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Clinical Outcome in COVID 19 with Yoga and Naturopathy Intervention: A Systematic Review

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ABSTRACT
Exploring traditional Indian systems of medicine, such as Naturopathy and Yoga, can provide potential benefits in improving host immunity and mitigating the severity of the infection. Naturopathic medicine therapies focus on correcting underlying imbalances caused by sedentary lifestyles and require a comprehensive care plan to support long-term sustainable health and enhance immune function. This review aims to thoroughly investigate the recent scientific literature regarding the clinical efficacy of yoga and naturopathy in treating COVID-19 and to explore the proposed mechanisms underlying their ability to improve the host immune system. To gather relevant references, comprehensive searches were conducted in PubMed Central, Research Gate, Science Direct, Google Scholar, Scopus and MEDLINE databases from 2018 to 2023, using the keywords Naturopathy, Yoga, Covid-19 and India. The initial search yielded a total of 693 records. After applying specific inclusion and exclusion criteria, seven articles were selected for synthesis, comprising two case studies, one pilot study, three randomized controlled trials and one cohort study. The integration of naturopathy and yoga in conjunction with conventional modalities has shown promising results in effectively managing the severity of Covid-19. These findings highlight the potential benefits of incorporating these holistic approaches into treating Covid-19 patients.

INTRODUCTION

The Coronavirus emerged as a global pandemic, officially as per the World Health Organization on March 11, 2020[1,2]. Belonging to the Coronaviridae family, this virus causes respiratory infections such as severe pneumonia, which can be particularly fatal for immunocompromised and elderly individuals. Although it affects individuals of all ages, those with weak immunity and underlying health conditions tend to experience milder to moderate symptoms. The virus spreads through respiratory droplets expelled by infected individuals[3-7]. Implementing healthcare strategies that primarily focus on immune surveillance and resilience can significantly reduce the severity of the disease. These strategies aim to decrease inflammatory markers, enhance the activity of specific immune cells involved in COVID-19's pathogenesis and mitigate inflammatory responses[8]. While vaccination can induce specific immunity, strengthening overall host immunity remains crucial in preventing the spread of infection and reducing the potency of SARS-CoV. Exploring traditional Indian systems of medicine, such as Naturopathy and Yoga, can provide potential benefits in improving host immunity and mitigating the severity of the infection. Naturopathy is a subset of primary care medicine that combines ancient healing practices with contemporary research, emphasizing the body's inherent healing power, disease prevention and individual responsibility for optimal health. Its therapeutic techniques include diet and clinical nutrition, yoga, acupuncture, behavioural modification, hydrotherapy, physical medicine, medicines and minor surgery[9]. Naturopathic medicine therapies focus on correcting underlying imbalances caused by sedentary lifestyles and require a comprehensive care plan to support long-term sustainable health and enhance immune function[10,11]. This review aims to consolidate existing literature on Yoga and Naturopathy for COVID-19, demonstrating the efficacy and consistency of this treatment strategy in fighting the pandemic by improving the host immune system.

MATERIALS AND METHODS

Study strategy and design

Literature search: A comprehensive search of literature published from 2021 to 2023 was conducted to identify relevant studies. The search was performed using keywords such as: “Yoga,” “Naturopathy,” “COVID-19,” “India,” “therapeutic effect” and “efficacy” and their synonyms. The following databases were searched: PubMed Central, Research Gate, Science Direct, Google Scholar, Scopus, Medline and Cochrane. No restrictions were placed on the type of study (Fig. 1).

