







An Insight into Ayurveda and Yogic Practices Sustain Physical and Mental Health in COVID-19 Pandemic

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Abstract: The worldwide public health disaster caused due to a viral outbreak of the coronavirus disease 2019 (COVID-19 or SARS-CoV-2) challenges the entire healthcare system. The COVID-19 is a highly pathogenic viral transmittable infection that causes the severe acute respiratory syndrome. It is a kind of pneumonia virus and the third type of coronavirus after severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS). In December 2019, the third coronavirus was discovered in patients with infectious respiratory disease in the capital city Wuhan, Hubei province, and initiate a global pandemic. It has a very high human-to-human transmission ability, which results in spread rapidly all over the world. Today's necessary to understand the physiopathology of COVID-19, which causes a global pandemic and infects more than 136 million people. The COVID-19 genome sequence is similar to the other two coronaviruses, with about 80% sequence identical with SARS-CoV and about 50 % with MERS-CoV. Remarkably, COVID-19 has a 90% similar whole-genome sequence with bat coronaviruses. The worldwide mortality rate of COVID-19 is 1 to 2%. Ayurvedic remedies; yogic practices like yogasanas, breathing pranayama, and meditation; other traditional Indian practices include decoction and drinking of herbal remedies. The Ayurveda, Yogic science, and other ancient practices boost the immune system, improve lung function, improve physiological strengths, normalize cognitive functions, and reduce the pandemic's community speeding. Ayurvedic remedies and yogic practices help to cope up with the COVID-19 pandemic. Yoga and ayurvedic were elements of daily routine practices of peoples in ancient times to keep themselves healthy.

Keywords: COVID-19; Ayurveda; Yogic practices; pandemic; health; ancient Indian practices.

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1. Introduction

In December 2019, the global pandemic outbreak of SARS-CoV-2 in Wuhan, the capital city of Hubei province, spread dramatically into Wuhan city, with an ongoing risk of a global pandemic [1]. On 30th January 2020, the World Health Organization (WHO) declared

the public health emergency of international concern with the outbreak of SARS-CoV-2 and confirmed SARS-CoV-2 had a stronger transmission capacity related to an outbreak of SARS in 2003. On 11th February 2020, the WHO officially named the disease caused by the nCoV-2019 as a novel coronavirus disease COVID-19. The indexes of COVID-19 confirmed cases increased rapidly in the world [2]. The public mindset to obey strict lockdown, self-discipline quarantines could slow down community spread which correlates with how much people trust WHO, state and center governments health ministry advisory regarding health care [3]. SARS-CoV-2 belongs to the β -coronavirus family. COVID-19 is the third known zoonotic disease, after the severe acute respiratory syndrome (SARS-2003) and the Middle East Respiratory Syndrome (MERS-2012), both belonging to the β -coronavirus family [4]. It is a highly identical genome to bat coronavirus, pointing to bat as the natural host. Likewise, SARS-CoV-2 also uses the identical receptor, angiotensin-converting enzyme 2 (ACE₂) [5]. The COVID-19 pandemic type of global challenge transcends territorial, political, ideological, religious, cultural, and academic boundaries [6].

Yoga and ayurvedic were daily routine practices of people in ancient times to stay healthy. These traditional practices help to improve immunity, body physics, and mental stability. The coronavirus outbreak is not the first on the globe. There were many pandemic viral outbreaks reported in history. In ancient times, these practices helped to cope up with pandemic viral outbreaks. The worldwide pandemic crisis has affected every individual. The yogic practices and Ayurveda help a sustainable and holistic lifestyle enrichment in any pandemic situation. The relation between ancient Indian practices and human health illustrated in Figure 1.

