ROLE OF INDUSTRY IN PREVENTIVE CARDIOLOGY

Behavior Change Procedures in Controlling Diet and Smoking

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INTRODUCTION

As industry moves toward providing employees with an increasing array of opportunities for health enhancement, it becomes increasingly important to consider what is known about the behavior changes needed to achieve such a goal. Two more difficult problems than dietary change and the reduction of cigarette smoking can hardly be imagined, and most physicians can easily recall their failures in helping patients achieve these ends. Nevertheless, substantial progress has been made in these two areas in the last few years and research continues apace. This paper will briefly review this progress with especial emphasis upon information of value to the clinician in an industrial setting.

DIET

The prudent heart diet (1) recommends four goals to individuals: to attain and maintain a desirable weight; to decrease intake of saturated fats; to increase the consumption of polyunsaturated fats; and to lower the intake of cholesterol. While weight loss, dietary change, and even exercise programs should be combined in practice, for purposes of exposition weight loss and dietary change will be separated here.

Weight Loss--

The modern approach to weight control was ushered in some 15 years ago with a hypothesis that obese and non-obese persons may differ in their style of eating (2), with the obese being more sensitive to environmental events leading to eating, eating their food more quickly, and chewing it less. Research has, of course, complicated the picture. However, although the differences in eating style between overweight and normal weight individuals are fewer than was once thought, the obese do seem to eat faster and tend to choose

more food than the non-obese (3). Moreover, the variation in findings between studies suggests that eating is much influenced by the social environment and may be, therefore, more easily changed by therapeutic procedures than was once thought. Finally, it seems likely that, at least in women, the obese are less active than the non-obese (4).

Given these findings, the main focus of the newer counseling methods is on the alteration of eating and exercise patterns, rather than on dieting. Such counseling often takes place in a group that meets once or twice a week for between 10 to 30 sessions. (Table 1).

Table 1. A behavioral weight control program

1.	Clarify and strengthen decision to lose weight; provide basic nutritional information
2.	Engender accurate and explicit expectancy with short term goal setting
3.	Self monitor food consumption
4.	Remove environmental cues associated with eating--e.g., remove food from sight, eat in only one place
5.	Change eating style--eat more slowly, chew food more thoroughly
6.	Reinforce behavior change
7.	Maintain weight loss--continued therapist contact, and use of self monitoring, spouse inducement in therapy

The major elements of most programs are self-monitoring, stimulus control procedures, and reinforcement of reported behavior (and weight) changes (see references 4 and 5 for detailed accounts of typical programs).

The first of these, self-monitoring, is directed toward recording the behaviors which are being changed, namely eating and exercise patterns, rather than concentrating solely on weight and calories. Indeed, in most programs calorie counting is downplayed although moderate restriction of consumption is advised. Clients are encouraged to use their records to identify their own problem areas and to concentrate their efforts upon these problems. The eating behaviors to which most counseling is directed include the elimination of cues which tend to enhance the probability of eating

and of behavior which leads to over consumption. In the first category, patients are taught to remove food from sight, and to empty refrigerators and cupboards of surplus foods, especially easily consumed snacks. In addition, eating should be confined to one place, preferably sitting down at a nicely laid table. This enhances the tendency to only eat at mealtimes, and disconnects eating with such activities as reading, watching television and lying in bed. Conversely, the latter activities will become less likely to lead to eating. When serving food, smaller plates can be used so that small portions will look larger, and some food might be left on the plate at the end of the meal. This procedure should eventually lead to the selection of smaller portions, and break the habit of automatically eating everything that is served. In the second category, the overweight can be taught to eat more slowly and to chew their food more thoroughly. Thus eating utensils should be put down between bites, and second helpings, if taken at all, should be progressively delayed.

While such behavior change forms the core of most counseling procedures, attention is also given to the reinforcement of gains. This may take the form of praise and encouragement from the therapist or from other members of a therapeutic group. In addition, family members can be taught to be supportive of weight loss efforts, or at the very least not to be critical of minor setbacks. Clients can learn to reward themselves for achieving behavior change or weight loss. Money or a special occasion can be made contingent upon appropriate changes. Thus, one participant in a weight loss group used squares of brown paper to cover the view from her kitchen window, removing one square for each pound lost until she had reached her target weight.

In addition to the use of reinforcement, some therapists attempt to modify patients' self-defeating thoughts by having their clients attend to and list such thoughts, and then teaching them appropriate counter-tactics. Finally, although not much studied as to effectiveness, some form of systematic increase of exercise is usually recommended. This may take the form of building more activity into the round of daily life, for example, parking at some distance from the office or supermarket or walking up and down stairs instead of using the elevator. Or patients may elect to add a structured activity such as a walk, participation in an exercise class, or a regularly scheduled game to their daily schedule.

Self-monitoring of exercise and perhaps self-reinforcement are probably useful techniques to promote adherence to an exercise program.

