The Impact of Emotions on Cardiovascular Health

This paper summarizes a one-day roundtable discussion on Gender, Emotions, and Cardiovascular Disease held November 14, 1998, in San Francisco, CA. The meeting was moderated by Redford Williams, MD. The participants were Janice Kiecolt-Glaser, PhD, Marianne J. Legato, MD, Dean Ornish, MD, Lynda H. Powell, PhD, S. Leonard Syme, PhD, and Virginia Williams, PhD

Recent research suggests that the maintenance of emotional well-being is critical to cardiovascular health. People who feel lonely, depressed, and isolated have been found to be significantly more likely to suffer illnesses and to die prematurely of cardiovascular diseases than those who have adequate social support. Consequently, the development of appropriate interventions to improve the emotional health of people with certain psychosocial risk factors has become an important research goal. It is anticipated that such interventions will increase the life expectancy of people at risk and that it may also save millions of dollars in medical care costs. First, however, researchers in this field must identify specific emotional risk factors and must agree upon a working definition of "good emotional health." Such explicit definitions, as well as additional data, are essential to educating physicians and insurers so that consideration of emotional health can be integrated into basic medical care.

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As recently as 20 years ago, few cardiologists gave their patients the advice that now seems commonplace: Stop smoking and drinking, maintain a healthy diet, get plenty of exercise, and reduce stress. Not until the 1970s did researchers begin to discover that the progress of heart disease could be slowed and even reversed through basic changes in life style. A study published in the *Journal of the American Medical Association* in 1983 demonstrated significant differences in cardiovascular function in patients who were treated with a short-term intervention consisting of stress-management training and dietary changes. Patients in the experimental group demonstrated improvements in cardiovascular status, including a 44% mean increase in duration of exercise and a 55% mean increase in total work performed. As a result of these adjuncts to conventional ischemic heart disease treatment, the ability of the heart to pump blood improved significantly in the experimental group.[1]

The mechanisms by which life-style changes result in improved cardiac function are becoming increasingly well understood. A cross-section or longitudinal section of the heart demonstrates that arteries clogged with plaque constrict and decrease blood flow to the heart. When platelets collect at a site of plaque deposition, the lumen can become critically narrowed. The actual plaque formation may take decades. Other factors may accelerate the process: in addition to dietary factors, emotional stress can cause arteries to constrict, blood to clot faster, and plaque formation to occur more quickly.[2] In 1990, the Lifestyle Heart Trial,[3] conducted by the National Institutes of Health over a period of five years, demonstrated that artery blockages continued to worsen over time when only moderate life-style interventions were instituted. In contrast, subjects who initiated the most intensive life-style changes exhibited increasing reversal and regression of their disease as time elapsed.[4]

More recent research has suggested that an additional factor, emotional well-being, is as important as life-style changes in the promotion of cardiac health. Studies have found that people who feel lonely, depressed, or isolated have a significantly higher incidence of cardiovascular illness and premature death than those whose emotional needs are met. These findings have led researchers to suggest that there is a basic need for human intimacy and for a sense of community and connection that have a direct impact on physical health.

Some have suggested that the prevalence of loneliness, alienation, and poor self-esteem in the American population has grown considerably since World War II.[5-7] People are mobile and are more likely than ever to be separated emotionally from family and community. They are more likely to derive their models of "normal" appearance and life style from a media-created image that is nearly impossible to achieve: ie, beautiful, slender, happy, and, above all, able to triumph over any adversity.[8,9] Interventions designed to decrease emotional risk factors and create emotional well-being may, therefore, prove to be increasingly important in the prevention and treatment of disease.

PSYCHOSOCIAL RISK FACTORS

Over the past decade, investigators have defined a number of psychosocial factors that appear to put individuals at risk for premature death from cardiac conditions. These factors include (but are not limited to) depression, lack of intimate and supportive personal relationships, job strain, hostility and anger, and low socioeconomic status.