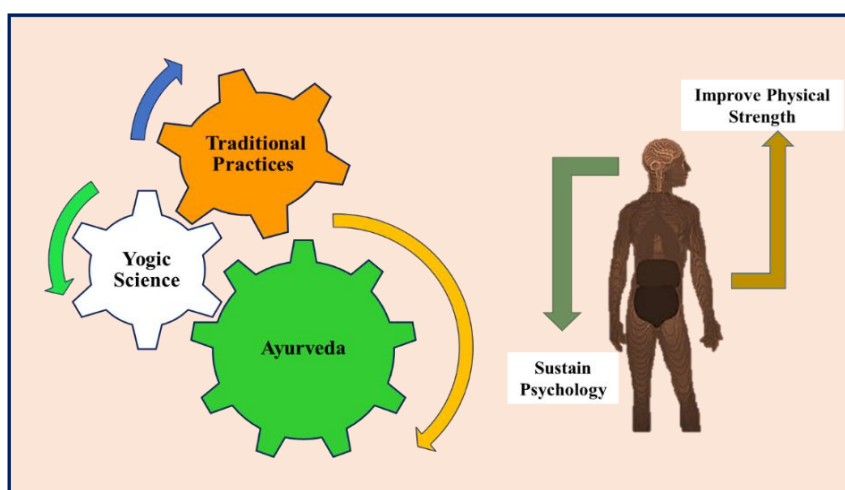


Figure 1. Ancient Indian practices and human health.

The present study's outline emphasizes all these practices with scientific reports and correlates their use for humankind to prevent themselves from pandemic viral outbreaks. The Yogic practices include yogasanas, breathing pranayama, a balanced diet, and meditation to help regain physiological and emotional stability. The ayurvedic herbal remedies help to improve the immunity of the system. The traditional routine practices decrease community spreading of this pandemic global outbreak like COVID-19. The review here focuses on scientific study and the use of ancient Indian methodologies to cope with the pandemic outbreak COVID-19 by balancing physical and mental health.

2. Yogic practices

Yogic practice is a traditional Indian culture from ancient times and is considered the science of holistic living. The word yoga derived from the Sanskrit word 'Yuj' means 'to join' and indicates the consolidation of mind, body, and spirit. In today's era, the basic concept of yogic science and its influence on physiological function is ignored by the scientific community [7]. Yogic science deals with non-physical control centers' spiritual anatomy, called 'chakras', and attaining mastery over yogasanas influences particular glandular secretions. All these aspects help to control the mental and physiological function of the body [8]. The yogic practices (yogasanas, breathing pranayama, meditation, diet) might be optimized issues related to psychological and physiological health. The yogasanas, breathing pranayama, meditation, and a balanced diet are the elements of yogic practices.

2.1. *Yogasanas.*

According to a study of numerous ancient documents, there are 84 yoga poses acknowledged and granted by Lord Shiva. The broad spectrum of research demonstrating physiological benefits of various yogic practices (yogasanas) includes modification on blood pressure in prehypertensive case [9], improved mental and cognitive functioning, and lower levels of depressive symptoms, which is accompanied by an increase in telomerase activity suggesting improvement in stress-induced cellular aging [10], anti-aging, cognitive-behavioral practices [11], heart rate variability (HRV) [12], central nervous systems (CNS) [13] and cardiovascular [14]. The Yogic Science was part of an ancient lifestyle to achieve physical and spiritual harmony in life evolved in the Indian peninsula 5000 years ago [15]. The yogic practices include meditation, yogasanas, breathing pranayama, and a balance diet [16]. The therapies and diagnosis based on the pulse (Nadi) and analysis of Tridosha state (physical and emotional govern the function of our bodies on three fundamental energies level) of an individual suggest meditative yogic exercises to improve health issue [17].

2.2. *Meditation.*

Mindfulness meditation improves physical and emotional health, reported benefits to include flexibility in cognitive, affective, and social function [18], emotional intelligence (EI), perceived stress and negative mental health [19], anxiety [20], self-efficacy [21], improving school climate [22], improved cognition [23], alterations in the brain [24] and immune system [25]. The meditation practice helps maintain emotional stability and stress in the complete lockdown and home quarantine process.