What are the results of such counseling procedures? In an average program clients lose about 11 pounds (4, 5) with 90% of all participants losing weight. One problem however is the variability of obtained results. Thus at the Stanford Eating Disorders Clinic, 40 patients followed for one year lost an average of 11.3 pounds during therapy, which increased to a loss of 12.7 pounds at follow-up one year later. But the range of weight change at follow-up was from a gain of 49.5 pounds to an additional loss of 38 pounds. Such variability suggests that there is much left to learn about counseling for weight reduction, perhaps particularly in the identification of patients who do well in such programs. One propitious finding is that weight loss during the first few treatment sessions predicts outcome at the end of treatment. Thus those who will gain most from this approach can be selected early in treatment.

Some of the factors associated with enhanced outcome have been identified in well controlled clinical experiments or can be reasonably extrapolated from the literature. Thus Stuart (6) reported a mean weight loss of 37 pounds for a small group of intensively treated patients, suggesting that more frequent meetings with individualized attention may be important both in enhancing initial weight loss and in producing better maintenance. Involvement of the spouse in treatment was found in one recent controlled study (7) to lead to an average 30-pound weight loss in a group of overweight subjects at six-month follow up, a result much superior to groups not involving spouses. Finally, a recent study demonstrated that setting appropriate short term goals for weight loss led to better results than setting longer term goals (8).

These results suggest that certain specific procedures will enhance the relatively modest results obtained by behavioral weight control programs. Moreover, such programs have tended to ignore the contributions of diet and exercise to weight loss. Thus adding effective dietary counseling and an exercise program to the already described procedures of the more usual program might well lead to additional short and long term benefits.

Changing Dietary Content--
The remaining goals of the prudent diet, all of which are synergistic

with weight loss, must be achieved by dietary change, and far less is known about the most effective way to achieve such changes than is known about weight loss. Nonetheless some elements of a dietary program are clear. First, diet is a family affair. Those concerned with food buying and preparation must change their behavior, and hence need to be involved in the program. As in the case of weight loss (7) spouse involvement would be expected to significantly affect adherence to diet. Taste is not as immutable as is commonly believed. Marked divergences from common tastes or food textures are indeed likely to lead to rejection of new foods. However, a graduated introduction, for example, first mixing whole and non-fat milk, and slowly increasing the proportion of non-fat milk should lead to easier acceptance. Moreover, once a new taste is acquired, the old is likely to be rejected, thus maintaining the new and more healthful behavior. Thus family involvement and a gradual adoption of a new diet seem to be important elements in effective dietary change.

In addition, information, available in many well prepared brochures, is a necessary but apparently not sufficient component for behavior change. Added to this, demonstration of different ways to buy and prepare food is probably an important and too little used method to achieve dietary change. Obviously such demonstration should involve those concerned with the buying and preparing of food, and can be economically provided in groups.

Intriguingly, successful adoption of a prudent diet has been found possible in outpatients over rather long periods of time. Thus members of the anti-coronary club (9) were able to lower cholesterol by over 10% within the first year of that study, and maintained that lowering for five years, while a control group showed no changes. However, a substantial number of subjects dropped out of this program and were lost to follow up. Thus attention to maintenance is crucial, which in turn implies continued contact with participants. Industry, may in this respect have some unique opportunities. Thus, the cafeteria can be used as a site both to teach and reinforce a more healthful selection of food stuffs, and junk foods can be gradually eliminated from the environment, being replaced by more appropriate snacks. Moreover, continued contact with participants is made easier by their being at the industrial site.

Salt Intake--

That there is an association between excessive dietary salt intake and the development and maintenance of hypertension is suggested

by evidence from several sources (10) and one study has suggested that moderate salt restriction results in small but definite changes in blood pressure (11). As with other forms of dietary change, even moderate salt restriction involves the whole family. Information about the relationship between excessive salt intake and high blood pressure, and of the potential benefits of salt restriction for children, as a preventive measure, should be provided. Second, given that taste shows a moderately rapid adaptation to change, a sequenced program of salt restriction with each phase lasting for several weeks should prove successful. As a first step, the use of added salt at meals should cease, and the more obvious high salt snacks should not be bought. Following this, no salt should be used in cooking, and finally, food buying habits should be altered toward low salt foods. Occasional monitoring of progress by measurement of sodium excretion from an overnight urine sample might help identify families having difficulty with this regime, which difficulties can be resolved by meeting with all those involved. Given that a substantial amount of dietary salt can be eliminated from the home environment by the use of these procedures, then at least a moderate salt restriction should be achievable in most cases.

