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Mindfulness Meditation as a Possible Treatment of Anxiety Disorder in Post-pandemic Era

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Abstract: In recent years, people's lives have changed dramatically due to COVID-19, and in many places people have been forced to stay at home, keep social distance from friends, or be forcibly quarantined in order to comply with outbreak control policies. This has made anxiety a psychological problem that people have to deal with. However, many people have little knowledge of the causes of anxiety or how to deal with it, which makes it difficult to deal with excessive anxiety or anxiety disorders. This paper examines the many factors that contribute to anxiety, and how meditation can biologically alter the brain and various systems in order to reduce anxiety. This paper may provide some information about the causes of anxiety and offers a possible way to deal with it.

Keywords: mindfulness meditation, prefrontal cortex, HPA axis, anxiety, Covid-19

1. Introduction

Anxiety is a familiar emotion to all of us, it can make us feel fearful and panicky, but it can also motivate us to accomplish our tasks. However, when anxiety becomes irrational or excessive, it may turn into General Anxiety Disorder. General Anxiety Disorder (GAD) is a kind of mental illness that led to consistent feelings of anxiety and dread in an individual. Unlike the stress and worry people got before exams or due days; General Anxiety Disorder can have a serious impact on a person's daily life. Nowadays, people around the world face serious mental health challenges. People have less interaction with one another as a result of the COVID-19 outbreak and worries about their health and the spread of the pandemic have risen. All of these stressors considerably increase peoples' levels of anxiety, which worsens their mental health. The practice of mindfulness meditation has a lengthy history, with its earliest recorded uses being in Hindu tradition around 1500 BCE. The mindfulness meditation practice changed significantly throughout the centuries that followed. Meditation evolves into many different forms. There are a few influential categories like Focus Attention Meditation (FAM), Open Monitoring Meditation (OMM) and mindfulness meditation.

There are many different types of meditation, but not all of them are effective in relieving stress, thus in this study, only forms of meditation that will actually have an impact will be taken into account. This study makes a literacy review on the topic of the effect of meditation in reducing post-pandemic anxiety and stress. While many people encountered stressors created by the pandemic, some of them do not have measures to cope with them, especially in the area counselling sector is still in its infancy. This study explains how meditation works biologically to lower stress and causation of anxiety and anxiety disorder, so as to popularize meditation as a way for people to manage their anxiety and stress.

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2. Analysis of Anxiety Disorders

Anxiety disorders can have a variety of origins. Based on the biopsychosocial model, this paper primarily classifies anxiety disorders into three groups: biological perspectives, psychological perspectives, and sociological perspectives.

2.1. Biological Perspective

Plasma cortisol levels are thought to be a key factor in the typical stress response. Plasma cortisol levels often rise when the hypothalamic-pituitary-adrenal (HPA) system is activated. the HPA is an area of the brain that controls how the body responds to stress. the HPA has a regulator, Corticotropin-releasing hormone (CRH). the CRH binds to the anterior pituitary and controls the secretion of adrenocorticotropic hormone (ACTH). ACTH is the hormone that targets the adrenal cortex and will promote glucocorticoid production, thereby activating the HPA system [1]. The hippocampus also has a strong influence on HPA. The hippocampus primarily forms inhibitory trans-synaptic influences on the hypothalamic paraventricular nucleus (PVN). The neurons of the PVN are where the ACTH secretagogue, CRH, is made. This also indicates that the hippocampus plays a crucial role in controlling the amount of glucocorticoid and ACTH in the body. Thus, dysfunction of the hippocampus will lead to increased HPA activity, which can lead to anxiety or depression [2]. Changes in some neurotransmitters will also lead to anxiety disorder. Serotonin is an inhibitory neurotransmitter that helps the human body to regulate mood, anxiety, sleep pattern, pain, and appetite. Diseases associated with serotonin have been shown to be associated with anxiety and depression. The anxiety- and aggression-related aspects of the depressive syndrome are connected to the serotonin (5-HT) ergic abnormalities seen in some depressed and anxious people [3]. Another neurotransmitter that will influence the regulation of HPA is norepinephrine. Norepinephrine is a neurotransmitter that regulates the body's alertness, arousal, decision-making, and attention. In the brainstem, the majority of noradrenergic neurons are arranged in discrete little groups called A1 to A7 cell groups. Although most noradrenergic neurons settled in locus coeruleus (LC), subgroups of noradrenergic nuclei diffuse throughout the brain, including the prefrontal cortex (A2, A2 cell group), hippocampus, amygdala (A4, A6 cell group), etc. The paraventricular nucleus of the hypothalamus and corticotropin-releasing hormone-containing neurons in PVN are directly innervated by the brainstem NE neurons from the A1 and A2 cell groups. This process plays a significant role in modulating stress reactions. So, flocculation of norepinephrine may lead to anxiety disorder [4]. The prefrontal cortex is another factor that will regulate the function of HPA. It offers a way through which cortical activity might control basic endocrine reactions to situations that endanger homeostasis.

2.2. Psychological Factors

Psychological factors causation of anxiety disorder mainly concerns life experience, including childhood trauma, stressful life event, and excessive stress and anxiety. An individual experiences excessive stress or one factor that leads to the increasing in patients of anxiety disorder and depression is the outbreak of COVID-19. For mitigation reasons, many countries promoted, or even mandated, social distance policies at the beginning of the epidemic. There are also countries that have implemented a policy of mandatory isolation. People's lifestyle has significantly changed as a result of the epidemic, both for political reasons and out of fear of illness. These sudden changes including compulsory quarantine, home quarantine, and social distancing are related to poor psychological and physical health [5]. By screening the quarantine population for psychological problems using the Patient Health Questionnaire (PHQ-9) and Generalized Anxiety Disorder Scale (GAD-7), Chinese scholars found that quarantine patients showed varying degrees of anxiety and depression [6].