2.3. *Pranayama Breathing.*

Yogic manuscripts define the 'Prana' is a dynamic strength that runs through distinct 'chakras' and 'nadis' in the system to retain the body healthy, stimulated, and rejuvenate. Pranayama Breathing plays an extremely pivotal role in the depiction and conservation of Prana. Yogic Pranayama breathing exercises are the practice of voluntary breath control in which the rhythm of inhalation (breathing in), retention (Kumbhaka or retention of the breath in the hatha yoga), and exhalation (breathing out) are consciously controlled [26]. The reported benefit of Pranayama breathing includes improving physical and mental fitness includes anxiety disorder in cardiovascular diseases patient [27], respiratory function [28], improvement

in asthma patients [29], significantly reduces the indices of ventricular repolarization dispersion in patients with arrhythmia [30], a significant reduction in blood pressure [31] and boost immune function [32].

2.4. Immunity boosting Indian food.

It is one of the most important ways to stay healthy to strengthen immunity. Indian culture rich in biodiversity, having diverse food patterns. The great diversity in food patterns that are consumed daily makes Indian diets distinct from other countries. In routine Indian diets, cereals, millets, pulses, legumes, vegetables, fruits, and spices [33]. The traditional Indian food guidelines are prescribed in Ayurveda. The Indian diet has many similarities in Ayurvedic dietetics. It is also coined as Ayurvedic foods [34]. Ayurveda is a traditional system of medicines in India. Ayurveda illustrates how an individual can improve by establishing the connection between life elements, food, and body. Food is responsible for different aspects of an individual, including physical, temperamental, and mental states. To stay healthy, maintaining a stable, healthy diet routinely is essential [35]. The nutritional values of foods are enhanced by various traditional processing such as sprouting, malting, and fermentation [36].

Indian immunity-boosting balanced diet includes green leafy vegetables, apricots, berries, green peas, sprouts, yogurt, and honey. These food materials contain many immunity-boosting nutrients like vitamins, water-soluble and insoluble fiber, flavonoids, protein, folate, potassium, iron, zinc, magnesium, calcium, carotenoids, which helps to boost and improve immunity.

3. Ayurveda

Traditionally, herbal-based medicines were used to treat many human diseases for thousands of years in India, Egypt, Greece, and the Middle East. The traditional Indian medical model is known as Ayurveda.

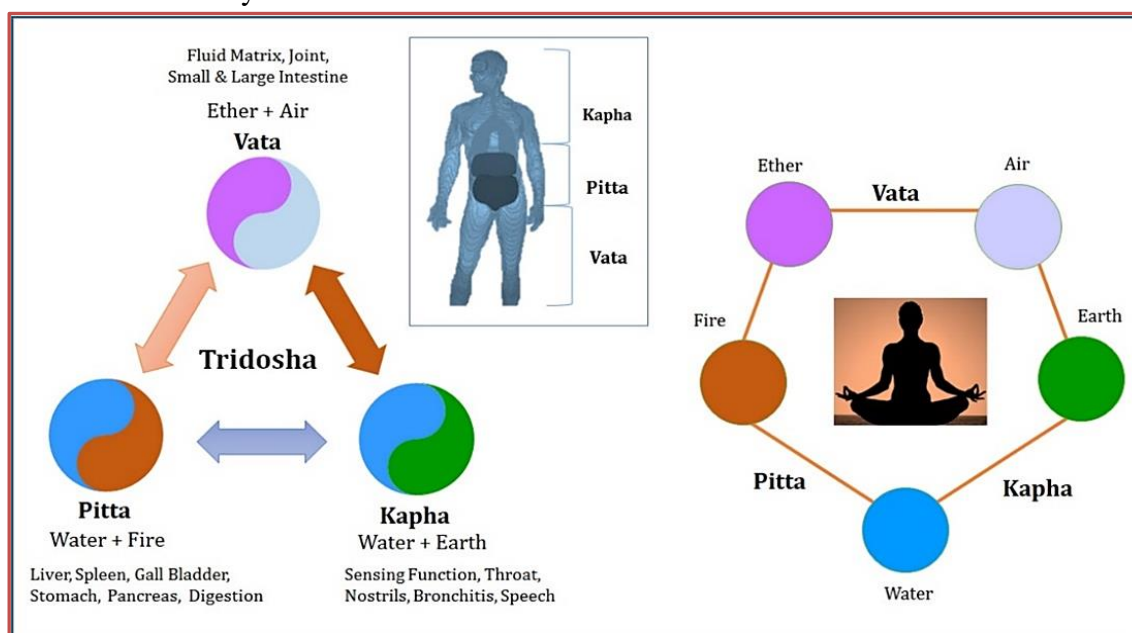


Figure 2. Tridosha, Prakriti and related diseases relation.

