell et al. (31), and by Rose and Hamilton (29) indicate the potential impact of brief contacts with physicians. Such contact is apparently enhanced by its timing as part of a visit to a chest clinic, as in Raw's study, to a general practitioner, as in the study of Russell et al., or as part of response and followup to screening for individuals at high risk, as in that of Rose and Hamilton. Similar findings are reported for myocardial infarction patients following minimal physician intervention (5, 19).

Public media approaches to smoking cessation have begun to achieve some popularity in recent years. Perhaps that receiving the greatest publicity is "The Great American Smokeout" sponsored each year by the American Cancer Society (ACS). A Gallup Poll survey based on personal interviews with a representative national sample of 1,551 men and women, 18 years of age and older, was sponsored by the ACS to evaluate the 1980 Great American Smokeout (2). The interviewing for the study was conducted 1 to 10 days after the Smokeout. The findings indicated a high degree of visibility for the program, as 83 percent of those interviewed knew of

it. Approximately 30 percent of smokers interviewed participated in the program—9.2 percent reported refraining totally from smoking and an additional 21.2 percent reported cutting down on that day. Demographic analyses showed a more pronounced impact of the Smokeout in terms of rate of participation among women, younger people, and better educated people, compared with men, medium-aged and older people, and the less well educated. Finally, the success of the program, as judged by level of familiarity with and active participation in the 1980 Smokeout, was equal to or greater than that occurring in the 1978 and 1979 programs.

The use of television in smoking cessation has been explored by several investigators. One format involved carrying out a smoking cessation program as part of a nightly news program. Each weekday evening, for 3 weeks, the regular science reporter devoted 2 minutes to the program. The program included habit-breaking and self-motivating procedures and several ways to prepare for a quit date, including gradual withdrawal. Viewers were also urged to quit before the quit date if they felt able to do so. Announcements the week prior to the program's start encouraged viewers to participate and to send a post card to the station if they were willing to be included in the evaluation of the program. Out of about 5,000 post cards received, a sample of 300 was drawn for followup. One month after the final broadcast, 8 percent of the sample reported abstinence (7). This sampling procedure probably included a selection bias for highly motivated individuals; however, it should be noted that subjects sent in their post cards prior to the start of the program, before they knew how much they would like the program, or whether they would succeed in it.

Working with the same televised cessation program, Dubren (8) explored the impact of taped telephone messages to encourage maintained abstinence. Following a broadcast invitation, 200 viewers sent in cards indicating they had quit for at least 1 day; of these, 64 were assigned to treatment or control groups. The treatment group received a telephone number to call, but the controls received no further attention except for followup. Run each weekday for 4 weeks, the 3-minute telephone messages were changed daily. Subjects were encouraged to call the telephone number to help themselves remain abstinent throughout this period. Among those offered the telephone messages, 65.5 percent reported not smoking at the end of the 4-week period. In contrast, only 34.4 percent of the control group reported abstinence. Seventy-eight percent of those offered the telephone messages reported calling at least once. Twenty-four percent reported calling for all 20 of the recorded messages. The mean number of calls among those who called at least once was 10.6. The validity of these reports is suggested by the fact that the monitor on the telephone answering machine recorded 256 calls received and

the subjects reported having made 245. The abstinence rates among this group are impressive. However, it should be recalled that the group was selected from among those who had quit for 1 day and who took the initiative of sending in a post card to report their success. For logistic reasons, the subject population was limited to those residing within New York City, but only 67 cards were received from this area. Thus, these results do not necessarily provide an accurate indication of outcome to be expected in a more general population of smokers.

Best (3) also reported on a television version of a smoking cessation clinic consisting of six half-hour shows broadcast weekly. The program content was developed from self-management components of a clinic program also developed by Best and his colleagues (4). The shows emphasized problem solving with behavioral self-management approaches. Other procedures included self-monitoring, encouragement of a buddy system, and modeling (each show included a simulated interview with a participant). A quit date was set for the day on which the fourth show was to be televised, but participants were given an alternative of gradual withdrawal between shows three and five.

