

# The Value of Stress-Management Interventions in Life-Threatening Medical Conditions

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## *Abstract*

Emotional stress has been associated with the development and progression of several chronic medical conditions. Recently, researchers have assessed the impact of stress-management interventions on patients' psychological functioning, quality of life, and various disease outcomes, including survival. This review summarizes the value of stress-management techniques in the treatment of two important, life-threatening conditions: coronary

heart disease and cancer. Results from randomized clinical trials indicate that psychological interventions can improve patients' psychological functioning and quality of life. However, there is limited evidence to suggest that these interventions significantly reduce morbidity and mortality.

## *Keywords*

coronary heart disease; cancer; psychological interventions; stress management

Many studies have demonstrated that higher levels of emotional stress are associated with poorer health outcomes in a variety of medical conditions, including coronary heart disease, cancer, gastrointestinal disorders, and chronic pain. As a result, research has focused on the benefits of stress management for patients' physical health. Stress-management techniques are designed to alter patients' cognitive and emotional responses to stressful events and reduce the physiological arousal that often accompanies these responses. These techniques may include cognitive restructuring, guided imagery, and relaxation.<sup>2</sup>

There has been much debate recently about the effects of stress management on quality of life and adverse clinical events. In this review, we briefly summarize research on the value of stress-management techniques in treating two important health conditions: coronary heart disease and cancer.

Research has demonstrated that stress and negative emotions can affect the development and course of cardiovascular disease by altering underlying pathophysiological processes (see Fig. 1). For example, stress can lead to excessive nervous system activation that may trigger myocardial ischemia (a temporary, inadequate supply of blood to the heart) and cardiac arrhythmias. In addition, stress may promote unhealthy lifestyle behaviors, such as poor diet, smoking, physical inactivity, and nonadherence to medical therapies; these behaviors, in turn, may alter physiological processes, resulting in the development and progression of disease.

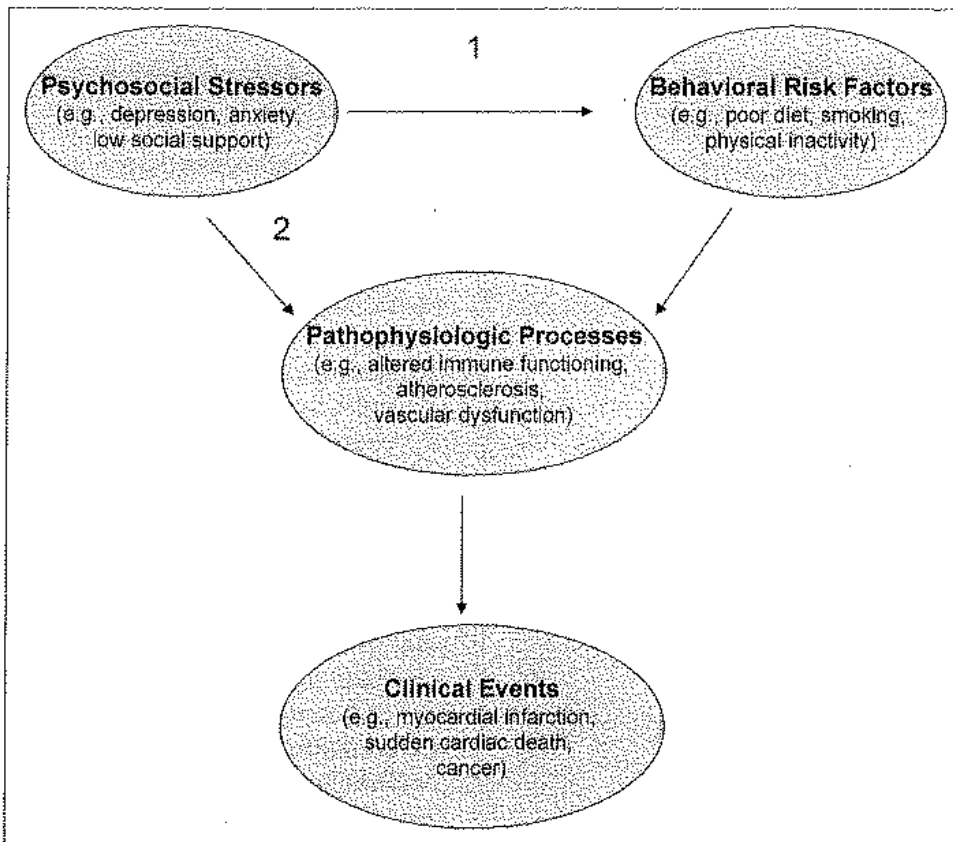
Stress-management interventions, which may alter physiological and behavioral processes relevant to disease, may ultimately reduce disease morbidity and mortality.

