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Review Article

Health Anxiety: A Double-Edged Sword for COVID-19: A Mini Review

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Abstract

Besides being a global health pandemic, COVID-19 has multiple psychological consequences. The high mortality rates increase anxiety and depression levels in patients with COVID-19 and the general population. Consequently, the anxiety related to COVID-19 may manifest as health anxiety named Coronaphobia. This exaggerated fear can lead to behavioral and physiological changes that complicate COVID-19 control in several ways. First, as "Worried Well" patients, who are generally in good physical health but experience excessive concern about their health, these individuals burden the healthcare system by misinterpreting bodily sensations as signs of potential infection, potentially spreading the virus in such environments. Second, the sterile immune response plays a key role in disease development. Psychological stress stimulates systemic and central nervous system (CNS) sterile inflammation, which, in some conditions, might weaken the body's defense system against the virus. Herein, we summarize these mechanisms to offer insights into self-management strategies during the current pandemic.

Introduction

SARS Corona virus-2 (SARS-CoV-2), a newly emerging virus, has spread rapidly worldwide, posing significant challenges to public health systems. While uncertainties persist regarding its origin, nature, and infection process, the psychological impact of the pandemic has become increasingly evident. Several surveys have reported a significant increase in anxiety among the general population, with increased mortality rates contributing to elevated stress levels, depression, and anxiety, particularly among COVID-19 patients.[1] Quarantining confirmed patients, often leading to isolation from family members, can exacerbate feelings of loneliness, guilt, and fear of transmitting the virus to loved ones. Chronic stress during epidemics and infectious outbreaks is well-documented, as uncertainty and a sense of losing control often elevate anxiety levels.[2] This paper explores the definition of health anxiety, followed by a discussion of specific challenges related to this anxiety during the COVID-19 pandemic. We also examine the role of the immune response in the development or exacerbation of health anxiety, finally; we analyze the behaviors of "worried well" patients in the context of health anxiety. Health anxiety can have both beneficial and harmful consequences. On the positive side, it may encourage protective behaviors such as mask-wearing, social distancing, vaccination, and hygiene. On the other hand, it also might lead to excessive fear, avoidance of medical care, misinformation, or even panic attacks. While health anxiety can motivate health-promoting behaviors, it can also exacerbate mental health problems and maladaptive responses during a crisis like the COVID-19 pandemic.

We discuss how chronic anxiety and fear can influence vulnerability to COVID-19 and propose potential strategies for managing these psychological effects during the pandemic.

What is health anxiety?

Feeling anxious is crucial for human survival when facing life-threatening dangers. Unlike early humans, modern individuals experience anxiety differently due to changes in lifestyle and stimuli that trigger anxiety. One of the most troubling concerns in today's world is personal health. Health anxiety is an anxiety disorder often classified within the OCD spectrum. Individuals with health anxiety are preoccupied with the belief that they are currently or will soon suffer from a physical illness, misinterpreting bodily sensations or changes as symptoms of disease.[3] Everyone experiences some level of health anxiety, and the associated awareness of potential health threats can be protective, aiding in the early identification of health issues. However, excessive health anxiety can be harmful,

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as it causes psychological and physical symptoms that are often mistaken for signs of organic disease. Pandemics, such as the H_1N_1 influenza (swine flu), are often covered excessively in the media and have been linked to increased anxiety and compensatory behaviors (e.g., using hand sanitizers).[4] Since late 2019, COVID-19 has threatened the physical health and lives of millions worldwide, resulting in numerous deaths within weeks. The highly contagious and rapid spread of COVID-19 have caused widespread fear, worry, and concern, leading to an overall deterioration in individuals' psychological health. Consequently, health anxiety, called Coronaphobia, has emerged as a prevalent disorder. Coronaphobia is defined as an exaggerated fear of contracting the virus, accompanied by excessive concern over physiological symptoms, significant stress about personal and occupational losses, increased reassurance-seeking and safety behaviors, and avoidance of public places and situations, resulting in significant impairment in daily functioning.[5] An appropriate level of health anxiety can benefit individuals and aid in preventing COVID-19 outbreaks. However, Coronaphobia, arising from the interaction of external risk factors and psychosocial processes, can lead to behavioral and physiological changes that complicate COVID-19 control.

