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Efficacy of Yoga in Coping with Mental Health Issues due to COVID-19 Pandemic: A Review

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ABSTRACT

The world was shocked with the sudden outbreak of a virus in the early 2020 destroying lives and livelihoods of millions across the globe. The COVID-19 pandemic with its epicentre in Wuhan, China spread across the globe like a fire. To restrict the further spread of the virus, nations around the world went into complete lockdown restraining people from any movements outside their homes. The government imposition saved people from the dangerous virus but had a crucial impact over many people's livelihood, employment and thus creating mental health problems. Many non-governmental as well as non-profitable organizations have tried their best to help humanity in the best possible ways to keep them engaged and also support their livelihoods. However, the need of the hour is to equip oneself with a good mental and physical health in these dark hours. Ancient Indian practices like yoga and meditation are proven tools to cope with misery, fear and anxiety during such times of despair. Their benefits encompass both physical health such as improving immune functions and activating parasympathetic activity, and mental health benefits like overcoming anxiety, depression and insomnia. This review highlights the benefits of yoga practices in combating the mental health issues faced by individuals due to lockdown, loss of near or dear ones and unemployment and highlights its role in improving wellness during the pandemic.

Key words: COVID-19 pandemic, Mental health issues, Stress, Yoga therapies, Socio-economic crisis.

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INTRODUCTION

Coronavirus disease (SARS-CoV-2) is a highly infectious respiratory tract infection which caused a global public health emergency as declared by the World Health Organization on the 11th of March, 2020. As of August 5, 2021 India reported a total of 31,812,114 cases with many states of India affected majorly (World Health Organization, 2021). The pandemic has impacted humankind in unprecedented and monumental ways, striking at their physical, mental and financial stability. During the health crisis and social isolation norms, many individuals lost their livelihood causing financial burden and insecurity.[1] More than 30 million jobs have been lost around the world.[2] This economic crisis has resulted in many mental health complications among individuals, especially those who have lost their job.[3] This scenario is intensified among those suffering from loss of near and dear ones along with the financial strain or those with preexisting psychiatric disorders. [4] A report by the International Labor Organization on 29th April, 2020, stated that nearly 1.6 billion informal economy workers out of the total 2 billion workforce suffers a severe hit to their livelihood due to the pandemic.^[5] The Indian economy suffered a

big setback, with the growth rate falling to 1.9 in the year 2020. $^{\rm [6]}$

According to a survey on MSMEs (Micro, small and medium enterprises) in three states of India, Maharashtra, Tamil Nadu and Uttar Pradesh, 92% of the owners faced severe reduction in their incomes while 45% of the enterprises dismissed their workers either temporarily or permanently. Also, the ratio of women laid off was much higher (30%) than the men (24%). Laborers from Maharashtra were affected the most, with 61% losing all the income they earned and their mode of income.^[7]

Given the situation, it is obvious that the pandemic has also posed a great threat on global mental health. Job insecurity, not being able to look after the family, providing shelter and food to oneself and dependents are a few of the major concerns. It was noted that, apart from the loss of income, unemployment is also accompanied by loss of social circle, status and competence. Therefore it leads to deterioration of both mental and physical health. Two independent studies in the United States and Israel studied the association of income loss and anxiety and depression levels among 4000 subjects. The results indicated a positive correlation of income loss and financial strain with depressive symptoms

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among the subjects. Follow up after a month highlighted worsening of the symptoms among those with financial strain. A study reported an increase of 9750 deaths in the scenario with an increase of 0.7% in the unemployment rates. The World Health Organization states that for every completed suicide, there would be more than 20 suicide attempts. Therefore, the numbers of mentally distressed people would be much higher than actually reported. This review highlights the importance of ancient Indian practices such as Yoga in combating insecurities and mental health issues faced during the COVID-19 pandemic, with special focus on mental health conditions among the unemployed.

Coronavirus disease spreads by human-to-human transmission, mainly by respiratory droplets and surface contact.[10] The incubation period of the virus is 2-14 days with presenting symptoms of cough, fever, cold, loss of taste/ smell, shortness of breath. The virus is inoculated into the nasal passage by respiratory droplets containing virus particles.[11] The virus uses its spike proteins to bind to ACE-2 protein of ciliated cells, inoculates itself inside and multiplies.[11] In the trachea and further down in the lung, they attach to lung cells mainly type 1 & II pneumocytes that help in gas exchange.[11] The body's innate immunity comes into action to destroy the virus infected cells. They secrete many inflammatory products that cause capillary permeability causing the fluids to enter in the alveolar space. Increase in surface tension between the cells and alveolar collapse decreases gas exchange, leading to reduced oxygen concentration and shortness of breath. The virus particle debris that accumulates in the alveolar space causes mechanical irritation and cough (Figure 1).[12]

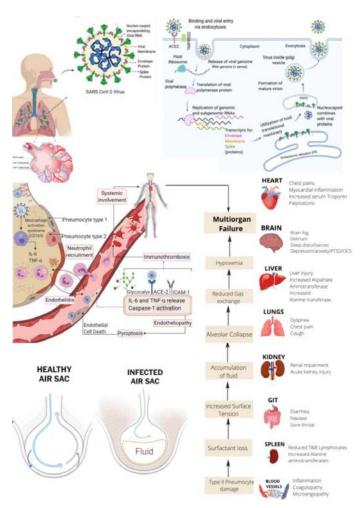


Figure 1: Immuno-pathology of SARS-CoV-2.

