Review and Evaluation of Methods of Smoking Cessation, 1969–77

Summary of a Monograph

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ALTHOUGH 38 PERCENT OF THE U.S. POPULATION has quit smoking, there remained 53 million smokers in 1975. Six of 10 smokers have seriously attempted to stop but have failed; another 3 say they would try to stop if there were an easy way. Many smokers need help in quitting, which is the reason smoking cessation methods have proliferated during the last decade. This report is a summary of a monograph on smoking control methods published by the Bureau of Health Education, Center for Disease Control (*1*), and a followup to a critical review in *Public Health Reports* in 1969 (*2*).

In 1975, 39.3 percent of the U.S. males 21 years and older were smoking, a decrease of 13.5 percent since 1964. Smoking among females 21 years and older declined from 31.4 to 28.4 percent during the same decade. Over the 6 years from 1969 to 1976, however, the percentage of U.S. teenage boys who smoked did not change (30 percent), while the teenage girls who smoked increased from 22 to 27 percent. Smoking rates are about the same among Canadian and U.S. adults. Between 1965 and 1974, regular smoking among Canadian teenagers increased 3 percent.

Cessation Techniques and Programs

Methods summarized in the review (*1*) were those employed in U.S. and Canadian programs over a 9-year period ending in 1977. The monograph also contains a list of doctoral dissertations completed dur-

Cartoon from the National Cancer Institute's Helping Smokers Quit Kit

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ing the years 1970 through 1976 that are related to smoking cessation methods.

Smoking cessation is examined from several viewpoints: the intervention techniques of self-care, medication, and hypnosis; the service packages delivered by nonprofit institutions, medical sponsors, and commercial enterprises; behavior modification techniques; and the mass media and community programs. Each will be briefly described, and some success rates will be discussed in a subsequent section.

Self-care. The intervention technique termed "self-care" is the preferred method of giving up smoking; most ex-smokers have quit on their own. Self-care has three modes: devising one's own way of quitting; receiving instructions or advice on how to stop and then doing it; and using an aid or self-help guide such as a stop-smoking book, a quit kit, instructional manual, a phonograph record, cassette tape, cigarette filter, or lozenges or other substance sold over-the-counter.

Numerous quit kits have been developed. The Self-Testing Kit was devised by Dan Horn, former director of the National Clearinghouse for Smoking and Health. (This agency became a part of the Office of Smoking and Health, also in the Department of Health, Education, and Welfare, in July 1978.)

A variety of aids is available to help smokers break their habit. The most popular is a filter that reduces the tar-nicotine levels, permitting the smoker to be weaned away from his or her addiction to cigarettes.

Unfortunately, self-help materials have seldom been evaluated systematically, so we do not know the effectiveness of individual aids in assisting smokers in quitting.

Medication. Three types of pharmaceuticals are aimed at helping people overcome the smoking habit: substitutes, deterrents, and vegetable base products. Lobeline sulphate is the most common substitute for tobacco; its purpose is to serve as a replacement for nicotine and to provide irritant effects in the mouth and stomach. It has been contended that lobeline satisfies the craving for nicotine and thus helps smokers quit; there is no evidence, however, to support this contention. Two other nicotine substitutes are Tabex and nicotine chewing gum. Deterrents such as astringent mouthwashes are prepared mainly from silver nitrate, copper sulfate, or potassium permaganate. These preparations create a deterrent effect by irritating the oral and nasal mucosa. Vegetable base products, such as Libbs, Nicocortyl, oak extract, and Tabazero, have been used to help people stop smoking. The action of these products is not clear, and their efficacy in smoking cessation is doubtful.

Another category of pharmaceutical aids includes those that attempt to reduce the physiological and psychological withdrawal symptoms related to quitting. Some have a relaxing effect, and others aim at helping the person sleep, overcome nervousness, prevent weight gain, or diminish fatigue.