A "companion self-help guide" was offered to all who wrote or called the station. The 1,403 smokers who did so were followed for program evaluation. Followup response rates varied from 64 to 87 percent due to unrelated events (e.g., a phone workers' strike). Among those responding, abstinence rates were 11.5 percent at the end of the series and 14.7 and 17.8 percent 3 and 6 months later. This suggests a "sleeper effect" of increased abstinence over time.

Best reports costs of the program to have been \$8,500, apparently excluding promotion and cost of air time. This averages \$48 per abstinent case at 6-month followup, higher than several others reviewed here, perhaps because of the limited population of the setting—Bellingham, Washington.

Also explored in Best's study were predictors of successful outcome. Pretreatment smoking rate was less (23.5 per day) among those who were abstinent 6 months later than among those who were not (27.2 per day). Several other predictors of outcome were previous attempts to quit unaided, reduced rate of smoking during the program but prior to quit-day, and subjects' perceived likelihood of success. All these may be viewed as measures of motivation. This, too, is consistent with the previous studies reviewed above. Subjects' ratings of the extent to which they actually used the procedures advocated in the program were also related to abstinence at 6 months. Again, such ratings are ambiguous as to whether they reflect the subjects' motivation or the specific effects of program components.

The importance of motivation is suggested by one final aspect of Best's program. It achieved an abstinence rate about twice that gained by the program reported by Dubren (7). Selection factors may account for this. Dubren's program was run weeknights on the news broadcast. Considerably greater commitment was required by Best's program, as it was run between 7:00 and 7:30 on Saturday evenings. Thus, it may have achieved a higher abstinence rate due to a higher motivation level of its participants.

The viability of media as a vehicle for smoking cessation programming is suggested by overall success of two well-known programs for coronary risk reduction, the Stanford Heart Disease Prevention Program and the North Karelia Project in Finland. Only the Finnish project reports population shifts in smoking, obtained from assessing different random samples over time. Both of these programs include mass media encouragement of smoking cessation along with other procedures for heart disease risk reduction. For example, as part of the Stanford project, residents of one town receiving only mass media intervention showed an 8 percent abstinence rate at a followup 3 years after the initiation of the community program. A control community showed an abstinence rate of only 3 percent. Smokers at high risk for coronary heart disease were offered counseling for smoking cessation in a third community. The overall abstinence rate was 24 percent within this community (24). The abstinence rate among those offered the group treatment was between 32 and 50 percent at the 3-year followup, depending on whether those smoking at the start but not available at followup are counted or not counted as smokers (23). This study admirably puts into perspective the contribution of a media approach relative to no treatment and to intensive treatment.

The focus of the North Karelia study was to explore the impact of a televised smoking cessation clinic (21). An actual clinic with a group of participants and a leader was videotaped and televised nationally. The airing of the 10 sessions was timed so that the final session would show the group members at actual 6-month followup, discussing their experiences. Within the Province of North Karelia, smokers were encouraged to watch the programs in groups. About 200 leaders volunteered to form the groups, which the authors calculated to be only about 1 leader for every 300 to 400 smokers within the Province. National surveys conducted before and 1 month after the program indicated decreases in the percentage of persons reporting smoking during the month prior to the second survey, from 45 to 43.2 percent among males and from 25.7 to 24 percent among females. However, these trends were not statistically significant. About 7 percent of the national sample watched at least four of the seven sessions. Only 10 percent of those who watched reported viewing the program in a supportive group setting.

This program was also evaluated by comparing the results in North Karelia with those in a neighboring province. These results were confined to data based on males, 30 to 64 years old. Intensive publicity efforts within North Karelia resulted in 9 percent of this sample viewing four or more of the seven programs in comparison with 4.8 percent of the sample in the neighboring province. For both samples, 27 percent of those who watched at least four programs and attempted to stop smoking reported abstinence at a 6-month followup. Although 2.3 percent of North Karelia smokers reported abstinence at the 6-month followup in comparison to 1.3 percent in the control province, this difference was not significant.