The world, however gained its first milestone in the fight against Coronavirus at the end of 2020 with the development of vaccines against the virus.

NEUROBIOLOGY OF STRESS RELATED TO COVID-19

The stress induced by the pandemic has been more threatening to the humankind than the disease itself. There exists a bi-directional relation between neuropsychiatric symptoms and the immune response, and this interaction is the subject of the field of Psychoneuroimmunology. The presence of continuous immune inflammatory markers can lead to neuro-psychiatric symptoms.^[13] On the other hand, psychological morbidity such as depression and stress are also associated with increase in pro-inflammatory cytokines like IL-1β,[14] Interleukin-6 (IL-6). Research studies have noted an increment in Tumor Necrosis Factor-α (TNF-α) and C-reactive protein (CRP) among psychiatric patients during the pandemic.^[15] SARS-CoV-2 can also affect the brain tissue by causing a cytokine storm, which is believed to have an impact on neurological and psychiatric symptoms. However, it still remains unclear whether the COVID infection actually impacts inflammation and mental health independently, or if they affect each other. [16] Also, several viral infections can cause encephalitis, peripheral organ dysfunction and cerebrovascular changes that present with psychiatric disorders.[17] A study noted that one third of COVID infected patients had symptoms related to the peripheral nervous system. MRI and EEG scan showed larger leptomeningeal spaces in 62% and ischemia in 15 % of the patients.[18]

On the other hand the socio-economic, loss due to the pandemic and pandemic imposed lockdown has impacted the mental health of the individuals. The pandemic has led to rise in anxiety, depression and other associated mental illnesses. [19] The fear and anxiety leads to distorted inconclusive thoughts that reduce rational thinking and lead to negative conclusions. [19] The viral pandemic caused significant unemployment, lack of social gathering, lack of leisure activities that led to a wave of desperation, rejection and further personality disorders. [19] The mental health of the health care professionals was also more compromised than ever before during the COVID crisis. [20] A UK based study reported the crucial role of well-being maintenance among the health care workers during the pandemic given the extreme burnout. [21] Another leading cause of mental morbidity among individuals was the social stigma for COVID infected people, COVID treating health care workers and other frontline workers. [22]

Role of Ancient Approaches in Combating Mental Health during COVID-19 Pandemic

Worldwide, holistic approaches like exercise, pranayama, breathing techniques and meditation have played an immense contribution in improving health naturally. However, the global situation due to pandemic has brought these ancient Indian practices back in the spotlight. A study on a tele-yoga intervention for stress management during the pandemic revealed that the stress levels among tele-yoga practitioners reduced by 30% after the intervention. [24]

Among the components of yoga, the most commonly used components are asana (postures) and pranayama (regulation of breathing). Pranayama is possibly the most important component for dealing with stress and anxiety. "*Prana*" is understood as breath or the subtle life force energy in the body. "*Ayama*" is controlling the motion of this energy. Pranayama consists of three processes: inhalation, retention and exhalation. [25] The easiest way of getting control of the breath is through *prana* and hence we seek to control the movement of the breath in and

out of the body during the pranayama.^[25] The goal of any pranayama is to maintain the harmony of the body, mind and spirit.^[25] Oxygen content increases in the body during pranayama, which activates the brain cells and helps remove toxins from the body.^[26] The mind gets relaxed with slow, focused and long inhalation and exhalation which increases the parasympathetic activity.^[27] Diaphragmatic and abdominal muscles are efficiently used during pranayama and thus the respiratory efficiency and alveolar ventilation gets improved. The pressure is reduced to the maximum extent inside the thoracic muscle cavity by maintaining a quiet inner state, and the resulting pressure inside the thoracic muscle cavity is less than the atmospheric pressure.^[28] According to the principle of siphon, this causes an automatic flow of air.^[28]