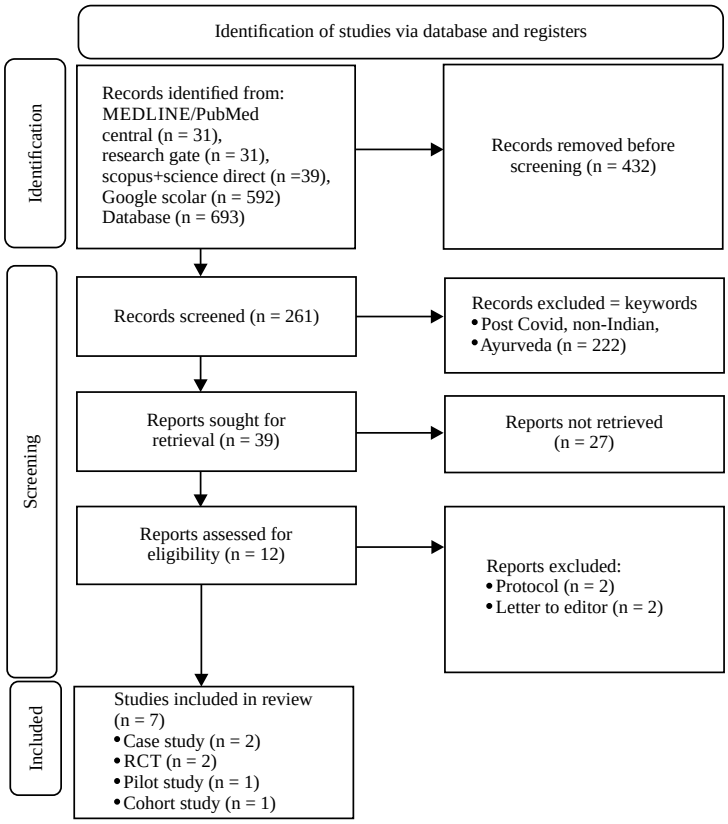

Fig. 1: PRISMA flow chart and screening of studies

Inclusion and exclusion criteria

Exclusion criteria:

- Letters to the editor and study procedures were excluded
- Animal trials and in vitro studies were not considered

After applying these criteria, five studies were selected for review.

Study population and intervention: The selected studies included a population ranging from 18-70 years of age[12], consisting of individuals previously diagnosed with COVID-19. All study subjects were found to have average higher mental functions. The selected studies focused on managing COVID-19 and its manifestations through naturopathy and yoga interventions. The interventions employed in these studies included Balneotherapy, Diet therapy and yoga therapy.

RESULTS

A total of 693 records were identified using the keywords "Yoga," "Naturopathy" and "COVID-19". Seven articles were included in this study after applying the inclusion and exclusion criteria. The selected articles comprised a range of study designs, including 2 case study, one pilot study, three randomized controlled trials and 1 cohort study. Table 1 and 2 presents the quality assessment, details of each article, including the source, keywords, study design, intervention used, parameters assessed and conclusions.

DISCUSSIONS

To the best of our knowledge, this study is the first to examine the effect of naturopathy and yoga on improving the host immune system in COVID-19 patients. The COVID-19 pandemic has significantly impacted mental health, particularly among vulnerable groups[13]. Psychological symptoms of stress, anxiety and depression can impair immunological function and increase vulnerability to viral upper respiratory tract infections[14,15]. Therefore, investigating the relationship between psychological distress and the immune response to COVID-19 infection is crucial. A close connection between the neurological, endocrine and immunological systems explains how mental health issues can influence the immune response to infection[16]. Naturopathy addresses underlying causes rather than symptoms, while yoga effectively manages psychosomatic and lifestyle disorders[17]. Naturopathic interventions such as balneotherapy stimulate the body's inherent healing mechanisms by improving blood and lymph circulation. Yoga supports weakened or damaged systems and physical medicine techniques, including massage and manual manipulation, correct structural disintegration. Naturopathy also employs

Table 1: Quality assessment of the included studies

Author (year)	Sampling method	Comparison group	Blinding	Random allocation	Calibration of investigator	Scales used for measurement	Limitations	Long-term follow-up of cases
Jerrin *et al.*[31] (n = 130)	not specified	Not present	Not done	Not done	Not mentioned	HADS, CAS scale	• No control group and • Being a non-randomized trial • Limited sample size	Not done
Mooventhan *et al.*[35]	Not applicable	Not present	Not done	Not done	Not mentioned	Symptom score	Not applicable	Not done
Jagadeesan *et al.*[32] (n = 42)	not specified	Not present	Not done	Not done	Not mentioned	DASS-21, PSQI, WHOQOL-BREF	• Small sample size, single center, • Short evaluation period • Lack of control group	Not done
Aruchunan *et al.*[24]	Not applicable	Not present	Not done	Not done	Not mentioned	DASS-21	Not applicable	Not done
Sharma *et al.*[33] (n = 62)	Simple random	present	Not done	Done	Mentioned	HADS, PHQ-9, GAD-7, PSS-10	• Smaller sample size • Unequal gender distribution	Not done
Pradeep[36] (n = 112)	Non-Randomized	Present	Not done	Not done	Not mentioned	DASS-21 and WHO QoL	• Smaller sample size • Non-randomization	Not done
Dua *et al.*[26] (n = 20)	Simple random	Present	Outcome assessor and statistician	Done	Mentioned	QOL, SGRQ, PHQ-9, GAD-7 scale and FSS	• Small sample size • Blinding of patients was not possible due to study design	Not done