Depression and job strain are often recognized as risk factors for illnesses, and this is particularly true for people with heart problems. In a study of patients who were assessed for depression soon after having a heart attack, for example, 15% of those who met criteria for major depression had died after six months, as opposed to only 3% of those who were not depressed.[10] The researchers carried the study on through 18 months and found that even minor depression was associated with increased risk of a recurrent heart attack.[11] A study of male workers in Scandinavia compared subjects based on the demands they faced at work and the degree of control they had over their work situations. Those who had the most control and the lowest demands showed no evidence of coronary artery disease. In contrast, the incidence of disease was 20% in the group with the highest demands and the least control.[12]

Social isolation is less commonly recognized as an important factor in predicting morbidity and mortality from cardiovascular problems. Yet, it has repeatedly been shown to have a strong impact on the ultimate fate of people suffering from coronary artery disease, as well as people who have had heart attacks or have been slated for surgical procedures. In one study, investigators at Duke University asked 1300 patients whose arteriograms showed significant atherosclerosis whether they had a spouse or another person in their lives in whom they felt they could confide. At follow-up five years later, 50% of those who had no spouse or other confidant had died, compared with 17% of those who had a spouse or confidant.[13]

Early studies of the health consequences of inadequate social support focused on the relationship between social connectedness and total mortality in community-based studies, and found that the association was stronger for men than for women in middle-aged cohorts, and was strong in both elderly men and women.[14-19] Investigations that focused on coronary heart disease (CHD) mortality in healthy middle-aged cohorts found that the association between various measures of social support are strongest in men,[20-22] with only one study showing a marginally significant association for a combined sample of men and women.[23] In studies of patients with coronary disease, a number of measures of social support—living alone,[24] living alone with a confidant,[13] emotional support,[25,26] social isolation from life stress,[27] instrumental support,[28] social integration,[29] and availability of support[30]—were associated with hard cardiovascular outcomes after adjustment for other CHD risk factors.

Clustering

Psychosocial risk factors have been found to cluster in individuals, rather than occurring in isolation.[31] In part, this is because they tend to reinforce one another. Low socioeconomic status, for example, may be connected to increased job strain. Both of these factors may increase hostility, and hostility may decrease social support and increase depression. In

addition, people who have a composite of these psychosocial risk factors are particularly likely to smoke, drink, or overeat.

Another explanation for the clustering of risk factors, however, is that they may be linked to the same root cause. Hart and Risley[32] found that children of low socioeconomic status received significantly fewer positive communications from their parents than those who were economically better off. It is believed that the presence or absence of intimacy and positive reinforcement from parents has a significant long-term impact on both mental and physical health. A study of monkeys found that those reared in groups of peers separated from their mothers had a greater cortisol response to stress.[33] Other studies in monkeys have found that the absence of maternal attention during the first few months of life is associated with a marked decrease in brain serotonin levels.[34] Low serotonin levels, in turn, have been linked to increased mortality.[35]

Thus, whereas the absence of positive social interactions may teach a person that the world is a depressing, alienating place, encouraging them to turn to smoking or drinking for solace, it is also important to note that there may be more purely physical explanations for the emergence of clustered risk factors. Low brain serotonin levels, for example, may on their own account for the appearance of several emotional and behavioral risk factors in certain individuals.[36]

Pathways of Action

Similar to the causes of clustering, the pathways by which depression, social isolation, hostility, and other psychosocial factors put people at risk for cardiovascular problems are not yet fully defined. Certainly, one pathway for risk is that people who do not have their emotional needs met are more likely to engage in risky behaviors—such as smoking, drinking, and overeating—that lead to increased incidence of disease. Conversely, when emotional needs are satisfactorily met, people are more likely to successfully and permanently make the healthy life-style changes necessary for the reversal of cardiovascular disease. Recent research using coronary artery disease as the primary model demonstrates that patients can and actually do make the necessary life-style changes that result in disease reduction when emotional needs are nourished and the patient is properly motivated.[4,37]

However, it has also been suggested that lack of emotional satisfaction may be a risk factor on its own, independent from its impact on life style and the ability to make positive changes. Certainly, there is evidence that emotional state has an impact on immunity, healing, and the development of illness in general:

- A long-term study of Harvard undergraduates by Russek and Schwartz[38] found that students who did not have close ties with either parent while growing up had an 87% occurrence of serious illness in midlife, whereas only 25% of those who were close to both parents had such illnesses.
- Cohen et al[39] examined the hypothesis that close ties to friends, family, and work result in increased resistance to host infection. The researchers inoculated people with cold viruses and then monitored the level of symptoms experienced. Those with the most social contacts were found to have four times fewer colds than those with few social contacts.
- When measurable antibody production in response to a hepatitis B vaccine was assessed in a study by Glaser et al,[40] vaccine response was greater in subjects who were significantly less stressed and anxious.
- Marucha et al[41] showed that increased stress is associated with slower healing of wounds.

