Psychological Factors Associated With Maintenance of Improved Health Behaviors in Postcoronary Patients

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ABSTRACT. Multiple regression analyses of interview data determined whether certain behavioral, personality, and social support variables were associated with maintenance of changes in exercise, weight loss, and smoking cessation for a group of postcoronary patients. The results indicate that the psychological reactions to success or failure at one health behavior change, especially smoking, may affect the ability to maintain changes in other health behaviors. Also, the affective psychological sequelae to heart attacks may disrupt attempts to change health habits or may themselves be alleviated once successful health changes are achieved.

THE BEHAVIORAL PATTERNS most frequently identified as risk factors for coronary heart disease are smoking, a diet high in saturated fat and cholesterol, excess weight, and sedentary living. Many intervention programs designed to lower the incidence of heart disease have therefore focused on three types of health behavior changes: smoking cessation, dietary modification, and increased physical activity. A problem confronted by risk-factor reduction programs is that although many participants initially are able to make improvements in their health behavior, they are unable to maintain them. The behavioral improvements are often followed by a sudden or gradual return to previous risk-related health habits (Meyer, Nash, McAlister, Maccoby, & Farquhar, 1980).

The purpose of the present study was to determine whether certain behavioral, social, and personality factors are related to the maintenance of smoking cessation, weight loss, and exercise for postcoronary patients. Because three major health behavior areas were investigated, it was possible to determine whether the various factors may be differentially related to maintenance in these three health areas and also whether attempts at maintenance of one health behavior change influences attempts at maintenance of other health behavior changes.

Method

Subjects

Thirty-five heart patients (30 males, 5 females, $M = 56$ years) and 29 spouses participated in the study. All patients had recently experienced their first myocardial infarction ($n = 31$) or first severe episode of angina requiring hospitalization ($n = 4$). All patients were at risk in at least one precoronary behavior area; that is, they were either sedentary, obese, or smokers, and a behavior change in their risk area(s) had been strongly recommended by a physician. All the patients had made a significant postcoronary change in at least one behavior so that maintenance of change could be calculated.

Procedure

Data on maintenance of behavior change were obtained by a structured interview conducted within 18 months of the patient's initial hospitalization ($M = 8$ months). The subjects were asked to describe the changes and fluctuations in their health behaviors since they discovered they had a serious heart condition. After the interview, they were asked to fill out questionnaires while a separate spouse interview was conducted. The independent data gathered during the spouse interview was used to assess the accuracy of the patient's self-report of behavior change and as a supplementary source of information for deriving maintenance scores. Because the experience of a coronary problem was a very salient life event, most patients and their spouses did recall and agree on the details of the attempts to change health behaviors. In a few cases, the spouse interview provided data that basically corroborated the patient's self-report but was more precise in defining when and how much change occurred; or the data from the spouse varied slightly from the patient's self-report, in which case the time and degree of health behavior changes were estimated as falling between the spouse's and the patient's reports.

The validity of information received during the patient and spouse interviews was also maximized by using several techniques suggested by Brown, Sklair, Harris, and Birley (1973). Time was divided into weekly periods, and behavior changes were pinpointed to one of those periods. When dating was not immediately clear, the time of a behavior change was related to an anchor date (e.g., holidays, return to work). Where there was still some doubt as to the exact time of a behavior change, a range of uncertainty was calculated and its midpoint used as the best estimate. Using these techniques in a 1-year retrospective study, Brown et al. obtained 81% agreement between schizophrenic patients and their relatives about the occurrence of life events and almost no disagreement about the time of onset of their psychiatric symptoms.

For exercise, weight control, and smoking reduction, maintenance was calculated only if the individual was formerly at risk in that area and a significant improvement took place some time since the coronary. Maintenance scores were calculated as the number of weeks during which a significant improvement in behavior was maintained, divided by the number of weeks between the start of the behavior change and the interview. Multiplying by 100 resulted in a maintenance score expressed as the percentage of weeks maintained. The following were the specific criteria used for each health behavior:

1. *Exercise:* At risk was defined as being sedentary with no regular aerobic exercise. A significant improvement was defined as sustained activity (> 10 min) on a regular basis (3 times per week), which was directly related to meeting an exercise goal prescribed by the physician or nurse. The exercise maintenance score was the number of weeks that exercise was maintained, divided by the number of weeks since regular exercise first began, excluding time when hospitalization or illness made maintenance impossible ($n = 26$).

2. *Weight control:* At risk was defined as being 20% above the highest weight recommended for the appropriate height and body frame category. The weight-control maintenance score was calculated as the number of weeks in which weight loss was occurring or in which at least a 10% weight loss was maintained, divided by the number of weeks since the start of attempted weight reduction ($n = 19$).