Thirteen months after the airing of the shows, a national survey was repeated and indicated a maintained abstinence rate of about 1 percent of those smoking at the original airing. Furthermore, shows were repeated 3 months prior to this final national survey. Approximately another 1 percent reported abstinence from this second airing of the shows. Thus, the two broadcasts of the program led to approximately 2 percent of smokers nationwide remaining abstinent for 3 months to 1 year. The authors estimated that this constitutes 10,000 to 30,000 individuals, an appreciable number, especially when the health and economic costs of diseases related to smoking are considered. The authors further estimated that production of the seven sessions cost only \$8,000. These figures indicate a cost per abstinent smoker of less than \$1.00.

Predictors of Outcome

As mentioned previously, a number of studies have attempted to identify personality patterns that typify the smoker. No underlying personality pattern responsible for smoking has been found and, therefore, no pattern-specific treatments have been developed. A somewhat more productive strategy has explored those characteristics related to success in specific cessation programs. Social support factors have been found to encourage success in maintenance of cessation (15, 22, 34) while a history of "negative affect" smoking (26) has been found to reduce maintenance success. (See the section in this Part of the Report on maintenance of smoking cessation.)

More directly pertinent to self-help approaches was a study of those who had successfully reduced smoking without assistance (25). Subjects were university students who had smoked 20 or more cigarettes per day for a minimum of 6 months. To be counted as successful, they had to have reduced their consumption at least 50 percent for at least 4 months; half of the 24 successful subjects were abstinent. Data were also gathered from 24 unsuccessful smokers. All subjects were identified retrospectively. Thus, the decision to quit

or cut down and the manner in which this was accomplished were not influenced by the survey.

Successful individuals reported greater use of self-reward and problem-solving or self-management procedures than did the unsuccessful persons. However, they did not report frequent use of self-monitoring procedures, a nearly universal component of behavioral self-control programs. Finally, 40 percent of the successful subjects reported use of techniques to control cues related to smoking. This study indicates that self-reward and active problem-solving strategies may be worth emphasizing both in self-help and in more organized approaches to smoking cessation. The importance of self-reward is also suggested by Rozensky and Bellack (30) in studies of self-rewarding tendencies for those who had quit smoking or lost weight.

Friedman et al. (11) also surveyed several behavioral, social, and psychological characteristics of Kaiser Permanente subscribers who had or who had not quit smoking. Smoking histories, number of cigarettes smoked per day, and reported depth of inhalation indicated less intense smoking at the time of the examination among those who remained quitters than on the part of those who persisted in smoking. The quitters reported somewhat less alcohol consumption than persistent smokers among whites and among black males. The percentage of subjects reporting consumption of more than six cups of coffee per day at the time of the index examination was also lower among quitters than among persistent smokers for all subjects. Among whites but not among blacks, a greater portion of quitters had completed at least some college.

Implications

For a decade, those studying smoking cessation have felt little encouragement from the relatively poor long-term outcome of intensive smoking cessation clinics. With few exceptions, results have stayed quite close to the 20 to 30 percent abstinence figures described by Hunt and Matarazzo (16). More optimism is spurred by the present assessments of self-help and mass media approaches and of brief interventions by health professionals. Such approaches have the potential to reach large numbers of smokers who find them attractive. Abstinence rates ranging from 5 to 40 percent have been obtained in selected but nevertheless large audiences (3, 14, 29). In entire populations, such approaches may encourage 2 percent of smokers to quit in a year's time (21). Their impacts may be enhanced by "sleeper effects" in which increasing numbers of persons exposed to them continue to quit as time passes (3). Largely unexplored is the extent to which these approaches may be combined to enhance each others' impacts (23).

What determines the impact of self-help approaches? Those most likely to quit on their own or with minimal media intervention seem to be physically and psychologically healthier (10), have milder smoking habits, in terms of history and intensity of current smoking (3, 10, 29), and may be generally more skillful in controlling their own behavior, as measured by the use of self-reward and problem-solving tendencies (25).

