Indian Journal of Traditional Knowledge
Vol 21(3), July 2022, pp 475-488

Integrative Therapy based on Yoga, Ayurveda and Modern Western Medicine for treatment of high-risk cases of COVID-19: A telemedicine-based case series

S A Bentur[a], A Mishra[b], Y Kumar[c], S Thakral[d,#,*], Sanjiv[e] & R Garg[d,f,g]

[a]Ayurveda physician and yoga expert (private practitioner), Greater Noida (West)-201009, Uttar Pradesh, India

[b]Department of Ayurveda and Holistic Health, Dev Sanskriti Vishwavidyalaya, Haridwar, Uttarakhand 249 411, India

[c]Advait Clinic, Delhi 110 085, India

[d]National Resource Centre for Value Education in Engineering, [e]Department of Chemical Engineering, [f]Amar Nath and Shashi Khosla School of Information Technology, [g]Department of Computer Science and Engineering, Indian Institute of Technology Delhi, New Delhi 110 016, India

E-mail: sonika@sscbsdu.ac.in

Received 09 October 2021; revised 23 June 2022

We report a telemedicine-based case-series of 30 mild/moderate (classification based on guidelines by Ministry of Health and Family Welfare, Government of India) COVID-19 patients, treated using Integrative Therapy based on Ayurveda, Yoga and Modern Western Medicine, i.e., MWM (allopathy). Cases were high-risk owing to comorbidities like Diabetes Mellitus, Hypertension, Coronary Artery Disease, Ulcerative colitis, Chronic Kidney Disease and/or age above 60. The cases have been categorized into YAS (Yoga-Ayurveda based treatment, with possibly allopathic Supplements: 4 patients), YASP (Yoga-Ayurveda based treatment, with possibly allopathic Supplements and Paracetamol: 6 patients), YAM (Yoga-Ayurveda based treatment, and MWM as adjunct: 6 patients), MYA (first tried MWM, later switched to Yoga-Ayurveda: 14 patients). Based on each patient's symptoms and co-morbidities, a personalized treatment plan including Ayurvedic medicines, Yoga protocol, dietary recommendations and lifestyle modifications was prescribed by a registered Ayurveda doctor and a Yoga consultant. More than half of symptomatic patients started improving within 5 days (90% within 9 days); more than 60% reported at least 90% recovery within 10 days. Six patients with oxygen saturation (SpO2) below 95%, benefited through *Makarasana* and *Shithilasana*; none progressed to composite endpoints (consisting of admission to Intensive Care Unit, invasive ventilation or death). Considering that approximately 19.3% of the patients with these comorbidities progress to composite end points, the p-value is 7.21×10^{-3}. The Integrative Therapy, incorporating Yoga and Ayurveda with MWM, may offer an economical, scalable treatment option for COVID-19 by reducing burden on healthcare facilities and preventing risk-exposure of healthcare workers.

Keywords: Ayurveda, COVID-19, Integrative therapy, Yoga

IPC Code: Int Cl.[22]: A61K 9/00, A61K 36/00, A61K 36/9066, A61K 45/00

The rapid rate at which COVID-19 has engulfed the planet has made it one of the deadliest health disasters thus far. Across 228 countries and territories hit by the virus, more than 546 million confirmed cases and more than 6.3 million deaths have been reported as on June 23, 2022(ref. 1). The severity of illness caused by COVID-19 is associated with one's medical condition[2-5]. COVID-19 patients with co-morbidities such as Diabetes Mellitus (DM), Hypertension (HTN), Chronic Obstructive Pulmonary Disease (COPD) or old age have been observed to exhibit poorer clinical outcomes[2,3,6-8]. Therefore, the Ministry of Health and Family Welfare, Government of India, recognized age being above 60 and presence of diseases like DM, HTN, cardiac disease, chronic lung disease, cerebrovascular disease, chronic kidney disease (CKD), immune-suppression and cancer as risk factors for severe illness in COVID-19(ref. 9).

