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Mental stress, meditation, and yoga in cardiovascular and cerebrovascular diseases

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Abstract:

It is well known that stress can increase the risk of heart attack and stroke although the exact way it does this is unknown. This information is particularly more relevant in a post COVID-19 era where healthcare workers are increasingly facing more stressful working conditions. Thus, it is important to look into alternative methods to deal with stress including meditation and yoga which have shown potential.

Keywords:

Anxiety, COVID-19, depression, ischemia, mediation, stress, stroke

Cardiovascular and cerebrovascular diseases are among the most common causes of death in the United States. The number of cases globally has been rising over time. Mental or psychological stress increases the risk of both heart attack and stroke. Studies have shown that stress-induced peripheral vasoconstriction increases the activity of the insula and parietal cortex.^[1] Stress-induced myocardial ischemia also presents with increased brain activity in the anterior cingulate, inferior frontal gyrus, and parietal cortex.^[2] The sympathetic response, more commonly known as the fight or flight response, may potentially play a role in the development of myocardial ischemia.^[3] A similar mechanism has also been suggested to increase ischemic stroke.^[4] There is also a unique difference in myocardial ischemia caused by mental stress as compared with physical exercise. Mental stress-induced ischemic usually presented silently and sometimes was evident in patients whose conventional stress was negative but the

exact mechanism of action of this difference is unknown.^[5]

This topic is especially relevant currently, as increases in mental stress have been seen due to the effects of the COVID-19 pandemic. We are living in a rapidly changing time with many factors that can increase stress in the general population. The COVID-19 pandemic changed many things and we are still not completely through the pandemic. Health-care workers in particular on the front lines suffered an increase in burnout and anxiety with increased patient hospitalizations and increased work hours. The pandemic also is impacting future medical professionals such as medical students who report increased stress.^[6] COVID-19 postmortem explorations of the brain have shown ischemic damage and microinfarcts which suggests a possible link between the virus and cerebrovascular health.^[7]

Even though this topic is very pertinent, there is still much potential for further study. The risk that is increased due to stress can be underrated which makes it even more important to consider.^[4] There are several clear areas in that more research

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can be done. For example, the role of social determinants of health is not clearly studied in groups that are usually marginalized including women, immigrants, and African American populations. It is important to consider whether certain groups have a larger risk with social factors that work with cardiovascular and cerebrovascular risk factors. Furthermore, since there is an interplay between psychological state of mind and emotions with physical manifestations of disease, more research should be conducted on patients with anxiety and depression. The role of medication in the management of these conditions can also be studied to see whether it can help manage the risk for cardiovascular disease. The use of selective serotonin reuptake inhibitors can be used to decrease anxiety but whether its usage has any protective or decreases the risk of cardiovascular and cerebrovascular disease remains unclear. Management of stress using meditation and yoga can also be further studied for their effectiveness. A study looked at the effect of breath meditation on mental health professionals during the pandemic. They found that it improved sleep by increasing relaxation.^[8] Some research exists to suggest that meditation can benefit the risk of cardiovascular disease, whereas further study is needed for definite conclusions.^[9] Meditation is a practice that does not have a significant cost associated with it and can be implemented in almost all populations which theoretically could be used as a preventive measure. Yoga has been shown to help health-care workers stabilize their psycho-physical health.^[10] A current limitation on the application of yoga is that current research has problems with consistent methodology which prevents its utilization.^[11] Knowing this information, however, presents areas of future study.

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Conflicts of interest

Prof. Yuchuan Ding is an Associate Editor of *Brain Circulation*. The article was subject to the journal's standard procedures, with peer review handled independently of the Editor and their research groups.

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