Ayurveda is one of the worldwide accepted oldest traditional medicine systems in India. The ancient wisdom in this traditional medicine system includes rich knowledge leading to new avenues in the herbal drug. Ayurveda has also allowed its vast documented knowledge of <https://nanobioletters.com/>

clinical practices, formulations, and medicinal plants [37]. Natural products from plants, animals, marine life, fungi, bacteria, and other organisms are important for modern drug discovery. The major classes of antibiotics like Penicillin's to Biaxin (Clarithromycin), Difidid (Fidoximycin), Zithromax (Azithromycin), and Erythromycin and classes of few antifungals drugs such as polyenes and echinocandins rely on natural product isolation from microbes and natural resources [38].

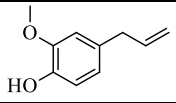
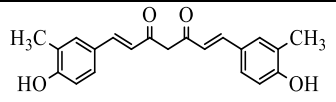
3.1. Introduction to Tridosha and Prakriti (nature).

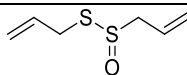
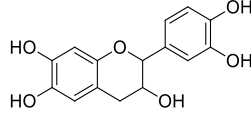
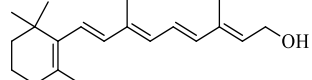
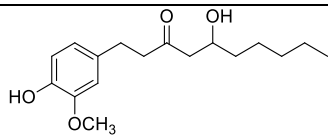
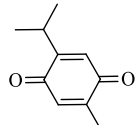
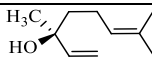
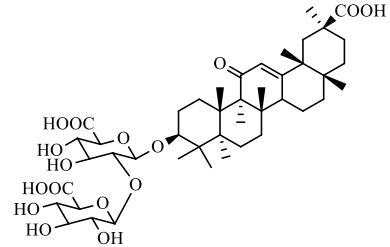
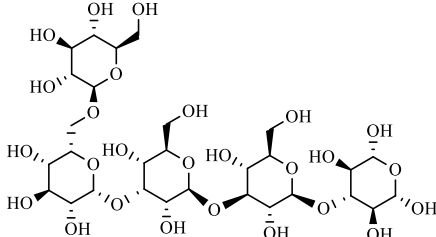
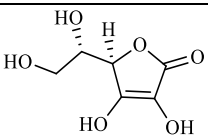
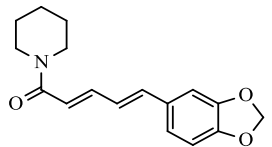
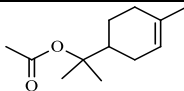
Ayurveda trusts that the complete universe is composed of five elements: Vayu (Air), Jala (Water), Aakash (Space or ether), Prithvi (Earth), and Teja (Fire). These five elements (referred to as Pancha Mahabhoota in Ayurveda) are believed to form the human body's basic senses of humor in variable combinations. The diagnosis of disease in Ayurveda, the traditional medicine of India, is based on the concept of three major constitutional types Tridosha includes Vata, Pitta and Kapha defined as "Prakriti" and they control the basic physiological functions of the body, it is briefly illustrated in Figure 2 [39]. According to the World Health Organization (WHO) reports, herbal remedies are still used by up to 70-80 % of the world population [40]. Although the Indian Government lists 106 traditional medicines, mainly Ayurveda, Yoga, Unani, Siddha, and Homeopathy (AYUSH) are taught in selective universities [41]. The Ayurvedic insight, Charaka Samhita, described nine yonis (source of fermentation), viz. Phala (fruits), Dhanya (cereals), Mula (roots), Pushpa (flowers), Twak (bark), Sara (exudate), Kanda (branches), Patra (leaves), and Sharkara (sugar) for formulation and making of herbal medicine and Ashtanga Hridayam is primary ancient root texts of Ayurveda includes philosophy Ayurveda, the protocol of medicine and therapy and providing clear guidelines in all aspects of medicine and diagnosis of health [42].