Table 2: Outcome measures of the included studies

Study	Design	Inclusion criteria	Intervention	Outcome measures	Findings
Jerrin *et al*.[31] (n = 130)	Pilot study	Covid-19-positive patients of both sex	Yoga and Naturopathic intervention were given for 60 min a day for two weeks	HADS (Hospital anxiety depression scale) and CAS (Corona anxiety scale) score	After the intervention, there was a significant reduction in HADS-anxiety scores ($p<0.05$), HADS-depression scores ($p<0.04$) and CAS scores ($p<0.01$), indicating a decrease in anxiety, depression and COVID-19- related stress
Mooventhan *et al*.[35]	Case report	COVID-19 Positive	Conventional medicine+yoga and naturopathy for 11 days	Number of hospital stay and symptom score	The length of hospital stay was 11 days. Which is less than the median hospital stay observed in previous studies and the symptom score reduced from 6 (day 1) to 0 (day 6)
Jagadeesan *et al*.[32] (n = 42)	Quasi-experimental study	Who satisfied COVID-19 diagnostic criteria and asymptomatic home-isolated patients All adult patients from18 to 60 years of age	Bhramari Pranayama (Bhr.P) for 15 days	Depression anxiety and stress scale-21 [DASS-21], sleep quality (Pittsburgh Sleep Quality Index-PSQI) and overall quality of life (WHOQOL-BREF)	The mean scores of depression, anxiety, stress and total DASS-21 showed a significant reduction ($p < 0.001$) after the intervention, suggesting an overall improvement in mental health
Aruchunan *et al*.[24]	Case report	COVID-19 positive	Conventional medicine+yoga and naturopathy	Systolic blood pressure (SBP), diastolic blood pressure (DBP) and pulse rate (PR) were measured with the digital BP apparatus. Assessments such as pulse pressure (PP), mean arterial pressure (MAP), rate pressure product (RPP) and double product (Do-P) Depression anxiety and stress scale (DASS)-21	Post-test assessments compared to baseline assessments showed a conversion of positive to negative RT-PCR results for COVID-19, improvements in cardiovascular parameters (SBP, DBP, PR, MAP, RPP and Do P) and psychological parameters (depression, anxiety and stress)
Sharma *et al*. (n = 62)[33]	Quasi-randomized controlled study	COVID-affected patients	50 min of yoga+conventional medical treatment	Standardized Hospital Anxiety and Depression Scale, Generalized Anxiety Disorder-7 Item, Patient Health Questionnaire-9 and Perceived Stress Scale	The add-on yoga intervention led to a significant decrease in stress, anxiety and depression. Furthermore, patients practising yoga significantly improved oxygen saturation and heart rate levels
Pradeep[36] (n = 112)	Nonrandomized controlled study	COVID-19 Positive patients	• Yoga and naturopathy intervention (yoga therapy, naturopathic diet, steam inhalation, self-acupressure) • Simple-sectional breathing through a telemedicine mode for 14 days+ conventional medical treatment	Depression anxiety stress scale (DASS-21), World Health Organization (WHO) QoL and Symptom scores	YNI group had shown significant improvement in DASS-21 scores and the QoL domains as compared with the controls. The severity of cough was significantly reduced in the study group compared with the controls
Dua *et al*. (n = 20)[26]	Parallel-group prospective randomized controlled trial (RCT)	COVID-19 patients with moderate pneumonia, (iii) having a smartphone with internet facility, (iv) needing oxygen supplementation and (v) serum procalcitonin <0.5 ng mL^{-1} Moderate pneumonia was defined as hypoxia with a saturation of 90-94% on room air/dyspnea/respiratory rate >24 breaths min^{-1} per Indian Council of Medical Research (ICMR) guidelines	One hour yoga session that included pranayama and Gayatri mantra (GM) chant for up to 14 days	High-sensitivity C-reactive protein (hs-CR, interleukin 6 (IL6), ferritin, D-dimer, erythrocyte sedimentation rate (ESR), neutrophil-lymphocyte ratio (NLR), chest x-ray (CXR) scores, health-related quality of life (QOL) by St George Respiratory Questionnaire (SGRQ), Patient Health Questionnaire (PHQ)-9 and Generalized Anxiety Disorder (GAD)-7 scale, and fatigue assessment by Fatigue Severity Scale (FSS)	The Intervention Group showed a more significant decline in high-sensitivity C-reactive protein (hs-CRP) levels than the control group, indicating reduced inflammation. Both intervention groups demonstrated a decline in quality of life (QOL), depression, anxiety and fatigue severity scale (FSS) scores, with a significant decline observed in FSS scores in the Intervention Group. The median chest X-ray scores were also reduced in the intervention group, indicating potential improvements in lung health

