The loneliness of social isolation can affect your brain and raise dementia risk in older adults

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Abnormal levels of beta-amyloid protein in the brain form plaques (brown in this illustration) between neurons, disrupting cells. Tau protein can form tangles (blue) within neurons, harming neural communication. Credit: National Institute on Aging, NIH

Physical pain is unpleasant, yet it's vital for survival because it's a

warning that your body is in danger. It tells you to take your hand off a hot burner or to see a doctor about discomfort in your chest. Pain reminds us all that we need to take care of ourselves.

Feeling lonely is the social equivalent to feeling physical pain. It even triggers the same pathways in the brain that are involved in processing emotional responses to physical pain.

Just like feeling physical pain, feeling lonely and disconnected from others is also a signal that we need to take care of ourselves by seeking the safety and comfort of companionship. But what happens when we are unable to find companionship and the loneliness persists?

As scholars at the Center for Healthy Aging at Penn State, we study the impact of stress on the aging body and brain, including how it can worsen cognitive decline and risk for dementia. The social isolation older adults are experiencing now amid the coronavirus pandemic is raising new mental health risks, but there are things people can do to protect themselves.

The health consequences of loneliness

The COVID-19 pandemic has put many older adults' social lives on hold, leaving them at greater risk for loneliness. They know they face a higher risk of developing severe symptoms from COVID-19, so many are staying home. Restaurant closures and limits on visitors to assisted living centers have made it harder to see family and friends.

But even prior to the pandemic, public health experts were concerned about the prevalence and health impacts of loneliness in the U.S. Loneliness affects between 19% and 43% of adults ages 60 and older, and many adults ages 50 and over are at risk of poor health from prolonged loneliness.

Research has shown that prolonged loneliness is associated with increased risk for premature death, similar to smoking, alcohol consumption and obesity. Other health consequences are also associated with loneliness, including elevated risk for heart disease and stroke, and it is associated with increased physician visits and emergency room visits .

Loneliness can affect brain health and mental sharpness

Older adults who are socially isolated or feel lonely also tend to perform worse on tests of thinking abilities, especially when required to process information rapidly. And those who feel lonely show more rapid decline in performance on these same tests over several years of follow-up testing.

It is thought that loneliness may contribute to cognitive decline through multiple pathways, including physical inactivity, symptoms of depression, poor sleep and increased blood pressure and inflammation.

Loneliness has also been found to increase the risk of developing dementia by as much as 20%. In fact, loneliness has an influence similar to other more well-established dementia risk factors such as diabetes, hypertension, physical inactivity and hearing loss.

Although the underlying neural mechanisms are not fully understood, loneliness has been linked with the two key brain changes that occur in Alzheimer's disease: the buildup of beta-amyloid and tau proteins in the brain. Other indicators of psychological distress, such as repetitive negative thinking, have also be linked with the buildup of beta-amyloid and tau in the brain. Theories suggest that loneliness and other psychological stressors act to chronically trigger the biological stress

response, which in turn appears to increase beta-amyloid and tau accumulation in the brain.

How loneliness can contribute to disease

The evidence suggests that prolonged feelings of loneliness are detrimental to health. So, how do those feelings get converted into disease?

Feeling lonely and socially isolated can contribute to unhealthy behaviors such as getting too little exercise, drinking too much alcohol and smoking.

Loneliness is also an important social stressor that can activate the body's stress responses. When prolonged, that response can lead to increased inflammation and reduced immunity, particularly in older adults. Inflammation is the body's response to fight off infection or heal an injury, but when it continues unchecked it can have a harmful impact on health. Stress hormones play an important role in making sure that inflammation doesn't get out of control. But, under chronic stress, the body becomes less sensitive to the effects of the stress hormones, leading to increased inflammation and eventually disease.

In healthy older people, loneliness is related to a stress hormone pattern similar to that of people who are under chronic stress. This altered pattern in the stress response explained why people who were lonelier had poorer attention, reasoning and memory ability.

Social activity can buffer against the decline

Maintaining high quality relationships may be a key for protecting brain health from the negative impacts of loneliness.

Older adults who feel more satisfied in their relationships have a 23% lower risk of dementia, while those who feel their relationships are supportive have a 55% lower risk of dementia, compared to those who feel dissatisfied or unsupported in their relationships.

Maintaining social activity also buffers against decline in thinking abilities, even for those who live alone or who have signs of beta-amyloid accumulation in their brain. One reason for these benefits to brain health is that maintaining strong social ties and cultivating satisfying relationships may help people to cope better with stress; people who feel better able to cope with difficulties or bounce back after a stressful event show less buildup of tau protein in their brains.

This is good news because, with the importance of social distancing for controlling the COVID-19 pandemic, how people manage their feelings and relationships is likely more important for brain health than the fact that they are spending time physically apart.

Strategies for coping with loneliness

Loneliness is a common and normal human experience. An important first step is to recognize this and accept that what you are feeling is part of being human.

Rather than focusing on what's not possible at the moment, try to refocus your attention on what you can do to stay connected and make a plan to take action. This could include planning to reach out to friends or family, or trying new activities at home that you normally wouldn't have time for, such as online classes or book clubs.

During times of high stress, self-care is essential. Following recommendations to maintain regular exercise and sleep routines, healthy eating and continuing to engage in enjoyable activities will help

to manage stress and maintain mental and physical health.

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