3.2. Immunity boosting herbal remedies.

According to Ayurvedic science, the COVID-19 pandemic disease deals with Kapha, which is made up of water and earth. The Ayurvedic science helps to improve the immune system of the body, and controlling Kapha could be done by few herbal remedies includes drinking of turmeric (*Curcuma longa*) [43], Tulsi (*Ocimum sanctum*) [44], Garlic oil (*Allium sativum*) [45], Green tea (*Camellia sinensis*) [46], drumsticks (*Moringa oleifera*) and beans (*Phaseolus vulgaris*) [47], onion (*Allium cepa*) [48], ginger (*Zingiber officinale*) [49], Cumin (*Cuminum cyminum*) [50], Coriander (*Coriandrum sativum* L.) [51], Jeshthamadh or Liquorice (*Glycyrrhiza glabra* L.) [52], Heart-leaved moonseed or Gulvel (*Tinospora cordifolia*) [53], Amla (*Phyllanthus emblica* L.) [54], Black pepper (*Piper nigrum* L.) [55], Majdalawieh and Elaichi (*Elettaria cardamomum*) [56]. The Prophylaxis and immunity-boosting active components/ingredients present in these medicinal plants are listed in Table 1.

Table 1. Immunity-boosting bioactive components present herbal remedies.

Sr. No.	Medicinal plants	Main Active components	Structure	References
1	<i>Curcuma longa</i>	Curcumin		[43]
2	<i>Ocimum sanctum</i>	Eugenol		[44]

Sr. No.	Medicinal plants	Main Active components	Structure	References
3.	<i>Allium sativum</i>	Allicin		[45]
4.	<i>Camellia sinensis</i>	Catechins		[46]
5.	<i>Moringa oleifera</i>	Vitamin A		[47]
6.	<i>Zingiber officinale</i>	6-Gingerol		[49]
7.	<i>Cuminum cyminum</i>	Thymoquinone		[50]
8.	<i>Coriandrum sativum L.</i>	Linalool		[51]
9.	<i>Glycyrrhiza glabra L.</i>	Glycyrrhizin		[52]
10.	<i>Tinospora cordifolia</i>	(1,4)-α-D-glucan		[53]
11.	<i>Phyllanthus 2923mblica L.</i>	Vitamin C		[54]
12.	<i>Piper nigrum L</i>	Piperine		[55]
13.	<i>Elettaria cardamomum</i>	alpha-terpinyl acetate		[56]

3.3. Other immunity improving medicinal plants.

The immune-boosting is an alternative remedy to cope up with any influenza. The ancient people used herbal remedies for improving and boosting the immune system. In the studies reported, immune-boosting Ayurvedic herbal remedies include *Amandla impilo* immune booster widely used South African herbal remedies [57], *Avandula angustifolia* [58], *Moringa oleifera* treatment increases Tibet expression in CD4⁺ T cells and remediates immune

defects of malnutrition [59], *Malva sylvestris* [60], *Mentha longifolia* [61], *Elephantopus scaber* [62], *Passiflora Incarnata* [63], *Xanthophyllomyces dendrorhous* [63] and *Cirrhhina mrigala* [65].