"Worried well" patients and COVID-19

Individuals with health anxiety may be dismissed as the "worried well" during this pandemic due to disrupted mental health services and healthcare systems' limited understanding of psychosocial factors. The term "worried well" refers to relatively healthy individuals who believe they are affected or likely to be affected, overburdening healthcare systems with misinterpretations of symptoms and potentially spreading the virus in such environments. Reports from the 2009 H1N1 influenza pandemic indicated that many health-anxious individuals rushed to hospitals with common symptoms, such as cough or mild fever, leading to overcrowding and wasting health care resources. Notably, such visits also increased viral transmission and the prevalence of COVID-19.[6] In many cases, shortness of breath due to anxiety is mistaken for COVID-19 symptoms. Furthermore, illness, fear of death, and intolerance of uncertainty can biologically increase the risk of COVID-19 infection.

Chronic stress is not inherently pathogenic, but it stimulates an immune response that heightens susceptibility to infections and diseases. Excessive anxiety related to COVID-19 can activate an immune response and increase inflammation. Inflammasomes are intracellular multiprotein complexes that recognize damage-associated molecular patterns (DAMPs) or pathogen-associated molecular patterns (PAMPs), triggering the activation of proinflammatory caspases and the release of proinflammatory cytokines.[7] Upon viral infection, inflammasomes amplify inflammatory responses, leading to in immune dysregulation, cytokine storms, and exacerbated viral infection.

Sterile immune response role

Sterile inflammation plays a key role in many diseases, including ischemia-reperfusion injury, autoinflammatory diseases, type 2 diabetes, gout, pseudogout, obesity, atherosclerosis, and Alzheimer's disease[8] it is highly comorbid with MDDs.[9] Frequent or severe stressors induce affective dysregulation and increase inflammatory proteins in tissues and blood, even in the absence of pathogens.[10, 11] This stress-induced cytokine/chemokine response constitutes sterile inflammation.[11] Psychological stress stimulates systemic and CNS sterile inflammation, potentially causing physical and mental health damage. Repetitive exposure to stressors, such as social struggles, threats, isolation, and rejection, elevates inflammatory markers, including CRP, interleukin-6 (IL-6), and interleukin-1β.[12] Similarly, acute stressors or major life events, such as the death of a spouse, increase IL-1β and IL-6 activity in the elderly.[13]

Excessive stress damages cells in the body. Stressor exposure may trigger DAMP release independently of necrotic cell death. DAMPs are intracellular molecules released from damaged or dying cells as part of an innate immune response during trauma or pathogen-induced infection. Upon DAMP release, a noninfectious inflammatory response develops via binding to pattern recognition receptors (PRRs). Stressor-induced sterile inflammation depends on inflammasomes, particularly the NLRP3 inflammasome, which plays a key role in DAMP-triggered peripheral and CNS inflammatory states. DAMP binding to Toll-like receptors (TLRs) induces NLRP3 gene expression.[14, 15] Once sufficient NLRP3 protein is produced, it interacts with the adaptor protein ASC, leading to second-signal activation. Consequently, procaspase-1 is recruited through its caspase recruitment domain, resulting in its activation. Active caspase-1 then cleaves pro-IL-1β into mature IL-1β (and IL-18). Notably, the NLRP3 inflammasome responds to various second triggers, including ATP, K+ efflux, β-amyloid, silica, uric acid crystals, and reactive oxygen species (ROS).[14,16] Multiple receptors, such as TLRs, RAGE, and CD91, can bind DAMPs, facilitating NLRP3 inflammasome formation.[17]

Evidence also suggests that frequent exposure to stressors triggers sterile inflammation in the brain, contributing to neuroinflammation.[18] DAMPs play a significant role in the pathophysiology of neuronal damage in depression.[19] Excessive anxiety and stress about COVID-19 can stimulate an immune response that elevates inflammation, predisposing the body to COVID-19 infection. As noted, excessive inflammation increases the severity of COVID-19 infection.