3. *Smoking:* A significant postcoronary improvement was defined as a decrease of at least 50% in daily smoking, although the results in this study revealed that all subjects who made a significant reduction had in fact quit completely. The smoking-control maintenance score was calculated as the number of weeks that a significant decrease in smoking was maintained, divided by the number of weeks since the first decrease in smoking occurred ($n = 19$).

In multiple regression analyses, the following major variable sets were used to predict maintenance of change in smoking, exercise, and weight control: (a) personality variables, which included the Type A subscale of the Jenkins Activity Survey (Jenkins, Rosenman, & Friedman, 1967) and the Health Locus of Control Scale (Wallston, Wallston, Kaplan, & Maides, 1976); (b) social support variables, which included a series of questions that assessed the extent to which the patients were socially integrated, the degree to which they sought social support, and the extent to which they received help or support from friends and relatives in making each behavior change; (c) behavioral variables, which included a series of questions that assessed the level of precoronary risk for smoking (number of cigarettes per day) and obesity (percentage of excess body weight), the number of precoronary attempts to improve health behavior, the number of behavioral risk areas (smoking, obesity, sedentariness) present before the coronary, and the presence of other health habits.

Additional variables that were correlated with maintenance of health behavior changes included (a) postcoronary signs of depression, including disturbances in sleep, mood, appetite, memory, concentration, and motivation; (b) the extent of the patients' beliefs that their behavior change would be efficacious in preventing future heart problems; (c) their beliefs about what caused the heart problem; and (d) the degree to which they perceived health behavior change and maintenance as challenging.

Several control variables were incorporated into the multiple regression analyses to index extraneous factors that might be related to maintenance: (a) approval motivation as measured by the Social Desirability Scale (Crowne & Marlowe, 1960), (b) the number of days between the first coronary incident and the initial interview, and (c) whether the patient was a volunteer in the study or had been convinced to participate by a health professional.

Results

The relationship between each of the three maintenance areas and the control, personality, social support, and behavioral variables was investigated by means of multiple regression analyses. Variables were first entered hierarchically in these sets according to the order described previously. This ordering allowed the calculation of semipartial correlation coefficients (*sr*) that represented the unique contribution of each set to the prediction of maintenance beyond the contribution of the control variables. All other variables were analyzed independently using simple correlational procedures.

The control variables approval motivation and time between coronary and interview did not account for a significant proportion of the variance in exercise, weight-control, or smoking maintenance scores. Volunteer ($n = 15$) versus nonvolunteer ($n = 20$) status was also unrelated to maintenance scores.

The behavioral variable set accounted for a significant proportion of the variance in exercise maintenance (sr^2 = .33, p < .01), indicating that better health behavior in general was related to more successful maintenance of postcoronary exercise. Separate analyses were then performed on each variable in the behavioral set to determine which were responsible for this relationship. The results revealed that only the number of precoronary risk areas accounted for a significant proportion of the variance in exercise maintenance scores (r = .36, p < .05). Thus, the fewer the number of risk areas (sedentariness, obesity, or smoking), the longer the maintenance of postcoronary exercise.

To determine whether the presence of precoronary smoking or obesity was related to exercise maintenance, each subject was coded according to the precoronary presence or absence of those risk areas. Separate regression analyses revealed that only the area of smoking behavior was significantly related to postcoronary maintenance of exercise (r = .37, p < .05). Thus, if a person was a smoker before the coronary, he or she was less likely to maintain postcoronary exercise.

The number of precoronary risk areas was also the only behavioral variable to show a significant relationship with weight-control maintenance (r = .42, p < .01). Smoking was the specific precoronary risk factor that accounted for the predominant amount of variance, although the relationship reached only the borderline level of significance (r = .42, p < .07). In addition, maintenance of smoking reduction and maintenance of weight control were both positively related to exercise maintenance (r = .55, p < .05; and r = .76, p < .01, respectively).

The social support variable set accounted for a substantial amount of variance in the maintenance scores of weight control (sr^2 = .22) and smoking reduction (sr^2 = .29). Analyzing the components of this set revealed that maintenance of weight loss was significantly related to the amount of help from others perceived by the individual (r = .54, p < .05) and the amount of help the spouse reported he or she had given the patient (r = .64, p < .01): The greater the help received, the more successful the maintenance of weight loss. The desire for help from others was related to smoking-reduction maintenance (r = $-$.42, p < .05): Those with poor maintenance of smoking reduction felt the desire for more help and support from others.