SMOKING CESSATION

The field of smoking cessation is made bewildering by the variety of approaches used, including drugs, hypnosis, various clinic programs, and aversive procedures; and by the fact that all too few of these approaches have been properly evaluated in long term controlled studies. Moreover, cigarette smoking is a strong behavior resistant to efforts to eliminate it. One reason for this is that nicotine appears to be a powerful reinforcer both in animals and man, and smoking is an efficient way to deliver nicotine to the brain. Indeed, cigarette users may well regulate their smoking to achieve a consistent nicotine level (12). Moreover since smoking is such a frequent behavior there is every opportunity for environmental events such as a cup of coffee, or a feeling of tension, to become firmly associated with smoking, and to act as cues to take a cigarette. Thus like eating, cigarette smoking is under control of the social environment.

Early systematic research into smoking cessation procedures suggested that with all therapies between 40% and 70% of participants stop smoking, but with a strong tendency to relapse, so that by

six months or a year only 20%-30% remain non-smokers (13). The most useful basic approach to smoking cessation involves a combination of strongly affirming and clarifying the smoker's reasons for quitting, self-monitoring, and a gradual tapering schedule (see reference 14 for a detailed account of tapering).

As with weight management programs, self-monitoring is used to acquaint smokers with the number of cigarettes consumed, to discover the situations in which smoking is more prevalent, and to provide feedback about progress in treatment. Tapering begins by giving up cigarettes which are the least necessary, and when consumption is reduced to some 10-12 cigarettes each day, then a date for total abstinence is set. It is at this point that the maximum of attention is required. Several procedures appear to be helpful in diminishing relapse rates. First and foremost, continued contact in person and by telephone with the therapist is absolutely necessary. Second, rehearsal of how to cope with difficult situations may be useful, for example, what to say when a "friend" offers a cigarette, and even urges one to smoke. Finally the use of relaxation training may help participants cope with the aversive feelings associated with cessation (15).

Table 2. A smoking cessation program

1.	Clarify and strengthen decision to stop smoking and provide relevant information
2.	Engender accurate and explicit expectancy with short-term goal setting
3.	Model nonsmoking behavior
4.	Self monitor cigarette consumption
5.	Taper to some 10-12 cigarettes each day
6.	Stop smoking--specific target date; aversive procedures
7.	Maintain cessation--adequate support of nonsmoking; dealing with tempting situations

Recent research suggests that two procedures may augment the results of tapering. The first of these involves the use of an aversive event made contingent upon smoking, either electric shock, or cigarette smoke itself used in a procedure known as rapid smoking. On theoretical grounds the latter procedure should be more effective since it uses an aversive stimulus in the involved sensory

modality. However although some of the research findings as to the effectiveness of these procedures are contradictory, both shock and rapid smoking have been associated with success rates of 60% at one year follow-up in controlled studies (16). In the rapid smoking procedure participants inhale upon command every six seconds until they cannot proceed. After a rest period, if clients feel that they can smoke again, the procedure is repeated. This technique should not be used for smokers with chronic lung disease or known cardiac problems. Some therapists have their clients vividly recall in imagination their feelings of disgust and nausea which occur with this procedure, so that they can combat urges to smoke when they actually occur.

In the most successful use of electric shock reported to date, clients were shocked for all components of the chain of behavior, e.g., lighting a cigarette, inhaling, and so forth, and treatment continued after total cessation of smoking occurred. Only subjects exposed to shock stopped smoking, and at six months follow-up none of the subjects had relapsed.

As with weight loss programs, the use of reinforcement sometimes in explicit contracts negotiated between therapist and client, may be expected to enhance the effectiveness of whatever treatment is being used (16).

The second approach to smoking cessation of some promise involves the interaction between an ongoing community cardiac risk factor reduction campaign and a tapering procedure used in a group contest. Two years after treatment 44% of those participating in the group remained non-smokers, compared with 12% in comparable participants exposed only to the community campaign (17). These results may be particularly important to industry, since the use of an ongoing health campaign to strengthen the effects of smoking cessation efforts is of course possible. Moreover, maintenance can be assisted in the industrial site, by providing areas for non-smokers in cafeterias, and by limiting the areas in which smoking is permitted.

CONCLUSION

Industry provides an excellent site for the use of behavior change procedures to enhance health. Employee participation is likely to be high and drop out rates low, thus enhancing the probability

of maintaining achieved results. As we have seen, much can be done to enhance healthful behavior within the work environment by improving cafeteria offerings, restricting the sale of "junk" food, and confining cigarette smoking to certain areas. Moreover, a positive campaign to enhance health by providing information via posters, printed material, and lectures can be devised and implemented. Such a campaign, which should be continuous, is likely to increase participation in behavior change programs and also to enhance maintenance of change.

Finally, research in the applied behavioral sciences continues to expand the range of procedures useful to achieve the life style changes needed to enhance health. As we have seen in the areas of dietary change and smoking cessation, the procedures are becoming increasingly well specified, and many manuals are available both for the group leader and participants. Just as such programs need skilled medical advice, so do they also need input from behavioral scientists acquainted with these areas of research. Only then will the maximal results be achieved.

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