Cognitive and Behavioral Mechanisms

Health anxiety manifests through cognitive and behavioral mechanisms that shape how individuals perceive and respond to health threats like COVID-19. Cognitive mechanisms include distortions such as catastrophizing and hypervigilance, where individuals overestimate the

likelihood of infection and misinterpret normal bodily sensations as disease symptoms.[20] Behaviorally, health anxiety drives avoidance, excessive health monitoring, and reassurance-seeking behaviors. These actions may temporarily alleviate anxiety but reinforce fear over time.[21] During the pandemic, these mechanisms exacerbated mental health conditions, such as anxiety and depression, impairing daily functioning as individuals became preoccupied with perceived health threats.

Vulnerable Populations

Vulnerable populations, including those with chronic illnesses, mental health disorders, older adults, socioeconomically disadvantaged individuals, minorities, and healthcare workers, experienced increased health anxiety during COVID-19.[22] Pre-existing conditions increased perceived vulnerability, while socioeconomic and systemic factors, such as limited healthcare access, worsened anxiety.[23]

Long-Term Implications

Unaddressed health anxiety from the pandemic risks chronic mental health issues like GAD and depression, alongside physical impairments derived from prolonged stress, such as cardiovascular problems.[24] Social isolation, strained relationships, and reduced quality of life may persist, alongside increased healthcare utilization and potential post-pandemic mental health crises.[23] These effects underscore the need for ongoing mental health support.

Research indicates a 30% increase in health anxiety during COVID-19, with strong associations with depression and PTSD, particularly among vulnerable populations.[25] Case studies highlight severe cases, such as individuals with acute anxiety requiring cognitive-behavioral therapy (CBT) or mindfulness-based interventions, emphasizing the importance of early treatment. Studies also identified behavioral patterns, including excessive health checking and avoidance, highlighting the need for specific therapeutic approaches.[26]

Recommendations

Coping Strategies and Treatments

Effective management of health anxiety during the pandemic includes CBT to challenge distorted thoughts, mindfulness-based interventions to reduce worry, and exposure therapy to confront fears.[27] Self-regulation techniques, such as behavioral activation, relaxation methods, and social support, are also valuable, with pharmacological options ,such as selective serotonin reuptake inhibitors (SSRIs), used for severe cases.[28] These multifaceted approaches aim to enhance resilience and reduce the impact of anxiety.

Healthcare systems should train workers to practice empathetic listening and to attend to psychosocial factors to alleviate fears. Equipping health workers with psychological first aid, effective communication strategies, and stress management techniques could be a promising tool in this field.

Self-care strategies, such as relaxation techniques (e.g., breathing and muscle relaxation exercises), should be offered to all individuals in quarantine. Mindfulness meditation can help people become more self-aware and accept physical sensations calmly.

Physical activity potently protects the body against chronic inflammation caused by stress. However, high-intensity exercise may be less effective, as its forceful nature could exacerbate an already stressed system, particularly in individuals unaccustomed to exercise.

At the community level, Coronaphobia screening and interventions are highly recommended, alongside instructive training to address such phobias. However, further studies are needed to optimize these services.

For COVID-19 patients, family members and relatives may inadvertently increase panic, and patients' concerns about the condition of family members or contacts may increase fear, potentially manifesting as panic attacks. Health education and telecommunication with patients can significantly improve their mental and physical condition. The protective effect of resilience against negative emotions is particularly important.

Some studies suggest that fluoxetine has protective effects against COVID-19, so adding it to treatment protocols could be beneficial.

The question remains: in today's modern world, where lives are filled with stress and anxiety, is the virus one of nature's tools for selecting and retaining individuals with a high ability to cope with stress?

Conclusion

During the COVID-19 pandemic, excessive fear can harm individuals and society, while a lack of fear or misinformation can lead to neglect of safety measures. While a certain level of awareness and fear is necessary to promote proper health protocols, misinformation, often spread through social networks or media, can exacerbate anxiety and worsen the situation. Effective anxiety management is essential to minimize the negative effects. By highlighting Coronaphobia's potential impact on healthcare systems and public trust, further investigation is required for developing preventive strategies and policy-level interventions.

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