3.4. Antiviral medicinal plant.

In the history of humanity, many infectious diseases have been treated with herbals. Traditional medicine is increasingly solicited through the trade-practitioners and herbalists in the treatment of infectious diseases. Plant-based medicines exhibit potent antiviral activity, including medicine against herpes simplex virus type 1 (HSV-1) [66], ethanolic extract of *Nilavembu Kudineer* against dengue and chikungunya virus, anti-hepatotoxic, *Cyperus rotundus* against anti-hepatitis B virus, and hepatic CYP450 [67], Triphala is tri-fruits equal proportions (1:1:1) mixture of the dried fruits of *Emblica officinalis*, *Terminalia belerica* Linn and *Terminalia chebula*) in against treatment of Hepatitis A [68], *Areca catechu*, *Eugenia jambohnu*, and *Saruca indica* extract against human immunodeficiency virus type 1 (HIV-1) protease [69], *Strobilanthes cusia* Leaf against Human Coronavirus NL63 [70], silymarin against EV-A₇₁ [71], Isatidis Radix derived glucosinolate isomers against influenza A [72], and *Polyalthia longifolia* leaves extract against paramyxoviruses [73].

3.5. Ayurveda can cure serious diseases.

Diseases that may be cured by Ayurvedic medicine include allergic and inflammatory [74], Alzheimer's disease [75], cancer [76], cardiovascular disorders [77], malaria and dengue [78], ischemic stroke [79], diarrhea [80], tuberculosis [81] and cirrhosis [82].

4 Traditional practices

The ancient culture is a model of an integrated pattern of healthy life learned beliefs shared among the community, including thoughts, patterns of interaction, lifestyle, views, relation, practices, ethics, and values.

4.1. Drinking of traditional beverages and decoction.

Tea and coffee are generally consumed beverages throughout the globe, and they are rich sources of polyphenols. Polyphenols impart antioxidant property which is beneficial against diseases like cancer, cardiovascular diseases, and aging [83]. Medicinal plants are gradually explored in the food industry for their health-promoting benefits in herbal teas, such as *Matricaria chamomilla* (chamomile), *Cymbopogon citratus* (lemongrass) *Aloe vera* (aloe), *Aspalathus linearis* (rooibos) [84]. Beverages like tea, coffee, and decoction boost immunity, mood, and health.

4.2. Say NAMASTE avoid handshake and hugging.

Avoid handshakes and hugs. Simply say 'Namaste', which will help to maintain social distance and physical contact. Physical contact is a leading cause of the spread of the COVID-19 viral outbreak.

4.3. Clean drinking and hot lemon water.

Warm water helps in the muscles' process of contraction and relaxation and helps prepare the muscles for better movement. In the case of drinking water, touching of lips to the container (bottle) causes oral transmission of influenza to another person who comes in contact with the container. Drinking water slowly, sip by sip, helps avoid the spread of COVID-19 via usual drinking habit. Citrus fruit having many health benefits consist of various bioactive components viz., iso-limonene, citral, limonene, phenolic, flavanones, vitamin C, and pectin [85].

4.4. Common prayers and funeral ceremonies are attained in Indian tradition.

In Indian culture, the Hindus have small temples in the house for prayers of God. Generally, they involve the common prayers which protect them from the transmission and spreading harmful bacterial and viral disease. Also, in the Hindu tradition, those involved in attaining funeral ceremonies prioritize self-sanitization by taking a shower and washing clothes worn without touching anything in the house. These traditional methods control the spread of harmful influenza-like coronavirus.

4.5. Removing footwear outside the house.

Removing shoes before entering the home has advantages such as reducing dirt and dust in the home, lessening housework and cleaning, minimizing the introduction of diseases like COVID-19, and decreasing the transport of diseases from one place to another [86].

4.6. Take spices in a routine diet.

Spices take a significant place in the common person's routine due to their flavor, taste, and medicinal values. In the recent few decades, the major community focuses on using spices to treat many illnesses and health-benefit. The spices like cinnamon, ginger, fenugreek, cumin, black pepper, curry, mustard, anise, onion, and ginseng are potent biological activities used to cured many diseases [87]. Including few spices in the routine diet is beneficial to the immune system and health, as it strengthens us to fight against diseases like COVID-19.

Table 2. Summary of all practices to improve physical and mental health.