Several research studies to assess various therapeutic agents for COVID-19 have been conducted[10,11]; vaccines are being administered across the globe. However, no definite cure for COVID-19 is yet available in the Modern Western Medicine, i.e., MWM (allopathy). The current situation demands easy to administer, scalable and inexpensive interventions that can aid in mitigating COVID-19 symptoms. Ayurveda and Yoga, two ancient complementary systems of India based on identical

#Present address: Shaheed Sukhdev College of Business Studies, University of Delhi

theoretical foundations, can possibly be an answer. Both the systems follow personalized treatment approach and a holistic approach to well-being. While Ayurveda focuses on health and wellness, Yoga assumes basic physical and mental health and proceeds to unfold subtler and deeper aspects of life[12,13]. See Mishra *et.al.*[14] (related works) for a detailed review on use of Yoga, Ayurveda and other systems of traditional medicine for treatment of COVID-19. Though the use of Yoga and Ayurveda in the treatment of a high-risk case of COVID-19 has been reported[14], no such study, either standalone or in combination with allopathy, for the treatment of multiple high-risk cases of COVID-19 is readily available in open literature. With healthcare professionals and patients being exposed to risk, and the healthcare infrastructures being overloaded during the pandemic, telemedicine has become a much sought-after mode of treatment and is being scientifically assessed for various ailments[15-22]. In particular, the use of telemedicine in Ayurveda, a relatively newer concept, is also being explored[23].

This study addresses all above concerns and requirements through a telemedicine-based case series of thirty COVID-19 positive patients with co-morbidities such as DM, HTN, CKD, Hypothyroidism, Coronary Artery Disease (CAD), Ulcerative Colitis, or aged 60 and above (or possibly both), treated using an Integrative Therapy plan based on Ayurveda, Yoga and Modern Western Medicine (allopathy). Twenty-eight of these patients may be classified as 'high-risk' based on the guidelines issued by Government of India[9], and the remaining two also posed serious challenge owing to their condition of ulcerative colitis. Thus, this study aims to explore the impact of Integrative Therapy on high-risk cases of COVID-19.

Materials and Methods

Patients' details

The patients included in the study were mild or moderate cases of COVID-19 (clinical severity of the disease classified as mild, moderate and severe as per guidelines issued by Ministry of Health and Family Welfare, Government of India)[9].

The following inclusion criteria were employed for the study:

- Willingness to participate in the study and provide the informed consent.
- Willingness to share all the details (such as government-issued photo id.) required for telemedicine practice.
- Access to video conference capability (phone/computer with high speed Internet) for consultations, Yoga and monitoring.
- Mild or moderate confirmed cases of COVID-19 with age between 18 and 60 years and presenting history of one or more of the following comorbidities: diabetes, hypertension, COPD, CAD, malignancy, ulcerative colitis, CKD.
- Mild or moderate confirmed cases of COVID-19 with age 60-75 years with or without any comorbidities.

The following exclusion criteria were employed:

- Inability to follow the prescribed treatment plan or non-compliance for the same.
- Illness turning severe.

The case series began on July 1, 2020 and went on till November 8, 2020. Purposive sampling technique was employed - the patients who approached us and fulfilled the inclusion criteria were included. A total of 47 patients filled in the informed consent form to join the study; out of these 5 were dropped since they did not meet the inclusion criteria, 6 patients did not turn up for consultation after filling in the informed consent form, 4 patients were dropped within the first three days due to non-compliance, 2 were followed-up for about a week but were found non-compliant. The case reports of 30 patients have been presented here. Table 1 presents the demographic details and other relevant information about the patients whose case reports have been presented in this paper.

Treatment settings

The presented case series involved treatment through telemedicine. Only confirmed positive cases of COVID-19 were included into the study; for a patient to be included for the study, he/she was required to fill an informed consent form. A detailed medical history, existing condition of the patient and details of any treatment being taken were subsequently recorded, based on which a personalised treatment plan (based on Ayurveda and Yoga) was prescribed by the concerned Ayurveda doctor and the yoga therapist in the team. In case a patient with COVID-like symptoms approached one of the Ayurveda doctors in the team, Ayurveda-based symptomatic treatment was initiated, but the patient was included in the study only after being detected positive with COVID; the treatment plan was also appropriately revised thereafter. Except for the inability to perform physical examination, no known