The other reliable predictor of outcome seems to be motivation, as measured by participants' willingness to read manuals and to carry out activities encouraged in them (14). If motivation to quit smoking reflects incentives for long life, then the fact that measures of motivation predict outcome suggest that quality of life is an important factor.

A number of characteristics of the programs reviewed here may be emphasized to promote higher levels of motivation and cessation of smoking. Among these are modeling (3, 21), or pointing up the positive consequences of cessation in an authoritative manner (29). Several of the programs include buddy systems, but these apparently have not been emphasized. Supportive self-help groups (21) may also add to an individual's willingness to follow through with a program. All of these program elements may be combined with the range of media sampled to develop improved packages.

Summary

1. Ninety-five percent of those who have quit smoking have done so without the aid of an organized smoking cessation program, and most current smokers indicate a preference for quitting with a procedure they may use on their own, and a disinclination to enter an organized, comprehensive program.
2. Research evaluations of self-help aids have reported success rates up to 50 percent cessation at extended followups (6 to 15 months). Most estimates, however, fall below this, around 5 to 20 percent.
3. Brief and simple advice to quit smoking delivered by a physician has substantial potential for producing cessation in a cost-effective manner.
4. Televised smoking cessation clinics result in variable rates of abstinence at followup. The use of television and other mass media are a cost-effective intervention because of their large potential audiences.
5. Retrospective studies revealed greater use of self-reward and active problem-solving strategies among those who quit or reduced smoking on their own than among those who were unsuccessful in quitting or reducing smoking.

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PREVENTION IN ADULTHOOD: MAINTENANCE OF CESSATION

Introduction

In their review, Hunt and Matarazzo (25) plotted the temporal trend in relapse among smoking cessation clinic participants who had quit at end of treatment. They demonstrated that the proportion of participants remaining abstinent fell to about 25 percent 3 to 6 months later and remained fairly stable after that time, a trend replicated by Evans and Lane (15). Even less optimistic were data showing a long-term abstinence rate of 17.8 percent among 559 participants surveyed 5 years after attending smoking cessation clinics (51). Hunt and Matarazzo also showed similar curves for abstinence from heroin and alcohol use. With few exceptions (8, 24, 27, 33, 39, 49), studies published in recent years have failed to exceed 6-month abstinence rates of 30 percent. Therefore, improving the ability to maintain nonsmoking status following successful cessation would be a major advance in cessation technology.

Overview of Maintenance Procedures

Major reviews in recent years (3, 50) have emphasized the importance of procedures directed specifically at maintenance. Such procedures generally encourage maintenance directly by focusing on events or problems that occur following cessation, rather than encouraging maintenance indirectly by trying to develop more effective cessation procedures or by scheduling "booster" sessions that merely review cessation procedures. A number of approaches to developing distinctive maintenance procedures have been reported in recent years. Among these are reinforcement or incentive procedures, self-management procedures, attempts to find the best level of therapeutic contact, tailoring treatments to client characteristics, identifying and treating antecedents of relapse, and social support. Predictors of outcome have also been studied. Each will be reviewed in turn.

Reinforcement of Maintenance

In general, changes in behavior will be better maintained if they are supported by reinforcers that are relatively immediate and positive (40). The incentives for smoking cessation that are naturally occurring are negative and represent probabilities of delayed events (i.e., disease incidence). The naturally occurring consequences of cessation that are quick in developing, such as improved sense of taste, less minor respiratory distress, and monetary savings may not seem like large rewards. Unfortunately, the naturally occurring aversive consequences develop quickly and are generally profound

and highly salient (45). Consequently, supplementing naturally occurring reinforcers for cessation with programmed reinforcers may help maintain abstinence through periods when incentives for resumed smoking are strong.