Class	Protocol	Response	Reference
Mediation	Listening to relaxation music for 12 min per day for 8-weeks	Lower levels of depressive symptoms and greater improvement in mental health	[10]
Yogic practices	Yogasanas, breathing exercises, different cognitive tasks	Physiologically significant changes in heart rate variability	[12]
Yogasanas	Advice yoga to patients with inactive ulcerative colitis and impaired quality of life at weeks 0, 12, and 24 intervals	Lower the perceived stress and the disease activity	[14]
Yogic practices	8-week yoga program included two 90-min yoga classes and five 30-min home sessions per week	Improved physical function, enhanced mental or emotional state, enriched sleep quality	[17]
Mediation	20 min regular daily practice of either concentrative, mindfulness, or integrated meditation	Mindfulness meditation training demonstrated significant improvements	[19]
Meditation	Mindfulness meditation for weeks to months	Emotional intelligence, general self-efficacy, and perceived stress	[21]

Class	Protocol	Response	Reference
Meditation	Meta-analysis of morphometric neuroimaging in meditation practitioners	Meditation can alter brain structure	[24]
Meditation	two and a half hours spend time in meditation	Effects of meditation on how the brain and immune systems respond and stress	[25]
Pranayama	15-minute yogic breathing exercises practiced 5 times a week	Significant systolic blood pressure reduction in hypertension patient	[25]
Pranayama	Mild asthma practiced slow deep breathing for 15 minutes twice a day for two consecutive 2-week periods	control of breathing may contribute to the control of asthma	[29]
Pranayama	15-minute daily pranayama Breathing	Reduction in blood pressure	[31]
Pranayama	Yoga practice was with an instructor for 90 minutes once a week spread over 12 weeks daily at home for 40 minutes	Improves antioxidant status, immune function, and stress	[32]
Diet	The ideal combinations of traditional Indian diets include cereals, millets, pulses, legumes, vegetables, fruits, and spices	Health benefits	[33]
Herbal remedy	The leaves of Tulsi or its extract	Normalize the Kapha, Vata, fever, and antiviral	[44]
Herbal remedy	Garlic essential oil	Investigation into SARS-CoV-2 resistance	[45]
Herbal remedy	Golden milk of turmeric	Improve resistance power	[70]
Herbal remedy	Herbal desi-cava made-up of Tulsi, black pepper, ginger, gulvel, jeshthamadh, green tea, Cardamom, Asafoetida, Clove, and cinnamon	Improve immunity, cognitive and physiological functions	[83]
Water	Hot lemon water contains vitamin C	Improve immunity and physiology	[84]
Spices	Add spices in diet	Stimulate immunity	[87]

5. Discussion

This study retrieved the highlights of yogic and ayurvedic practices for balancing psychoneuroimmunology. The finding of ancient scientific information helps to understand ancient people's strategy to deal with an outbreak like COVID-19 with the help of yoga and Ayurveda practices. The yogic practices include yogasana, breathing pranayama, meditation, and a balanced diet to normalize psychological and physiological functions. The mindfulness meditation and breathing pranayama sustain mental and physical health, minimizing disorders like stress, anxiety, hypertension, and high blood pressure and immunity. Indian balanced diet boosts immunity due to the essential nutrients. The Ayurvedic practices are useful to improve the immunity of the system. The Ayurvedic remedies include golden milk of turmeric, decoction, desi-cava, tulsi leaves extract, and garlic extract. The traditional routine practices are useful to minimize the community spreading of the viral outbreak. Table 2 summarizes the applicability of yogic and Ayurvedic practices for the balancing of psychoneuroimmunology.

6. Conclusions

In the global pandemic of SARS-CoV-19, the general public suffers the issues related to cognitive and physiological health, including depression, anxiety, hypertension, stress, high blood pressure, weakening of body immunity, and cardiovascular functions. Review to understand how ancient people cope with an outbreak like COVID-19 with the help of yoga and Ayurveda. The symbolic suitability of ayurvedic remedies and yogic practices helps to boost immunity and regularize psychological function. The breathing pranayama improved the lungs' health (angiotensin-converting enzyme 2), reducing the threat of respiratory tract

infections. The mindfulness meditation normalizes psycho-neuro-immunity in the pandemic outbreak. The traditional routine practices are useful to minimize the community spreading of the viral outbreak.

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Conflicts of Interest

The authors declare no conflict of interest.

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