Table 1 — Patient details

Patient Id.	Age	Gender	Height (cm) approx.	Weight (Kg) approx.	City	Date of inclusion (year: 2020)
P01	55	M	160.02	70	Delhi	July 01
P02	40	M	165.02	85	Delhi	July 09
P03	62	M	173.00	68	Delhi	July 30
P04	75	F	160.02	66	Delhi	Aug 02
P05	65	M	170.18	73	Delhi	Aug 10
P06	65	F	157.48	68	Delhi	Aug 10
P07	38	M	170.00	68	Delhi	Aug 15
P08	43	M	160.00	95	Delhi	Aug 25
P09	49	M	172.50	96	Delhi	Aug 26
P10	43	F	165.00	77	Delhi	Aug 27
P11	38	M	-	-	Delhi	Aug 31
P12	45	F	154.00	68	Delhi	Sep 04
P13	60	M	167.64	48	Delhi	Sep 04
P14	75	M	150.00	60	Delhi	Sep 07
P15	66	F	160.02	-	Delhi	Sep 11
P16	52	M	172.72	80	Delhi	Sep 24
P17	39	M	165.10	67	Delhi	Sep 26
P18	49	M	177.80	86	Delhi	Sep 30
P19	71	M	-	-	Delhi	Sep 30
P20	40	F	157.48	71	Delhi	Oct 12
P21	38	M	-	-	Delhi	Oct 16
P22	71	M	162.56	56	Delhi	Oct 22
P23	62	F	160.02	65	Delhi	Oct 24
P24	35	F	157.48	78	Delhi	Oct 24
P25	65	F	162.56	70	Delhi	Oct 26
P26	65	M	170.18	60	Delhi	Nov 03
P27	60	F	157.48	70	Delhi	Nov 03
P28	52	M	162.56	75	Delhi	Nov 07
P29	44	F	154.94	75	Delhi	Nov 08
P30	55	M	162.56	70	Delhi	Nov 08

diagnostic challenges were faced. The treatment prescribed to the patients comprised Ayurvedic medicines, 10-15 guided Yoga sessions, lifestyle modifications and dietary recommendations. However, the patients included in the study could have had taken or be simultaneously taking modern western medicine (allopathy) for COVID in consultation with other doctor(s). Also, the patients continued with their ongoing treatments for any comorbidity(ies) they had.

For the purpose of this study, the day when a patient received the first consultation from a doctor in the team was considered as the `date of first consultation' for the patient. Consultation with the Ayurveda doctor and Yoga therapist was done through telephone and/or via video call (as per requirement); the yoga sessions were held through video calls (skype/google meet/whatsapp). Regular follow-up was done with the patients and the patients could also approach the Yoga therapist as well as their consulting Ayurveda doctor in the team. At the end of the guided sessions, the patients were given a recorded video of the yoga protocol for them to continue practising on their own.

As per the protocol of the study, any patient becoming severe during the course of the treatment was to be referred to a standard tertiary care facility for COVID-19 (though no such situation arose during the execution of the study). It may be noted that the ICMR guidelines for testing and treatment of COVID-19 kept evolving during the study. For instance, initially, ICMR had mandated a second RTPCR test to confirm absence of infection before terminating the treatment and isolation period of a patient even after recovery from symptoms[24]. Later, the norms changed and COVID patients who had recovered from symptoms and had been quarantined for a stipulated period of time no longer needed a second test[25]. In line with the government-issued guidelines, the treatment concluded with the patients' symptoms being (almost) resolved and their isolation period ending. Most patients chose not to go for a second test, but some did. The authors have reported the information as it was. No funding from any source was received for carrying out the presented case series. No fee was charged for consultation or guided yoga sessions; however, the patients had to buy their own medicines and pay for the suggested/required tests.

Case presentations

The patients included in the study were classified into the following categories based on their intake of modern western medicine (allopathy) for COVID-19: (i) YAS: only Yoga-and-Ayurveda-based treatment with possibly allopathic supplements such as Vitamin C and Zinc (ii) YASP: Yoga-and-Ayurveda-based treatment with allopathic supplements and paracetamol (iii) YAM: Yoga-and-Ayurveda-based treatment with modern western medicine (allopathy) as adjunct (iv) MYA: modern western medicine (allopathy) treatment (in most of the cases mandated by the government) followed by Yoga-and-Ayurveda-based treatment; this category has been further divided into two subcategories, viz., MYA-S (new symptoms presented after inclusion into the study) and MYA-NS (no new symptoms presented after inclusion into the study). The YAS group had 4 patients, YASP had 6 patients, YAM had 6 and

MYA had 14 patients (MYA-S having 7 and MYA-NS having 7). Two of the cases were asymptomatic, one of which was from YAS and the other from MYA; both the patients remained asymptomatic throughout. An overview of the cases included in the study follows (including the comorbidities and medical history of the patients, and the progression of illness with respect to COVID-19).

History of present illness/COVID

Table 2 summarizes the history of present illness (COVID) - the date of first consultation, category of the patient, the onset and progression of symptoms, date of confirmation of COVID etc.