Cardiac function may be similarly affected directly by a person's emotional state or social support network. For example, anger has been shown to be a trigger for heart attacks[42] and is associated with lowered ejection fraction,[43] vasoconstriction with narrowed arteries,[44] and a lowered threshold for ventricular fibrillation.[45]

DEFINING EMOTIONAL HEALTH

If poor emotional health has a negative impact on cardiovascular function, and good emotional health can have a positive, even a curative effect, then interventions designed to improve emotional well-being should be implemented as at least one element of treatment. However, before appropriate interventions can be developed and disseminated in the medical community, the academic community must create a

working definition of "good emotional health." This is important because it involves identifying and targeting the particular emotional factors or social situations that have the greatest impact on cardiac health.

Many researchers believe that having "social support" is the most critical aspect of good emotional health. However, definitions of "social support" vary considerably. One study of social support adjusted for approximately 150 variables,[46] and attempts are under way to identify those that are most important. Some research has suggested that having someone to depend on for empathy and companionability is a critical factor in affecting medical outcomes. The Duke University study mentioned above points to this conclusion, as does a study that compared approximately 25 different definitions of social support against findings on coronary atherosclerosis.[28,47] In another study, people about to undergo angiography were interviewed about the kinds of support available to them. The most powerful predictor regarding atherosclerosis was whether there was effective support—someone in their lives they could turn to when something was needed, whether for a loan, a ride, or advice. How many friends a person had and how close they were appeared to have less impact.[28] In a study of older people recovering from a heart attack, those who reported that they had one or more close friends were at significantly less risk of death than those who reported that they had no close friends.[25] Other researchers have suggested that the best general indicator of social support and emotional well-being is whether a person has a sense of control over his or her destiny and environment.[46]

IMPLICATIONS FOR GENDER-SPECIFIC MEDICINE

The presence or absence of emotional support has an effect on cardiovascular health in both men and women. The question of whether there is significant variation by gender in the character or degree of those effects warrants further exploration. The implications of research on emotions and cardiac problems, however, may ultimately be more significant for women than for men. Cardiac disease is generally diagnosed much later in women, and, for this reason, women often present with more advanced stages of the disease and more comorbid conditions than men. One reason for such delays in diagnosis is a lack of research on women and heart disease, which has produced a lack of understanding of the significant gender differences in the manifestations of the disease. Women often present with symptoms that are different from those traditionally associated with heart disease, which have been based on studies of men. Because women's symptoms do not always match documented criteria for the disease, they are dismissed until the disease is much more advanced.[48]

The fact that women are not diagnosed with heart conditions until they are in a dire situation implies that too many clues are missed along the way. Although much more research is necessary to overcome this problem, the awareness of psychosocial risk factors adds a new element that may aid in the earlier detection or prevention of heart problems in women. This is especially true given that women have been found to be more likely than men to successfully reverse the progress of coronary artery disease through these interventions.[49]

IMPROVING EMOTIONAL HEALTH

For both men and women, the current research goal is to create interventions that are conducive to emotional well-being and effective in stimulating lasting changes in life style. Medical professionals and patients have spent a good deal of energy on conventional treatments that offer little opportunity to improve emotional health. Alternative treatments may offer a range of support interventions, including the following:

- Individual counseling, in which patients have an opportunity to engage in an intimate relationship with someone who will treat them with unconditional positive regard
- Supportive group counseling, which enables patients to learn how to give and receive support in a structured setting so that they can generalize these skills to their own lives
- Cognitive behavior therapy, which is aimed at teaching patients how to alter negative thoughts about themselves and the environment around them, thereby altering emotional distress

- Life-skills training, which helps patients improve their ability to interact with others more effectively[9]
- Social mobilization, which connects patients with group support networks in their community

There is mounting evidence that such alternative treatments, when combined with a focus on comprehensive life-style changes, can be highly effective in reducing people's risk of cardiac problems and helping them avoid more invasive conventional treatments.[3,4,37]