Hypnosis. Most trials of hypnosis do not include inducing a trance; instead the therapist attempts to intensify concentration on the quitting process and provides support to the client. Frequently, hypnotic suggestions associate smoking with unpleasant thoughts. A variety of procedures are often used with hypnosis. Combined with individual or group counseling, meditation, or relaxation, hypnosis appears to achieve good results. There are few reports, however, which indicate that there has been a scientific evaluation or careful followup of hypnosis as a cessation method.

Nonprofit sponsors. Voluntary associations, public agencies, foundations, hospitals, medical groups, health plans, schools, and religious organizations have all sponsored smoking withdrawal efforts. They have generally been educational programs or individual or group counseling sessions. Nonprofit organizations have also sponsored cessation programs that use hypnosis, live-in programs, aversive conditioning, behavior modification, and other miscellaneous methods. Lecture-discussions, school classes, and the 5-day plan comprise the three types of educational programs.

Lecture-discussions present the statistical evidence regarding the harmful effects of smoking through lectures, reading materials, slides, and films. Participants keep records of their smoking, and sometimes the Clearinghouse Self-Test is used. Certain groups have developed special manuals for clients. Educational programs concentrate on smoking and problems associated with quitting. Many programs set goals and target dates for quitting.

School classes resemble the lecture-discussion format. Students register for the class through adult school, high school, or college. The first few sessions are mostly lectures, but later ones are entirely discussions. Goals and target dates are used, and teachers reassemble the class for followup sessions after the semester ends.

The Seventh-Day Adventist Church initiated the 5-day program for smoking withdrawal; it has been widely copied by professionals and lay persons. More than 11 million smokers in the United States, Canada, and 150 other countries have participated in this program of five consecutive sessions with several weekly followup meetings. At the sessions the physiological effects of smoking are discussed, and lung specimens are displayed. Physical fitness, exercise, balanced diets, intake of fluids, warm baths, hot and cold showers, body rubs, deep breathing, and a buddy system are encouraged.

The success of individual counseling to achieve cessation depends on the empathy and experience of the counselor. Psychologists and psychiatrists conduct the most intensive sessions and pay attention to personal problems that might hinder quitting. The least intensive counseling is the advice that physicians pass on to their patients about stopping smoking.

Group counseling is conducted by a variety of leaders and takes different forms. Sessions last from 4 to 20 weeks; the average group meets for 8 weeks. The group generally comprises the same people throughout treatment and offers social pressure to refrain from smoking. Its size varies from 8 to 20 clients. Many groups are counseled in the educational mode, but a few become intensive therapy encounters. Format depends on the sponsoring organization and the leader's skill.

Commercial packagers of services. A review of the yellow pages of the telephone books of more than 200 U.S. cities in 1977 identified 116 different types of smoking cessation programs as follows:

Type	*Number*
Proprietary and commercial firms	32
Medically sponsored	12
Voluntary groups	9
Used hypnosis	35
Used psychological or behavioral techniques	20
Used acupuncture	8
Total	116

All 27 cities in the United States with populations greater than half a million, except New Orleans, had smoking cessation programs.

SmokEnders, organized in 1969, grants franchises and runs chapters directly. SmokEnders uses a highly structured, systematic technique, consisting of 9 weekly meetings with group membership varying up to about 30 participants. The charge for treatment in 1978 was around $250. SmokEnders has conducted about 5,000 seminars for 100,000 smokers.

The Schick Centers for the Control of Smoking started in Seattle, Wash., in 1971. The Schick method consists of aversive conditioning sessions for 5 consecutive days with combinations of shock treatment, smoke satiation, and rapid puffing. For the next 8 weeks the client attends the "follow-on" program; it employs educational topics and discussion. The charge for the Schick method is $495. More than 50,000 persons have gone through the program. Clients are highly motivated, most of them are women, and the average age is 40 years.