Symptoms of depression were found to be negatively correlated with maintenance of exercise and weight loss (r = $-$.47, p < .05; and r = $-$.62, p < .01, respectively): A greater number of depressive symptoms was related to poorer maintenance of those behaviors. The patients' beliefs that improvements in behavior could prevent further heart problems was related only to maintenance of smoking reduction (r = .46, p < .05): Those who

saw smoking cessation as efficacious in the prevention of further heart problems were more successful at maintenance.

Smokers were the most likely to mention smoking as a cause of their heart problems (68%), but just 32% of obese subjects mentioned their weight as a cause, and only 9% of sedentary individuals mentioned lack of exercise as a cause. The two causes most frequently cited were diet (especially high intake of fats) and stress (on the job and at home), both mentioned by 46% of the total sample. Only the perception of stress as a cause of heart problems was significantly related to maintenance; those who mentioned stress as a cause of their heart problems were more likely to be poor maintainers of exercise ($r = .51$, $p < .01$) and weight loss ($r = .52$, $p < .05$).

Discussion

The pattern of significant results suggests that two major psychological factors had an impact on the postcoronary patient's maintenance of improved health behaviors. First, beneficial psychological effects may result from the very act of adhering to a health behavior change, a secondary psychological reaction that in turn facilitates change and maintenance of change in other health behaviors. Second, in response to having had a heart attack, the patient may develop psychological sequelae that subsequently disrupt his or her attempts to change health habits.

The first of these two conclusions was supported by the results indicating the important role played by smoking in the maintenance of other health behavior changes. Precoronary smoking predicted both poor postcoronary exercise and weight-control maintenance, and poor maintenance of smoking cessation was associated with poor exercise maintenance. Patients also tended to view smoking cessation as a very challenging health change and as the most important factor in the prevention of future heart problems. Some even reported that their physicians refused to treat them if they continued to smoke. Thus, the maintenance of changes in exercise and weight control may have been significantly influenced by the psychological side effects of attempting smoking cessation. Being unable to quit smoking may have been a powerful reminder to the patient of his or her own inability to take self-motivated control of his or her health habits, which in turn created a lax and pessimistic view of the chances of success in changing other health behaviors; or the need for exercise and diet may have been eclipsed in the patient's mind by the formidable risk of continued smoking. On the other hand, success at maintenance of smoking cessation may have enhanced the patient's confidence and determination in attempting other health changes. Comments such as "I feel like I have a halo around my head for not smoking" were common. These conclusions are supported by research revealing that smoking is one of the most reliable predictors of attrition from exercise programs (Martin & Dubbert, 1982; Oldridge, 1982).

Significant differences in the desire for social support emerged between postcoronary patients who were successful at maintaining smoking cessation and those who were not successful. Those who were not able to quit smoking showed a significantly greater need for help and support; successful quitters often stated that they did not want help, nor did they ask for any because "It was up to me" or "It was something I had to do on my own." This finding may reflect personality differences that affect success at smoking cessation, although no significant relationship emerged in this study between the personality variables and maintenance of health changes. Desire for social support may instead reflect the patient's psychological reactions to attempting health behavior changes. Being able to quit smoking may significantly enhance the patient's self-esteem and self-efficacy, but failing at this task may lead to feelings of inadequacy and to a low opinion of his or her ability to make any improvements without help from others.

The hypothesis that depressive symptoms would be associated with poorer maintenance of health behavior changes was confirmed in the areas of exercise and weight loss. Interpretations of this result are consistent with the previously stated conclusion about the psychological factors associated with health changes. Depression as a psychological sequela of a coronary problem may be a manifestation of the damage to the patient's sense of control in his or her life, thereby impeding consistent efforts toward improving health habits. In fact, research indicates that depression is a relatively common reaction to heart attacks that interferes with physical, social, and occupational functioning and is related to the unrealistic subjective distress and fear associated with postcoronary "invalidism" (Wishnie, Hackett, & Cassem, 1971). The appearance or magnification of depression may also represent a psychological reaction to the failure at maintaining health changes, and success at attempting health changes may prevent or alleviate depression by enhancing self-esteem and self-efficacy. Successful exercise regimens can also reduce depression and anxiety, which may result from cognitive and behavioral side effects rather than simply the direct effects of exercising (Martin & Dubbert, 1982).

In the present study, those patients who perceived stress as a cause of their coronary problems were more likely to show poor maintenance of exercise and weight control. An interpretation is that those patients who have been unable to maintain improved health behaviors after their coronary are more aware of and sensitive to their stress level because they have been unable to lower it through positive behavior changes. Exercise is considered one effective stress-reduction tool, but any type of regular adherence to a regime of improved health behaviors might have beneficial effects on self-esteem and self-efficacy that generalize to other aspects of the person's life and thus enhance the ability to cope with stressors.

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