A meta-analysis<sup>3</sup> of 23 studies assessing the effectiveness of stress-management interventions in coronary artery disease suggests that psychosocial interventions combined with standard care may reduce morbidity and mortality, as well as psychological distress (Linden, Stossel, & Maurice, 1996). Results indicated small, but significant, group differences that favored the inclusion of psychological interventions to reduce patient mortality and improve quality of life. However, this meta-analysis was based on studies with small sample sizes and nonrestrictive selection

criteria that had a variety of methodological weaknesses. Moreover, the psychological interventions were delivered in addition to other interventions, such as medication and exercise. Although the results indicate the effectiveness of psychological interventions over and above usual care, it is not possible to discern the unique contribution of the psychological interventions in reducing morbidity and mortality.

Friedman et al. (1986) conducted one of the first clinical trials of stress-management interventions in Type A cardiac patients. (Type A behavior, a constellation of behavior and personality traits such as hostility, aggressiveness, and ambitiousness, is often associated with coronary heart disease patients.) Participants were randomly assigned to a cardiac counseling intervention (consisting of recommendations regarding diet, exercise, and medication, and information about cardiovascular pathophysiology) or a behavioral counseling intervention that included relaxation training, cognitive restructuring, and other cognitive-behavioral techniques aimed at reducing Type A behavior. After 4.5 years, the Type A modification intervention, which was successful in decreasing Type A behavior, reduced nonfatal myocardial infarctions (MIs) by 44% relative to the cardiac counseling intervention. Overall mortality and mortality due to cardiovascular causes were not different between the cardiac and behavioral counseling groups.

Frasure-Smith and Prince (1985) conducted a randomized trial of monthly telephone monitoring of psychological symptoms in 553 male patients following their MIs. In the intervention condition, patients who reported high levels of distress received a follow-up telephone call or home visit to provide additional counseling. After 1 year, patients in the intervention group reported reduced distress and exhibited significantly lower levels of



**Fig. 1.** Two pathways through which psychosocial stressors may contribute to the development and promotion of disease. First, stressors may contribute to behavioral risk factors, such as poor diet. These behavioral risk factors, in turn, lead to pathophysiological processes, such as atherosclerosis (blockages in the arteries of the heart) and vascular dysfunction. Second, stressors may directly promote pathophysiological processes. In either case, pathophysiological processes can lead to clinical events such as myocardial infarction (heart attack) and death.

cardiac morbidity and mortality compared with men in the usual-care control condition. A 7-year follow-up revealed that there were fewer MI recurrences, but not lower mortality rates, among patients in the intervention group.

Given these promising results, Frasure-Smith et al. (1997) conducted a larger randomized controlled trial with a similar nursing-based telephone intervention. The participants were 1,376 male and female post-MI patients. In contrast to the original study, however, this study showed no significant difference in survival after 1 year between patients in the intervention and control groups. In fact, mortality rates were higher for women in the intervention group than for women in the control group. However, the intervention did not significantly reduce patients' symptoms of depression or anxiety. It is not surprising, therefore, that the intervention did not reduce mortality.

In one of the largest randomized trials of stress management for cardiac patients, Jones and West (1996) assessed the effectiveness of a group psychological intervention in more than 2,000 post-MI patients. The intervention consisted of relaxation, stress-management, and coping-skills training over a 7-week period. At 6-month follow-up, there were no clinically significant differences in depression or anxiety between patients in the intervention group and those in the control group. In addition, at 12-month follow-up, there were no differences between the groups in the incidence of nonfatal MI or mortality. However, the stress-management intervention was brief, and as in the Frasure-Smith et al. (1997) study, failed to alter levels of self-reported stress, including anxiety and depression.