Recent research on people with coronary artery disease has demonstrated that when people are motivated and supported, they are able to make and sustain substantial behavioral changes that are more difficult for those who do not receive emotional support. In the Lifestyle Heart Trial, patients adopted a vegetarian diet, exercised regularly, stopped smoking, and participated in stress management, as well as receiving group psychosocial support. Seventy-one percent of the experimental group patients sustained comprehensive life-style changes for five years, whereas control group patients made less significant changes. In the experimental group, the average percent diameter stenosis at baseline decreased by 4.5% after one year and by 7.9% after five years. In contrast, the average percent diameter stenosis in the control group increased by 5.4% after one year and by 27.7% after five years.[4] In the Multicenter Lifestyle Demonstration Project—in which patients eligible for revascularization, a bypass, or angioplasty participated in group support meetings, yoga, and meditation in addition to making diet and exercise changes—80% of patients were able to avoid having surgical procedures.[37]

The National Heart, Lung, and Blood Institute's ENRICHD (Enhancing Recovery in CHD) trial,[50] currently under way, is a multicenter study of psychosocial interventions for post–myocardial infarction patients. It is aimed at addressing the problems of depression and social isolation with individual and group-based interventions. Counseling features the provision of unconditional positive regard throughout the development of a strong therapeutic alliance between the patient and caregiver. Cognitive and behavioral deficits as well as degree of social isolation are assessed and treated by teaching such skills as listening, anger management, and mobilization of social networks as necessary. The aim of ENRICHD is to reduce mortality and recurrent heart attacks through these psychosocial interventions.

THE FUTURE

There is considerable resistance currently in mainstream medicine to the idea of including attention to emotional well-being as a legitimate part of medical treatment. Those who advocate such treatments are often stigmatized or dismissed as being too "touchy-feely." Such skepticism is not surprising, given that emotional risk factors cannot be isolated by a blood test or quantified by a diagnostic tool. Physicians are trained to believe that anything of significant importance can be measured, quantified and documented. Medical students receive little, if any, instruction in interventions that address emotional distress. Moreover, for the most part, doctors cannot be reimbursed for providing such services.

Yet, there is a clear interest in emotional interventions—or at minimum, more intimacy in medical treatment—among the American people. More money is currently spent on alternative medicine than on traditional medicine, despite the fact that very little alternative medicine is scientifically documented as effective. The quality that alternative therapies share, and traditional medicine lacks, is in fact the "touchy-feely" nature of the treatment. Practitioners of alternative medicine generally spend more time with their patients, listen more, and often touch their patients more than traditional practitioners do.[51] The mass exodus of patients from the offices of traditional physicians suggests that the alternative practitioners are meeting a very powerful need.

Medical schools need to give students hands-on practice in learning how to be aware of their own emotions and how to help others cope with emotional distress, suffering, and death. Much might be accomplished simply by changing the way these students are treated while in medical school, which is usually a highly stressful, hostile, critical, and at times even humiliating environment. It is difficult for people to learn to be caring, warm physicians when they are trained under such austere circumstances.

Equally important, insurance companies must be convinced of the benefits of providing coverage for emotional interventions. A study recently published in the *American*

Journal of Cardiology found that 80% of people who tried an alternative treatment, including life-style changes and social support, were able to avoid the bypass surgery or angioplasty for which they were otherwise eligible. Mutual of Omaha calculated savings of nearly $30,000 per patient as a result.[37] The more that studies can demonstrate the cost-effectiveness of psychosocial therapeutic interventions, the more insurance companies will help make these interventions available to those who need them the most.

Finally, the research agenda needs to focus on the definition of positive emotional well-being. Clearly, we understand the detrimental effects of hostility, anger, and depression on health. However, a more concerted effort is necessary to discover what experiences foster positive emotional states and interpersonal exchanges—for both men and women.

A generation of research focusing on gender differences in social class and ethnic circumstances is warranted, explaining the variety of both men's and women's experiences and how they differently influence emotional health and, hence, physical health. Using women as an essential target of research will ensure that both genders are able to maximize their capacity for positive relationships and emotional health, while also reducing the prevalence of premature and/or relentlessly progressive cardiac disease.

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