Most other commercial programs follow an educational approach, copying techniques and forms developed by researchers, but some use aversive conditioning. Meditation and relaxation techniques are also offered. Hypnosis is now available in most large U.S. cities, and

psychological-behavioral methods are also widely used. There are, however, no followup results for these programs.

Medically sponsored programs. A number of cessation procedures are employed in medically sponsored programs. Hypnosis, group techniques, and withdrawal clinics offered by foundations and health plans involve physicians and nurses. Physicians often urge patients to quit when they identify respiratory deficiencies or chronic illnesses. The practitioners explain how smoking directly affects the patient's health and emphasize the long-term benefits of smoking cessation. Some physicians issue a strong warning that the patient must quit smoking to preserve his life. More and more physicians and dentists are taking time (or assigning someone in their office to do so) to advise their patients how to quit. Followup support is offered by keeping in touch with the patient.

Risk factor trials are based on the proposition that cigarette smoking is a risk associated with two other major risks—high cholesterol and hypertension—leading to coronary heart disease (CHD). It is known that cigarette smoking acts both independently and synergistically with the other two major risk factors to produce CHD morbidity and mortality.

The first multiple risk factor trials were started in Europe. In the United States the Multiple Risk Factor Intervention Trial was initiated in 1972. In 20 cities, about 20,000 men between the ages of 35 and 57 years were selected for the study based on combinations of the three risk factors: cigarette smoking, high cholesterol, and elevated blood pressure. Half of the men were randomized to intervention while the other half were referred to their personal physicians. Intervention methods were designed to eliminate cigarette smoking, reduce cholesterol, and lower blood pressure. Those in the intervention group attended meetings for 8 to 10 weeks. Intervention was followed by maintenance sessions for the ex-smokers and extended intervention for the failures. The trial will last 8 years.

Behavior modification and conditioning. The primary behavior modification methods employ various techniques of aversive conditioning. More recently a number of investigators have taught positive reinforcement through self-management procedures. The electric shock technique for quitting smoking is administered in the laboratory and at clinics; however, smokers can also use pocket or pack shockers to associate shocks and cigarettes. Except when electric shock was combined with other procedures such as self-management, it has not achieved long-term abstinence. Other aversive methods employ smoke, noise, taste, sensory deprivation, and imagination. Despite large numbers of failures and poor research designs, psychologists have been persistent in efforts to improve aversive techniques. In the past few years, some studies have shown improved results.

The most promising aversive technique, rapid smoking, requires the subject to inhale from a cigarette once every 6 seconds for the duration of the cigarette or until he is nauseated. A number of investigators have expressed concern about the effects of rapid smoking on the cardiopulmonary system.

The satiation technique differs from rapid smoking in that subjects are simply required to increase the number of cigarettes smoked, not the rate at which they are smoked. The amount of smoking and its duration varies according to the experiment. Satiation requires no apparatus but does require health screening of subjects, because satiation also produces high doses of nicotine, which could adversely affect the cardiopulmonary system.

The objective of covert sensitization is to use the subject's imagination to produce avoidance behavior. Both the behavior to be modified and the noxious stimulus are imagined. The smoker is asked to imagine that he is receiving noxious stimulation while associating cigarettes with aversive thoughts. When the smoker imagines not smoking, he experiences pleasant feelings. When covert sensitization has been combined with other procedures, it has produced modest success, but when used alone, long-term quit rates have been disappointing.

Another aversive procedure is sensory deprivation. Its rationale is derived from evidence that a period of sensory deprivation leads to generally increased persuasibility and responsiveness to external cues. Sensory deprivation is an attitude change technique in which the subject remains in a dark silent room in bed for a lengthy period, usually 24 hours.

As a clinical procedure, stimulus control seeks to eliminate undersirable behavior by altering the situations in which the maladaptive response occurs. Smoking generally is associated with a variety of specific environmental and internal events. These associations trigger the smoking response (for example, drinking coffee, alcohol, finishing a meal). Investigators have tried restricting smoking to certain conditions in order to weaken the cues which trigger smoking. They emphasize gradual reduction instead of immediate cessation.