Recently, the National Institutes of Health sponsored a multicenter clinical trial, called ENRICH (Enhancing Recovery in Coronary

Heart Disease), that examined the impact of cognitive behavior therapy (CBT) on psychological functioning, morbidity, and mortality in 2,481 post-MI patients with clinical depression, low patient-perceived social support, or both. CBT is a type of psychotherapy that focuses on the link between thoughts and behavior and helps patients to modify their unrealistic or irrational thoughts to produce more adaptive behavior. This randomized controlled trial examined whether treating patients' depression and improving their social support reduced the risk of recurrent MI and death. Patients were randomly assigned to usual care or a CBT intervention for up to 6 months. Patients with moderate to severe depression who did not show a significant reduction in depressive symptoms after 5 weeks in the CBT intervention also received an antidepressant for up to 1 year. Patients in the CBT intervention experienced greater reductions in depression and larger improvement in social support compared with patients in the usual-care condition. However, the CBT intervention was not associated with decreased morbidity and mortality after a 2-year follow-up.

In summary, results of these studies suggest that stress-management techniques may improve quality of life in cardiac patients and reduce psychosocial risk factors such as Type A behavior, depression, and low social support. However, there is a paucity of data from well-controlled studies showing that stress-management interventions reduce morbidity and mortality. Because large numbers of patients need to be studied over long time periods to assess the impact of stress management on hard clinical end points (i.e., discrete, objective disease states that are well defined, including heart attack and death), some studies have examined surrogate markers of

coronary heart disease. For example, a stress-management intervention was associated with decreased myocardial ischemia induced by mental stress in 107 patients with stable coronary disease (Blumenthal et al., 1997). In addition, 5 years following the intervention, patients in the stress-management intervention experienced a significant reduction in adverse cardiac events, such as recurrent MI and surgical procedures to restore blood flow.

## CANCER

Much like the research with cardiovascular disease, research on cancer has used a biobehavioral model of stress and disease processes as a framework for understanding how stress affects physiological processes in cancer progression (see Fig. 1). According to this model, psychological stress is associated with alteration of the immune system, as well as negative lifestyle behaviors such as poor diet, nicotine use, and nonadherence to medical regimens. These factors may ultimately affect the course of the disease. Research suggests that psychological interventions can reduce stress, improve health behaviors, and possibly improve immune functioning. However, research on the impact of stress management on hard clinical end points, such as death, is more limited.

Spiegel, Bloom, Kraemer, and Gottheil (1989) conducted one of the first intervention studies examining the impact of a psychological intervention on patients' survival. Participants were 85 women with breast cancer who were randomly assigned to a control group or a weekly, 1-year intervention that provided group supportive-expressive therapy, a treatment that encourages patients with life-threatening illnesses to express their feelings and illness-related concerns. Participants in the intervention group lived 18 months

longer than patients in the control group; however, there were no significant differences in survival at the 10-year follow-up.

In a subsequent analysis of the Spiegel et al. (1989) study, Fox (1998) proposed that unmeasured confounding variables affected the survival of patients in the control group, and that without such differences, the survival of the two groups would not have been significantly different at 18 months. Fox compared the survival curves of the control patients in the Spiegel et al. study with survival curves from a large national sample of cancer patients and found that the patients in the control group had a lower rate of survival than the national sample. Thus, the significant difference between the survival rates for the control and intervention groups in the Spiegel et al. study may be explained by the lower survival of patients in the control group rather than the effectiveness of the intervention in decreasing mortality in the treatment group.

Fawzy et al. (1990) examined the impact of a psychological intervention on immune functioning and disease end points. Patients with malignant melanoma were randomly assigned to a control group or a 10-session psychological intervention that included coping-skills training, progressive relaxation, and group support. Participants in the intervention group not only improved their coping behaviors relative to participants in the control group, but also had increases in their natural killer cell activity,<sup>4</sup> which has been shown to be associated with increased immune functioning and decreased cancer progression. Six-year follow-up data indicated that only 9% of the participants in the intervention group died, compared with 29% of the participants in the control group (Fawzy et al., 1993).

In contrast, more recent randomized trials of psychological interventions for women with breast

cancer have not shown significant health benefits. Cunningham et al. (1998) randomly assigned women with breast cancer to a control condition or a psychological intervention consisting of 35 weekly sessions of support and CBT. Five years after the intervention, there were no significant differences in survival between the two groups. The researchers noted that limited statistical power may account for the lack of significant effects: Their small sample made it difficult to detect a difference even if one existed. In addition, the inclusion of other psychological interventions for patients in the control group may have mitigated significant group differences: Patients in the control group used relaxation audiotapes, and one quarter of participants in the control group attended support groups. Because patients in the control group also had the benefit of psychological interventions, group differences may have been reduced.

