

Mental Health and Cardiovascular Disease



For centuries, the mind–body relationship has been postulated. These findings suggest that depression and anxiety are not simply “in the mind.” They are real illnesses, like any other physical illnesses, and can negatively impact the entire body, including the cardiovascular system.

Despite the abundance of investigation and demonstration of a clear relationship between mental health and cardiovascular diseases, patients with coronary disease, myocardial infarction, heart failure, and arrhythmias are rarely assessed for psychological distress or mental illness as a contributor to or resulting from the cardiovascular disorder. Psychological distress and mental distress are terms used to describe a range of symptoms and experiences of a person’s internal life that are commonly held to be troubling, confusing, or out of the ordinary. Mental distress has a wider scope than the related term, “mental illness.” Whereas mental illness refers to a specific set of medically defined conditions, a person in mental distress may exhibit some of the symptoms described in psychiatry, such as anxiety, confused emotions, hallucination, anger, and depression without actually being “ill” in a medical sense. A wide range of life situations, including bereavement, stress, loss of a job, sleep deprivation, alcohol or drug use, assault, abuse or accidents, can induce mental distress. This may resolve without further medical intervention, yet may be a trigger for cardiovascular events.

The overlap of symptoms of cardiovascular disease such as palpitations, chest tightness, and shortness of breath that occur in healthy persons, including those due to stress, makes it very difficult for physicians and their patients to assign a causal or related role to mental health. Primary care physicians and cardiologists focus on treating symptoms and risk factors, which leaves little time to address feelings and emotions. Further, because of the social stigma that has traditionally existed around mental illness, patients and families may be hesitant to discuss mental health. The purpose of this commentary is to underscore the importance of mental health and its associations with cardiovascular disease.

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DEPRESSION AND CARDIOVASCULAR DISEASE

The prevalence of depression in patients with cardiovascular disease is threefold higher than that in the general population. Depression is underdiagnosed in the medical setting.^{1–4} The American Heart Association recommends that depression be recognized as a major risk factor for coronary heart disease, similar to hyperlipidemia, diabetes, hypertension, and smoking. There is about an 80% increase in the risk of developing new or worsening cardiovascular disease (ie, more complications or hospitalizations), as well as death from cardiovascular diseases in adults with depression with or without prior cardiovascular disease.^{3,5–7} Depression is also common in patients who have angina and can increase the risk of developing myocardial infarction,⁵ stroke, sudden death, and atrial fibrillation.^{4–7} The relationship between depression and anxiety and cardiovascular disease is bidirectional.³ In other words, depression and anxiety can increase the risk of developing cardiovascular disease; cardiovascular disease can increase the risk of developing depression and anxiety, and each may lead to a worse outcome.³

HOW DEPRESSION CAN PROMOTE CARDIOVASCULAR DISEASE

The American Heart Association has concluded that depression can accelerate atherosclerosis³ as well as promote the onset and severity of the coronary risk factors of diabetes, hypertension, and high levels of low-density lipoprotein (Table).³ The most important reason depression increases the risk for, or worsens outcomes in, cardiovascular disease, is its effects on lifestyle and compliance with recommended treatments. Depression has been shown to increase the risk of an unhealthy lifestyle, including smoking; diet higher in calories, salt, and saturated fat; and decrease in exercise and medication compliance.³ Each of these increases the risk of cardiovascular disease and worsens the outcome.³ The value of a healthy lifestyle and compliance with treatments can’t be underestimated. The risk of myocardial infarction and strokes increases 10-fold in patients who do not follow their physicians’ recommendations, compared with those who do.

In addition to its effects on compliance, physiologically, depression is associated with an increase in the stress hormone cortisone. High levels of cortisone³ can lead to increased blood glucose, weight gain, low high-density

Table Potential Mechanisms of How Depression and Anxiety Impact the Heart and Interventions to Reverse These Effects

How depression and anxiety effect heart disease

- Increase rate of atherosclerosis
- Increase risk of unhealthy lifestyle (smoking, a diet higher in calories, saturated fat, and cholesterol, decreased medication compliance, and decreased total exercise)
- Increase cortisol levels, which lead to increased blood sugar levels and increased blood pressure
- Increase other hormones which can increase resting heart rate and lead to a greater increase in heart rate with exertion
- Increased activity of platelets, which can accumulate and create a plug inside an artery, leading to blockage of blood flow

What patients can do to reverse those effects (cardiosmart.org section on healthy living, and heart.org are good references for patients)