Stimulus control can take many forms. One strategy is to increase the interval between cigarettes, which allows subjects to continue smoking but limits them to

particular times that are signaled by some cueing device, such as a pocket timer. Once established, the new smoking cue is gradually faded out simply by increasing the time interval. A second strategy is hierarchical reduction; subjects are asked to monitor their smoking activity carefully and to identify situations in which smoking would have a high or low probability of occurring.

Contracting or contingency management seeks to eliminate smoking indirectly by strengthening other behaviors not involved with cigarette use. The purpose of contingency contracting is to obviate the goals of the smoker while enhancing motivation through commitment. Two forms of these contracts are the depositing of money that is returned for not smoking and social contracts or agreements among peers that they will not smoke.

Systematic desensitization procedures are designed to strengthen responses that are incompatible with smoking. Because smoking behavior is frequently cued to anxiety, it is hypothesized that if the prior and proximal stimuli leading to smoking are desensitized, then smoking will diminish. Relaxation, meditation, and yoga resemble desensitization techniques.

Most cessation programs encourage self-control through recordkeeping. Strategies for quitting smoking through self-management encompass a variety of techniques; some may be employed with groups or in conjunction with educational or aversive procedures. Self-control includes both self-care efforts and those involving a leader or therapist. Most self-control programs involve the subject more actively in his treatment than do those with aversive methods. The most widely used self-control methods are those based on concepts of self-monitoring, stimulus control, contingency management, systematic desensitization, and self-control packages.

Mass media and community programs. Communications via the mass media have increased public recognition of the serious health hazards of cigarette smoking. Radio or television is the most effective way to reach a large number of smokers with instructions on how to quit. The broadcast withdrawal clinics generally use advance publicity urging listeners to request kits, materials, and record cards. The telecast includes facts about the risks of smoking and the benefits of quitting, instructions on how to cure the habit, and tips to aid the listener in maintaining nonsmoking status.

Community antismoking programs were offered in San Diego and three communities in northern California. The San Diego program involved mass media, schools, voluntary agencies, quit smoking clinics, telephone messages, and a variety of other efforts—all geared to saturate the community with an anti-smoking campaign. The Stanford program aimed at preventing coronary heart disease in sample populations of the three communities. Intervention procedures—preventive screening, mass media attention, and personal instruction on how to quit smoking—were varied among the communities to measure their effects.

Miscellaneous methods. Only a few of the miscellaneous ways to quit are reported in the literature, and evaluation of them is meager. Recent programs cover a range of procedures from mail and telephone messages to a Caribbean vacation cruise. Some were not intended as smoking cessation methods; rather smoking withdrawal was an offshoot of other activities such as transcendental meditation. The miscellaneous techniques include acupuncture, yoga, exercise programs, meditation, and relaxation. Staple puncture is the insertion of a needle into the ear, which acts to suppress the desire to smoke.

Good results have been reported with deterrents used in the workplace. Some companies have banned smoking where smoking and nonsmoking employees work in close proximity. Others have set aside smoking and nonsmoking areas. Although some employees have resented the regulations, most have complied and some decreases have been observed in these situations. Monetary deterrents appear to have the greatest acceptance by employees.

Success Rates

A review of 100 methods used in programs in Europe, Australia, and North America between 1963 and 1968 showed average end-of-treatment cessation rates of 50 to 70 percent (*2*). Many methods used more recently have had end-of-treatment success rates of up to 80 percent. But in the long run, even these methods show only moderate success. Of 67 trials conducted in the United States and Canada between 1969 and 1977 with at least 6 months followup, two-fifths had quit rates of at least 35 percent of the participants, one-fifth had quit rates between 22 and 34 percent, and two-fifths had rates below 22 percent. Twenty-seven percent of the programs scored at least 40 percent success at 6 months, and 18 percent achieved 50 percent success.