In a study of 124 women, Edelman and her colleagues (Edelman, Bell, & Kidman, 1999; Edelman, Lemon, Bell, & Kidman, 1999) also examined the impact of CBT on the survival of women with breast cancer. Patients in the intervention group attended eight weekly sessions, which included coping-skills training, cognitive restructuring, and relaxation exercises; these participants also attended three monthly follow-up sessions to reinforce their use of coping strategies. Results showed a short-term reduction in depression for participants in the intervention group; however, these improvements were no longer evident at assessments 3 and 6 months later. In addition, there were no significant differences in survival between the two groups.

Recently, Goodwin and her colleagues (2001) replicated the Spiegel et al. (1989) study in a sample of 235 women with breast cancer. Women were randomly assigned to a control group or the support-

ive-expressive group therapy intervention, which consisted of 90-min weekly meetings for at least 1 year. Although women in the intervention group reported lower levels of depression, anxiety, and pain than women in the control group, there were no significant differences in overall survival. Thus, although the beneficial effects of the intervention on psychological functioning indicate that the intervention was effectively delivered, it did not improve patients' survival.

In summary, the cancer research has yielded results similar to those of the cardiovascular research: There is considerable evidence that psychological and stress-management interventions reduce distress and improve quality of life in patients with cancer. However, there appears to be little evidence for the effectiveness of these interventions in reducing morbidity and mortality. However, studies have been limited by methodological problems, such as small sample sizes and unmeasured confounding variables. Cunningham and his colleagues (1998) proposed that in order for psychological functioning to affect cancer progression, it must be accompanied by physiological changes that significantly affect tumor growth at the tissue level. In fact, there are data to suggest that psychological interventions may induce significant changes in immune functioning. For example, Cruess et al. (2000) found that women with breast cancer who attended a 10-week cognitive-behavioral stress-management group intervention had significantly lower levels of cortisol (a "stress" hormone that also helps regulate the immune system and infection) than control patients.

## CONCLUSION

With respect to cancer and coronary heart disease, research suggests

that psychosocial interventions can improve patients' quality of life and reduce symptoms of depression and anxiety when these interventions are delivered by trained clinicians over an adequate time period. However, examination of the randomized clinical trials that have assessed hard clinical end points, such as nonfatal MI or disease-specific mortality, reveals little evidence that psychological interventions reduce morbidity and mortality. Although some studies have demonstrated positive findings (e.g., Friedman et al., 1986; Spiegel et al., 1989), they have been limited by methodological problems, such as small sample sizes, use of multiple therapies in the same group of participants, inadequate randomization, and reliance on outcome ratings provided by people who knew which patients received therapy. Randomized controlled trials are needed to determine the value of stress-management interventions in treating patients with life-threatening health conditions. However, these trials will require large numbers of patients, who can be recruited only from a large network of hospitals, and lengthy follow-up intervals. The expense and logistical difficulty of recruiting patients and developing interventions should not be underestimated. The study of surrogate markers of disease, such as myocardial ischemia, subclinical coronary atherosclerosis, vascular functioning, and immune functioning, may be a viable alternative to large-scale randomized clinical trials and may provide valuable insight into the impact of stress management on important pathophysiological processes relevant to health and disease.

### Recommended Reading

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### Notes

1. Address correspondence to Robyn Lewis Claar, Duke University Medical Center, Department of Psychiatry and Behavioral Science, Box 3119, Durham, NC 27710; e-mail: claar002@mc.duke.edu.
2. Cognitive restructuring is a technique to alter maladaptive thought patterns and replace them with more adaptive cognitions. Guided imagery is a technique in which patients are coached to create calming, peaceful images to induce relaxation. Relaxation techniques include deep breathing and progressive muscle relaxation in which various muscle groups are tensed and relaxed.
3. Meta-analysis is a statistical technique for comparing and combining effects found in several studies using a common unit of analysis.
4. Natural killer cells are a specialized type of cell that can recognize and destroy cancer cells and virus-infected cells.

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