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2.3. Sociological Perspectives

Anxiety disorder will also be triggered by sociological factors. From the sociological perspective, anxiety disorder may be a consequence of social structure, social comparison and social isolation. Norms, expectations, and demands from society and culture can contribute to anxiety. Anxiety disorders may be more common among people who are marginalized and subject to prejudice, poverty, or a lack of social support. People with low socioeconomic status need to face an extra amount of stress due to low life quality and insecure basic needs. Social comparison can also lead to anxiety disorder when people keep comparing themselves negatively to others. Chronic social isolation will also trigger anxiety disorder. This is because humans are social animals. The lack of social support can increase feelings of insecurity and stress, which finally leads to anxiety disorder.

2.4. Trigger Analysis for Anxiety Disorders

There are two main triggers for anxiety disorders respectively, the first is a physical trigger and the second is an environmental trigger. First, physiologically, the activation of the HPA axis, the flocculation of the neurotransmitter-serotonin and norepinephrine, and the increase in the stress hormones ACTH and cortisol all contribute to the rise in stress. Physiologically, excessive stress, and traumatic events, can lead to anxiety disorders. After the epidemic, people became more anxious than before because of prevention and control measures, and the prevalence of anxiety disorders increased, and it was difficult for people to seek psychological help because of isolation and social distance policies. Therefore, there is no place or time requirement for positive meditation as a good stress relief method for individuals.

3. Meditation

Mindfulness Meditation is long recognized by people as a type of activity that is beneficial for mental health. And in terms of the current pandemic environment, some countries are still adopting a strategy of trying to zero out new coronaviruses. Measures taken include restricting people from traveling and quarantining. These measures add to the anxiety and stress of the population and make it difficult to treat people who are already suffering from anxiety in a timely manner. At this time, mindfulness meditation, as a time- and place-neutral therapy, can be very helpful in relieving stress and maintaining mental health. Many researchers have published various articles on this topic of mindfulness meditation as a possible medium for alleviating anxiety and anxiety disorder. Articles that got analyzed mainly come from some authoritative websites. The overall result shows that meditation is effective in alleviating stress and anxiety by physically changing the human body. From multiple medical researches there are some ways which meditation can modify brain and endocrine system.

The first way meditation biologically changes the human body is by reducing ACTH. Mindfulness meditation can reduce the stress hormone ACTH and cortisol in the body. In an experiment conducted to measure the relationship between ACTH and cortisol level and meditation, scientists measured the ACTH levels after a period of mindfulness meditation. The result shows that the ACTH and the cortisol level of the experimental group of people dropped after a period of Mindfulness Meditation [7]. ACTH is the human body's main stress hormone, a lower level of ACTH indicated the reduction of stress. In addition, numerous health issues, including anxiety, have been related to persistently high cortisol levels. Mindfulness Meditation will also have an impact on the prefrontal and cingulate cortex which are the main part of the HPA axis. A period of mindfulness meditation can increase the activity of the prefrontal cortex, especially the dorsolateral and dorsomedial cortex. Prefrontal cortex is the part of the brain that regulates the release of dopamine, serotonin, and norepinephrine. As mentioned above, these neurotransmitters are closely related to the level of anxiety. Norepinephrine is the

neurotransmitter that regulates the body's arousal and serotonin is the neurotransmitter that regulates mood. By comparing the functional magnetic resonance imaging (fMRI) of participants before mindfulness meditation and after eight weeks of mindfulness meditation, researchers find out that the prefrontal cortex and cingulate cortex activity increased [8]. The increase in activity of the prefrontal cortex will lead to more serotonin and norepinephrine secretion, which will alleviate stress and anxiety. Mindfulness Meditation can also affect the amygdala. Mindfulness meditation would decrease the activity of right amygdala-sgACC. Higher activity of the right amygdala-sgACC is considered to be a sign of stress and anxiety. An exploratory research showed that the decreased activity of amygdala-rsFC lead to less hair-derived markers of cumulative HPA-axis. Furthermore, this research also showed that after a period of mindfulness meditation intervention, the activity of right amygdala-sgACC rsFC decreased in sample of stressed community adults [9]. Another area of the brain that is affected by meditation is the insula. It is believed that the insula, a part of the brain, is involved in a number of cognitive and emotional processes, including stress. According to a study, people who regularly practice mindfulness meditation have more grey matter in their insula than those who don't. This implies that practicing meditation may result in structural alterations in the brain that could lessen stress [10].

4. Conclusion

Meditation can have physiological effects on people. Firstly, meditation can reduce the stress hormone ACTH in the human body, thus relieving stress. Secondly, meditation activates prefrontal cortex and reduces amygdala activity, thus reducing stress. The grey matter of the insula also found to be increased after mindfulness meditation which demonstrated a sign of stress relief. The implication of this paper is to provide a potential way for people affected by the epidemic or control measures to relieve stress or reduce symptoms of anxiety disorders. Most of the papers or studies on the physiological effects of mindfulness meditation on authoritative websites have only been studied on a very limited number of people. This makes the results of the experiments not very credible in terms of generalization. Future studies may choose to expand the size of the experimental group to make the results more generalizable.

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