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The “Inactivity Trap”

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In this issue of *General Hospital Psychiatry*, Roshanaei-Moghaddam, et al. report that baseline depression may be a significant risk factor for the development of a sedentary lifestyle or decreased level of physical exercise. To many, these findings simply document in writing a common clinical observation. One of the well-recognized symptoms of major depression is reduced physical activity, and depressed individuals often report that even previously simple tasks like shopping or going to work seem impossible when they are in the throes of their illness. But in reality, clinicians seldom can determine whether depression or reduced physical activity came first, and either is plausible. In their review of the literature on this topic, Roshanaei-Moghaddam, et al. shed light on one limb of this bidirectional relationship, and their work contributes significantly to the notion that depression can lead to the development of reduced activity and exercise.

It must be pointed out, though, that the conclusion that depression is a risk factor for the development of sedentary lifestyle is by no means iron clad. To truly establish that depression leads to diminished physical activity, one would have to follow a large group of people with constant levels of physical activity over time, some of whom become depressed and some of whom do not. Then, at the onset of depression, the trajectory of physical activity and exercise would have to be compared to the activity levels of matched individuals in the cohort who do not develop depression. Such a study is, of course, not likely ever to be done.

In the absence that type of study, the conclusions of Roshanaei-Moghaddam, et al. might be supported if treatments that specifically affected mood disturbance (and that themselves do not affect motor activity) resulted in greater physical activity as mood improves. The problem is that antidepressant treatments have a range of effects on the brain, and antidepressants themselves may affect psychomotor activity independent of their effect on mood. There is evidence, for example, that even a single dose of a selective serotonin reuptake inhibitor improves motor performance.¹⁻³

Whether the evidence is iron clad or not, in the end the notion that depression leads to reduced physical activity is believable. Indeed, some have suggested that this association is nature's way of protecting an individual when he or she is vulnerable to harm. It has been hypothesized that depression may be “adaptive” and that the condition is an evolutionary trick intended to reduce the activity of an animal that has lost its social status in the group as a result of increasing age, infirmity, or injury.⁴ The evolutionary adaptation hypothesis suggests that depressed mood leads to diminished physical activity in order to reduce the chances that an animal will be

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attacked and to decrease the animal's need for food. In physically vulnerable individuals, depression may also provide a survival advantage by leading to social isolation, thereby decreasing the likelihood for conflict with others in the group that may result in harm. The reduced appetite and libido seen in depressed individuals may lead to a lower likelihood of competition with others in the group for resources, and changes in sleep patterns would allow depressed individuals to be more active when other more fit animals are not.

If depression somehow offers a survival advantage to frail individuals, then one would expect depression to be more common as an individual becomes more medically ill or debilitated. In fact, this is the case. The 12-month and lifetime prevalence of major depressive disorder in the community has been reported to be 5.28% (95% confidence interval, 4.98-5.57) and 13.23% (95% confidence interval, 12.64-13.81), respectively.⁵ However, the prevalence of depression is much higher among those who are physically ill. For example, major depression has been reported in 36.5% of patients over age 60 hospitalized with congestive heart failure,⁶ and is even higher in those with more severe symptoms.⁷ Depression has also been reported in more than half of patients with cancer in some studies.⁸ The more chronic medical conditions an individual has, the greater the likelihood of depression. In one study, compared to a reference group with no chronic medical conditions, the odds ratio of major depression was 2.22, 3.90, and 6.52 for patients with 1, 2 and 3 chronic medical disorders, respectively.⁹

While it is conceivable that depression may have offered a survival advantage in primitive societies by allowing an individual to survive a period of physical vulnerability, it is hard to view the association of depression and reduced physical activity as anything but problematic in the modern world. Frequent and regular physical exercise decreases all-cause mortality and helps prevent many physical ailments.¹⁰ It has been estimated that approximately 12 percent of all mortality in the United States is related to lack of regular physical activity.¹¹ In fact, inadequate physical activity has been documented as an independent risk factor for the premature development of cardiovascular disease,¹¹ and regular physical activity is associated with decreased mortality from heart disease.¹² Increased physical activity may aid in smoking cessation,¹³ helps maintain cognitive function in older adults,¹⁴ and decreases the risk of hip fracture.¹⁵ It also enhances psychological well-being by improving cognitive function and reducing stress, anxiety and depression.¹⁶

And while exercise has health benefits for almost all individuals, it seems to be particularly important in improving outcomes in patients with heart disease.^{17,18} Thus, the relationship between depression and the development of physical inactivity may explain why depression is associated with an increased risk of heart disease mortality among individuals without heart disease at baseline.¹⁹ It may also explain why depression has a well-recognized association with increased cardiac and all-cause mortality among patients who have sustained a myocardial infarction.²⁰

In many ways, people with heart disease and depression are the very group who needs to exercise most. The finding that depressed heart disease patients are more prone to physical inactivity than individuals without depression calls to mind the relationship between socioeconomic status and playing the lottery in our society. It is well-established that low-income individuals, those who should be the most cautious with their resources, actually spend a higher percentage of their income on lottery tickets than do wealthier individuals.²¹ As a result, the poorest in society may sink deeper in a "poverty trap," further preventing them from improving their financial situations.²¹

The idea that depression might lead to reduced activity among patients with heart disease suggests the possibility of an analogous "inactivity trap" which causes depressed heart disease patients to sink further into worsening health status. It is the unfortunate result of the

bidirectional relationship between depression and inactivity: depression leads to a reduced activity level, and depressive symptoms then become more severe. Berlin, et al.²² randomized individuals who exercised regularly to continued regular exercise or exercise withdrawal. They found that fatigue and somatic depressive symptoms began after a single week of abstinence from exercise and that cognitive-affective symptoms of depression were noted as early as two weeks. If depression leads to reduced physical activity, as Roshanaei-Moghaddam, et al. found, it is highly likely that the reduced activity will, in turn, lead to further depression, and individuals may fall into an inactivity trap from which there is no return.

In summary, Roshanaei-Moghaddam's work helps clarify that depression is a risk factor for the development of reduced physical activity. This adds to previously published studies on the other limb of the bidirectional relationship showing that regular physical activity decreases the risk of depression²³ and that cessation of exercise may lead to the development of depressive symptoms.²² Given the numerous health benefits of exercise, extra efforts must be made to urge depressed individuals to become, or remain, physically active and avoid falling into the "inactivity trap."

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