Research has shown improved quality of sleep with some practices like Bhramari pranayama. [29] Further, several studies during the pandemic have evaluated the efficacy of mindfulness and meditation in improving mental health. A study was conducted to evaluate the impact of Mindfulness Meditation intervention on levels of Depression, Stress, Anxiety and the participant's motivation and experiences were recorded. Results of the study showed significant improvements in reducing the severity, anxiety and stress symptoms. The study provided evidence in support of the effectiveness of Mindfulness Meditation and suggested low intensity intervention for modulating negative psychological states through easily accessible non-physical contact training modules.^[30] In a study employing self-reported mental health and anxiety measures, a significant reduction (nearly 50%) in negative impact of the pandemic on the mental health of Sudarshan Kriya (a specific yoga breathing technique) practitioners compared to the general population was observed. This strengthens evidence that yogic methods can be highly effective in maintaining mental well-being, even during difficult situations and hardship.[31] Another study on health care professionals working on the frontlines during the COVID 19 pandemic, reported a 36.84% decrease in stress, 27.39% decrease in anxiety and 46.75% decrease in depression after 40 days of Sudarshan Kriya practice. [32] A cross sectional study which investigated the level of mental well – being among the general population and its association with the practice of yoga and meditation during Covid-19 pandemic showed higher levels of well-being among people who practiced both yoga and meditation followed by practice of only meditation and then only yoga. The authors also found an association of yoga and meditation practices with changes in eating, sleeping patterns and family relationships. The study highlighted the effects of regular practice of yoga and meditation in improving mental well-being during the pandemic.[33]

Possible Mechanistic Basis of Yoga Improving Resilience to Stress

Pranayama exerts a salutary influence on stress-induced immune dysfunction which is responsible for the inflammatory response in COVID 19 patients.^[34] A study noted that yoga practitioners had better endurance, less fear, stress and anxiety than non-practitioners. [35] Yoga modulates the autonomic nervous system (to decrease the sympathetic or enhance the vagal activity to maintain balance), hypothalamic-pituitaryadrenal system, reduces the stress hormone cortisol and improves immunity which is indicated by decrease in heart rate, CD4 cell count, fasting blood glucose, and low-density lipoprotein levels. Therefore, people practicing yoga had better stress coping ability under lockdown. (Figure 2).[36] A study on effective strategy for self-management through yoga during lockdown revealed that the yoga practitioners significantly differed in their perception of personal control, illness concern and the emotional impact of COVID19. Evidence supports that yoga was an effective self- management strategy to cope with stress, anxiety, depression and maintain well-being during the COVID-19 lockdown. [37]

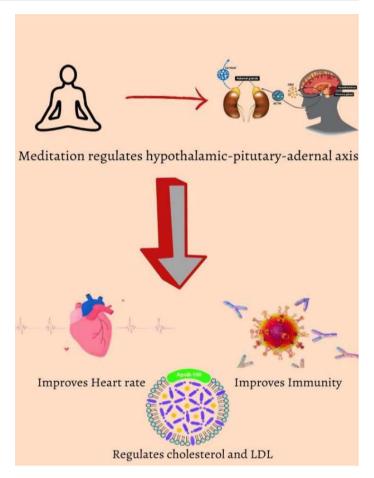


Figure 2: Correlation of hypothalamic pituitary adrenal axis with meditation.

Pranayama and Dhyana practices have various benefits like balancing the neuroendocrine system, improving the immune function, and stimulating the vagus nerve which is a critical factor in stress-induced disorders. [38] Autonomic dysfunction (increased sympathetic activity and decreased parasympathetic activity) is well-demonstrated in many neuropsychiatric disorders and a growing body of evidence suggests a role for yoga in improving parasympathetic function by vagal nerve stimulation. [39] Studies have also highlighted the shaping of new neural pathways among regular yoga practitioners. Yoga practice enhances activity in the pre-frontal medial cortex which is responsible for intuitive abilities, empathy, cognition and apprehension, improvements in these abilities are commonly noticed benefits of practicing yoga. [39] Yoga-based interventions have been used as non-pharmacological interventions in subjects with post-traumatic stress syndrome to deal with issues like stress and fear.[40] The human body tends to achieve homoeostasis by maintaining a balance between neural, endocrine and immune systems. However, when the balance between the three systems is altered due to physical or environmental factors, a mental or physical disorder is created. This balance can be usually restored by the practice of yoga. [41] Another study stated a lack of physical activity as one of the reasons for increased stress, insomnia and anxiety during the quarantine period. Moderate to intense home based activities like dancing, exercise and yoga can channelize energy among the youths and teenagers to improve both mental and physical functioning during these times.[42] Amelioration of stress, anxiety and lethargy due to the work from home lifestyle may be achieved by practicing yoga. [43] The different dimensions of Yoga help an individual to effectively deal with stress by changing the outlook of the person and also enable the person to respond without stressing the sympatho-adrenal axis.^[39]

CONCLUSION

The world is in despair with the COVID-19 pandemic affecting of individuals' livelihoods, family and also growth of individuals. The impact of the situation on mental and physical well-being has been severe. This brief review presents an overview of the effects and mechanisms of a holistic approach including yoga, pranayama, and meditation in helping to handle the stress, anxiety and uncertainty during this crisis.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

TNF-α: Tumor Necrosis Factor-α; hsCRP: High Sensitive C-reactive protein.

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