- Exercise
 - Moderate intensity aerobic exercise for at least 30 minutes, on 5 or more days of the week (total of 150 minutes of aerobic exercise per week)
 - Brisk walking, cycling, walking on treadmill, jogging, swimming, playing sports, climbing stairs
- Mindful meditation (suggest purchasing mindfulness meditation CD)
 - Practiced sitting with eyes closed, cross-legged on a cushion, or on a chair, with the back straight
 - Attention is put on the movement of the abdomen when breathing in and out, or on the awareness of the breath as it goes in and out of the nostrils
 - If one becomes distracted from the breath, one passively notices one's mind has wandered, but in an accepting, nonjudgmental way, and one returns to focusing on breathing
 - Meditators start with short periods of 10 minutes or so of meditation practice per day.
 - Helpful Web sites: mindful.org, freemindfulness.org, pocketmindfulness.com, marc.ucla.edu/body.cfm?id=22, wildmind.org
 - Apps: Omvana, Gratitude, Habit Tracker
- Breathing exercises (ie, yoga, slow-breathing, pranayama)
 - Seated, cross-legged, spine erect. Close right nostril with thumb of right hand, slowly inhale to maximum inspiration, then close left nostril with pinky of right hand and exhale slowly to maximum exhalation through right nostril, and repeat
 - Breathing rate is 6 breaths/minute
 - 10–15-minute sessions daily
- Medications
 - Several available, including SSRIs and SNRIs prescribed by primary care or psychiatrist
- Cognitive behavioral therapy (CBT) (excellent for anxiety, stress, and depression that is a grief response, but not helpful for major depression)
 - Done with a social worker or psychologist who serves as the therapist
 - Identify “automatic thoughts,” which refer to thoughts in response to outside events that evoke emotional responses. These automatic thoughts occur frequently and are not noticed by individuals, thus they are accepted as true without questioning
 - For patients with depression, these thoughts are negative, such as “I am a worthless person”
 - The initial goal of CBT is to help patients recognize these thoughts and associated changes in mood, and to challenge these thoughts until the patient accepts that these thoughts are not based on any evidence and are false
 - Patients with depression often avoid activity, thus behavioral strategies are used to increase engagement in activities associated with pleasure, mastery, or accomplishment. The patient is given an assignment such as to go to a party, or volunteer for a needy cause

SNRI = serotonin and norepinephrine reuptake inhibitor; SSRI = selective serotonin reuptake inhibitor.

lipoprotein, and increased blood pressure. It can also increase other hormones (adrenaline), which can increase resting heart rate, blood pressure, and heart rate response to exertion, each of which may increase the risk of myocardial infarction, arrhythmias, and heart failure.³ Inflammation from poor dental hygiene, pneumonia, surgical procedures, and arthritis increases the risk for heart attacks. Depression may increase inflammation as well. Depression may also lead to increased platelets activity,³ increasing risk of coronary artery occlusion.

ANXIETY, PSYCHOLOGICAL DISTRESS, AND CARDIOVASCULAR DISEASE

While the evidence is not as strong, anxiety, anger, and stress may increase the risk of cardiovascular disease, similar to depression (Table).³ General anxiety about daily tasks, even if criteria for an official diagnosis of generalized anxiety disorder are not met, and psychological distress, including anger and stress, have been shown to promote and precipitate cardiovascular diseases. The effect may also be progressive, meaning more episodes of anxiety, anger, and stress may be associated with a higher risk of cardiovascular diseases as well as symptoms or signs overlapping with cardiovascular diseases including chest pain, despite normal coronary arteries and palpitations or heart pounding even in the absence of structural or functional heart diseases.^{3,5}

While the definition of anxiety disorders infers chronicity, anxiety and negative emotions like anger, fear, grief, and severe emotional stress can result in the release of the hormone adrenaline, which temporarily increases blood pressure^{5,8} and results in constriction of arteries that can result in myocardial infarction (classic myocardial infarction or the “broken heart syndrome”) and induce cardiac irregularities in persons with and without structural heart disease, including atrial fibrillation, atrial flutter and tachycardia, premature ventricular contractions, and even sudden death. Repeated temporary increases in blood pressure may lead to plaque disruption, resulting in myocardial infarction or strokes, and in patients with a weakened aorta, such as those with aortic aneurysm or survivors of an aortic dissection, may lead to aortic dissection or rupture.⁶

RECOMMENDATIONS

Mental distress and mental illnesses are real and can be associated with severe cardiovascular consequences. Thus, it is important for patients to discuss their mental health with their doctor frequently, and for clinicians to assess the mental health of their patients, especially because mental illness often times goes undiagnosed. Depression and anxiety and an exaggerated stress response have effective treatments. Treatment improves long-term cardiovascular health and also dramatically and effectively increases quality of life.¹ Medications, as well as nonmedication

interventions, such as cognitive-behavioral therapy, mindfulness meditation, yoga, transcendental meditation, slow breathing exercises, and exercise, are excellent treatment options. These can reverse many of the cardiovascular changes from mental distress and mental illness. Moderate-intensity aerobic exercise for at least 30 minutes, on 5 or more days of the week, reduces the risk of myocardial infarction and death from cardiovascular disease.³

While beyond the scope of this commentary, there is evidence of benefit from the regular practice of meditation (Table). The goal of cultivating mindfulness is to become more aware of the present moment without judgment, often focusing on immediate physical sensations in the body, including the breath. This anchor for the attention is available to return to when the mind gets caught up in a story, a plan, a train of thought, or intense emotions. At any moment the individual can return their attention to this anchor, without judging themselves or their wandering minds and without holding on to whatever drew their attention away, but just letting it go, letting it be. Improvement can be seen in a few weeks, and when practiced long term, particularly facilitated by an expert, mindful meditation is very helpful for reducing stress and for a reduced emotional response, smoking cessation, lowering blood pressure, and enhancing quality of life by contributing to a more coherent and healthy sense of self and identity.

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