The best results were for programs employing group counseling, hypnosis, and the rapid smoking aversion technique. Taking medication for smoking cessation did not average even 20 percent abstinence in the short run, much less over time. The 5-day plan is widely

available, but its long-term (more than 6 months) success rates are low. The St. Helena live-in program that developed out of the 5-day plan has produced a 35 percent success rate after 1 year.

Although the rapid smoking technique shows mixed results, when this procedure was combined with social support and good maintenance practices, rates have been improved.

Hypnosis has gained popularity as a cure for smoking. Success rates are contradictory, with some hypnotists claiming high quit rates and others reporting that hypnotism has a poor record of helping smokers quit.

Computing health hazard appraisals of individuals and the use of risk screening programs have prompted some smokers to quit. Risk factors trials appear to work with persons at high risk for heart or respiratory diseases. Followup indicates that about half of high-risk men who try to quit refrain from smoking for at least 1 year.

Proprietary methods have become widely available; the fees provide an added incentive to remain abstinent. It has been extremely difficult, however, to obtain valid survey data on the quit rates of commercial clinics. Many claim excellent success rates, but these are based only on persons who complete the program and stop smoking. The few outside evaluations reveal success rates of about 40 percent.

The most efficient, widest-reaching penetration of the population of smokers occurs through mass media promotion of cessation methods and continued acceleration of positive governmental action against smoking. An example of a large-scale attempt to increase awareness of health and to effect behavior change is the Canadian program called "Operation Lifestyle," which reached two-thirds of the population through mass mailings.

Generally, counseling by physicians is not a sustained effort. They lack the time and commitment to provide long-term support. If health professionals became more active in smoking cessation, they could profoundly affect public awareness of the importance of quitting.

Comment

Success depends on both the participant and the method. Smokers who go through an entire course rather than attending just a few sessions are more likely to succeed. Smokers must be committed to stopping; this commitment is stronger in people who believe that the dangers of smoking are personally relevant and in those who have a compelling reason to quit. No single method works uniformly well with large numbers of individuals. People differ in personality, emotions, personal satisfactions, smoking habits, how strongly they are addicted to cigarettes, and whether they have the motivation and determination to quit smoking. For these reasons, many methods and combinations of interventions are needed.

Good maintenance procedures that continue to support the ex-smoker make the greatest contribution to success in smoking cessation. Once the smoker abstains, a myriad of forces acts upon the individual person to influence a return to smoking. These forces include environmental, social, and internal pressures such as the mass media, smoking by peers, and stress. When the smoker breaks his habit, he still must contend with the effects of his former addiction. Programs with well-planned, long-term maintenance reduce recidivism and increase their eventual success rate.

Much has been learned about the behavioral and addictive components of smoking during the last decade. Cessation, however, remains a complex multivariate outcome. Both the physiological and psychological components of smoking need to be considered in framing protocols for cessation. Followup and maintenance are imperative to any program and a key to sustaining cessation.

Withdrawal methods have come a long way since the first public clinics were started in Stockholm in 1955. It is obvious from the review that many methods are now widely available in the United States and Canada. Nevertheless, there are still unexplored areas of smoking cessation. In the next few years there will be further testing of procedures such as self-care and self-help and more use of the mass media, telephone, and mail. Other techniques—acupuncture, relaxation, meditation, biofeedback, exercise, deep breathing, and risk screening appraisal—will also receive attention. Group counseling, hypnosis, and aversive techniques will continue to be popular methods. Practitioners will make more efforts to help patients quit, and methods will become available at the workplace and for high-risk groups.

The current popularity of physical fitness could be used to devise cessation methods centered on exercise such as jogging or swimming, since these activities require good breathing ability and are incompatible with smoking. The key to prevention of the smoking habit lies in the promotion of health.

References

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2. Schwartz, J. L.: A critical review and evaluation of smoking control methods. Public Health Rep 84: 483–506, June 1969.