specific natural substances, dietary supplements and fasting therapy to manage bodily pathology[18]. These natural therapies promote the body's natural immune system homeostasis to counter pathogens. For instance, a naturopathic elimination diet and yoga have been shown to reduce inflammatory biomarkers and ameliorate clinical signs of inflammation[19,20]. Compounds like naringenin and hesperidin found in citrus fruits and grains indirectly affect insulin resistance through various pathways, such as promoting the growth of gut microorganisms and altering gene expression related to glucose homeostasis and insulin sensitivity[21-24]. Major micronutrients especially Vitamin E,Vitamin C and Vitamin D helps in reducing viral load by reducing reactive oxygen species, modulating immune function and promoting humoral response. And hydro modalities such as warm turmeric salt gargling,jalaneti,steam inhalation or local steam application helps in supporting mucociliary clearance and bronchodilator effect that ease upper respiratory tract infection(URTI)[25]. In the present review, various yoga and naturopathy interventions for COVID-19 patients have shown improvements in both systolic and diagnostic blood pressure, pulse rate (PR), pulse pressure (PP), mean arterial pressure (MAP), rate pressure product (RPP), double product (Do P) and the potential immunomodulatory effects of hydrotherapy treatments[26,27].

Additionally, a significant reduction in inflammatory markers, such as high-sensitivity C-reactive protein, was observed in COVID-19 patients after a 14 day diet and 1 hr yoga intervention[28]. Stress and depression are psychiatric conditions associated with the dysregulation of glucocorticoids released by the autonomic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis, leading to inflammation[29,30]. Recent meta-analysis studies have also demonstrated that acute psychological stress can alter circulating levels of inflammation and pro-inflammatory cytokines, contributing to a “cytokine storm,” which is implicated in COVID-19 pathogenesis[31,32]. Naturopathy and yoga interventions positively modulate the host immune system by reducing stress hormones, depression and anxiety and improving sleep. In this analysis, significant improvements were observed in HADS (Hospital Anxiety Depression Scale), PSQI (Pittsburgh Sleep Quality Index) and CAS (Corona Anxiety Scale) scores of COVID-19 patients after naturopathy and yoga interventions[33,34]. The subjective improvement in COVID-19 patients' symptoms can be attributed to the psychoneuroimmunology (PNI) effect of autonomic nervous system modulation and reduction of systemic inflammation through naturopathy and yoga interventions. Therefore, this review demonstrates the benefits of integrating naturopathy and yoga management with conventional interventions to enhance natural immunity in COVID-19 individuals.

CONCLUSION

This study reviewed seven Indian articles that examined the integration of naturopathy and yoga management alongside conventional approaches, demonstrating improvements in host immune function, quality of life, sleep and a reduction in depression, stress and inflammatory markers. The findings indicate that naturopathy and yoga interventions can improve overall functional symptoms in COVID-19 patients.

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