Some research has shown beneficial effects of reinforcement on nonsmoking. A monetary reward for adherence to a gradual withdrawal scheme led to 50 percent abstinence levels in participants at 6-month followup, versus 24 percent in controls (52). Subjects in the United Kingdom (36) made a deposit of £25, which was returned at the rate of £5 per week for each of the first 4 weeks following cessation. For the second 4-week period, subjects made a further £20 deposit, which was returned at the rate of £10 for each 2 weeks of abstinence. Subjects who smoked during the periods lost the amount of money that would have been returned to them. Deposits forfeited in this way were divided among those remaining abstinent. At the end of this 2-month period, abstinence levels among participants approximated 75 percent, validated by urinary nicotine analyses. Control subjects who did not participate in the reinforcement procedure showed a 2-month abstinence level of 55 percent. However, the difference between the two groups was no longer apparent at 6-month followup.

One way in which some have attempted to build reinforcement into the real world is through programs in the workplace. Rosen and Lichtenstein (42) reported a reinforcement program using a salary bonus of \$5 each month plus a Christmas bonus for employees who did not smoke during working hours. A questionnaire evaluation of 12 participants who had smoked prior to the program revealed a decline from an average of 33 cigarettes per day before the bonus system to 9 cigarettes per day after. Four of these individuals reported abstinence at the end of the program.

A number of anecdotal reports of smoking cessation and reinforcement programs in the workplace have also appeared. Among the procedures employed are reimbursement of the cessation clinic fee for people who maintain their abstinence until a target date, substantial salary bonuses (some on the order of \$1,000), making bets against the "house" (i.e., the company) on one's chance of success, and chances in a lottery for a fishing boat. Many of the programs seem to have centered on a chief executive's enthusiastic efforts to quit and, concurrently, to encourage other employees to do so (17). Whether this sort of enthusiasm can be replicated in planned programs is not clear.

The National Interagency Council on Smoking and Health recently surveyed several hundred major American companies regarding their interests and current activities in smoking cessation programs for employees. Programs were already offered by 14.7 percent of these companies. Further details on approaches to smoking cessation

programs in the workplace are available in a conference report published by the Council (35) and in papers by Danaher (13) and Fisher et al. (17).

Another approach to reinforcement is self-reward. This was found to be more common among those who were successful than among those who were unsuccessful in attempts to quit smoking independent of any organizational program (37).

Self-Management

Self-management packages may include procedures for relaxation to cope with urges or the emotions likely to provoke craving, procedures for contracting with oneself regarding aversive consequences for relapse and positive consequences for maintenance, and "stimulus control" procedures in which cues for smoking are avoided or eliminated. Lando (27) found 76 percent abstinence rates at 6-months after cessation when a comprehensive program was added to "laboratory smoking," which alone achieved 35 percent abstinence rates.

Several studies have reported the impact of comprehensive self-management on situational control procedures without aversive components. Their results all report approximately 30 percent abstinence at followup 6 months or more after cessation. These are more striking, however, because of their validation by reports of other group members (5), saliva thiocyanate (31), or urinary nicotine (58).

A different assessment of the importance of self-management was reported by Hackett and Horan (23). They studied self-management procedures including making contracts for maintenance with peers and family members, using relaxation skills, restructuring cognitions related to smoking and the desire for cigarettes, and thought-stopping. This last procedure (8) is designed to interrupt repetitive or troubling thoughts, as a means for coping with urges. Their program was used with and without "focussed smoking," in which participants faced a wall, received suggestions as to the aversive quality of smoking, and chain smoked for about 15 minutes for each of approximately six sessions. Individuals smoked between 3 and 3.5 cigarettes on the average in each of these 15-minute sessions. Results showed no improvement in maintenance with the addition of a self-management package. Focused smoking with or without the comprehensive program achieved abstinence rates of 40 percent from 6 to 9 months after cessation. It is important to note, however, that the content of the self-control packages used by Lando and by Hackett and Horan differed. Danaher (12) also failed to find any advantage of including self-control training with rapid smoking or with a normally paced "placebo" alternative.

Therapist Contact

Another approach to maintenance has been increased or varied modes of therapist contact. Schmahl et al. (44) found that subjects called biweekly by a research assistant to check on progress following cessation were *more* likely to relapse than were those called only monthly. Similarly, Relinger and his colleagues (41) found that increased therapeutic contact following cessation did not improve outcomes. A similar finding was reported by Lando (28), exploring both extent of therapist contact and magnitude of treatment. A two-stage treatment combined "laboratory smoking" and the comprehensive maintenance procedures reported by Lando (27). Subjects in a three-stage treatment received this combination plus a pre-cessation phase including films, pamphlets, and discussion of the risks of smoking. In an intensive contact program, subjects attended 13 or 15 treatment meetings, depending on whether they were in the two- or three-stage treatment. Minimal contact subjects attended only three or four sessions, again depending on whether they were in the two- or three-stage treatment. A significant interaction was found; subjects receiving the two-stage treatment did better in the intensive contact program, but the subjects in the three-stage treatment did better with less intensive contact. Lando (28) attributed his finding of relatively poor outcomes in the frequent therapist contact, three-stage group to possible "information overload" or to excessive complexity of treatment.

The finding that more contact may sometimes reduce treatment benefits points up a failing in the behavioral medicine and health education literatures. Reports often present only sketchy information on the manner in which curricula are presented. For instance, many devote little time to describing how meetings were run, what media were or were not used to support interventions, whether leaders used a didactic or a "self-discovery" approach to instructing participants, etc. Additionally, the scheduling of meetings to coincide with the natural progression of experiences prior to and after cessation is rarely discussed. An admirable exception to this latter point is a paper by Best (4).

Tailoring Treatments to Individual Characteristics

Treatment effects may be explored as interactions among treatment type, client type, and circumstances.

Best (4) explored interactions between treatments and client motivation and status on Rotter's (43) dimension of expectancy for internal versus external locus of control. The internal versus external (I-E) dimension was expected to interact with a "treatment focus," either satiation through doubling normal smoking rate or analyzing external cues for smoking. Satiation was expected to work better for internals since it provided a means of reducing desires for

cigarettes. Analyzing environmental cues for smoking, on the other hand, was expected to be better for externals since they would tend to be governed by such cues. The I-E variable was also expected to interact with whether or not subjects were told to "punish" relapses by smoking double their normal rate for 24 hours following any relapse. Internals were expected to benefit more from punishment since the punishment was self-managed and involved the satiation procedure directed toward urges to smoke.

The level of motivation was measured by several scales, including a semantic differential evaluation of smoking and subjects' estimates of their motivation to quit, desire to smoke, and probability of success. Several hypotheses were posed: (1) that motivation would interact with the timing of an attitude change manipulation related to the negative aspects of smoking; (2) that attempts to provoke attitude change would be more effective after quitting than before (before quitting, they might simply be met by client resistance); and (3) that this would be more pronounced among subjects low in motivation, since there would be greater difference between their attitudes prior to quitting and the attitudes encouraged in the change procedure. All subjects received individualized aversive conditioning, using rapid smoking and concentrated cigarette smoke in the treatment room.

Statistical analyses revealed significant interactions in the predicted directions between the treatment focus and the I-E variable and between the timing of the attitude change manipulation and two of the nine measures of motivation, the desire to smoke and the estimated probability of success. No significant interaction was found between the I-E measure and self-managed punishment following relapses. Using the desire for cigarettes measure of motivation and the I-E scale, subjects were coded as highly or not highly motivated and as internal or external. Depending on such status and the treatment received, they were then coded as matched or mismatched for treatment focus and for timing of attitude change. Among those matched for each, 50 percent were abstinent 6 months after treatment. Among those mismatched for each, 30 percent were abstinent 6 months later, while 25 percent of those matched on one and mismatched on the other variable were abstinent. Analyses of the percentage of pre-treatment levels still smoked at 6-month followup showed a significant difference between the matched-matched (30.4 percent) and mismatched-mismatched (75.2 percent). Several problems limit this study. First, a control condition that did not manipulate the procedures with which subjects were matched or mismatched in other conditions was not significantly less successful than the best of the other conditions. Second, in order to demonstrate the clinical utility of tailoring by individual differences, one