Table 2 — History of Present Illness/COVID

Patient Id.	Date of first consultation	Category	Symptoms at first consultation	COVID test date (+ve)	Symptoms that appeared in due course	Other remarks
P01	July 01	MYA-NS	obstruction in throat while speaking for long, extreme weakness, bad smell and taste, gastric upset, reduced appetite	June 24	started with fever, body ache, dry cough and other pneumonia-like symptoms; no new symptoms observed after the first consultation	patient sounded low, depressed, lacking in energy at first consultation; exhibited disease-induced anxiety
P02	July 09	MYA-NS	cough with sputum, weakness (mild), nasal/throat congestion, chest pain (mild)	July 04	started with fever that persisted for 2-3 days and progressed to other symptoms specified	SpO2 levels observed to be on the lower side (92-93) initially, patient advised to do *kunjal* twice weekly for the cough problem
P03	July 30	MYA-NS	sore throat (mild), stomach ache (mild), loose motions, weakness (mild)	July 26	constipation	slight drop in SpO2 in between – *Matsya Kreedasana* and *Makarasana* advised
P04	Aug 01	YAS	no symptoms	July 31	no symptoms at the onset; had nausea and vomiting, headache, constipation on a few occasions	the patient could not sit cross-legged and had stiffness in muscles and joints
P05	Aug 03	YAM	sore throat, mild fever, weakness	Aug 03	no new symptoms experienced	-
P06	Aug 04	YAM	fever, cough with sputum, weakness	Aug 04	gastric upset, anxiety	-
P07	Aug 15	MYA-S	fever, sore throat, cough with sputum, body-ache, weakness	Aug 14	started with fever, body ache and cough 4-5 days prior to the first consultation; symptoms progressed to ulcers in mouth, diarrhoea, headache, bad taste, reduced appetite, extreme weakness	patient seemed in distress believing that he has low immunity
P08	Aug 23	YAS	fever, body ache	Aug 24	foul taste/smell from the mouth, nausea, morning sickness	patient had anxiety about his postponed surgery for the fractured bone
P09	Aug 26	MYA-S	fever, mild cough and cold, headache, sore, throat	Aug 26	started with fever and cough 3 days prior to the first consultation; progressed to weakness, reduced appetite, bitterness in taste, body ache, mild nasal blockage primarily in the morning, constipation	patient is a regular practitioner of yoga and meditation; claimed to have observed a lot of improvement in short-tempered nature after resorting to yoga
P10	Aug 27	YAM	fever, sore throat, throat pain, cough with sputum, muscular cramps	Aug 26	weakness, upset stomach (loose stools), body ache, mild chest/nasal blockage, running nose with sneezing	developed headache on a certain day during the course of treatment - later recalled had forgotten to take medicine for BP
P11	Sep 01	MYA-S	diarrhea	Aug 26	started with fever; progressed to upset stomach (loose motions), mild pain in the stomach	patient exhibited anxiety over his continuing symptoms

(*Contd.*)

Table 2 — History of Present Illness/COVID (Contd.)

Patient Id.	Date of first consultation	Category	Symptoms at first consultation	COVID test date (+ve)	Symptoms that appeared in due course	Other remarks
P12	Sep 02	YASP	fever, body-ache	Sep 02	headache, dry cough, weakness, mild dyspnea	high respiration rate observed during the courseof treatment; panting during yoga sessions
P13	Sep 04	MYA-S	sore throat, body ache, diarrhea, weakness	Sep 03	started with fever, extreme weakness; progressed to specified symptoms	-
P14	Sep 01	YAS	fever (previous night), body-ache, sore throat, cough	Sep 07	initial symptoms subsided in 2 days; fever relapse on one day	patient had blood in stools on one day during the course of treatment following which *Kwath* was discontinued and coconut water recommended; problem did not recur; patient reported worsening of sleeping problem – yoga nidra suggested
P15	Sep 09	YAS	fever, cough	Sep 08	body ache, weakness, cough, diarrhea, reduced appetite	patient reported scanty urination; patient in distress and demotivated to do yoga
P16	Sep 25	MYA-NS	body ache (legs and back), sore throat, weakness	Sep 22	initial symptoms: fever, headache, body-ache, burning feeling in eyes; no new symptom observed after first consultation	-
P17	Sep 28	MYA-NS	anosmia (loss of smell), mild weakness and feeling cold	Sep 24	patient used to develop feverish feeling in the evening; no other symptoms	-
P18	Sep 29	YAM	fever, breathlessness, cough, chest congestion	Sep 28	sore throat, cough with sputum, weakness, body-ache, reduced appetite	SpO2 level was 92 at the time of first consultation, patient was suggested to practise *Makarasana*, after which *SpO*2 rose to 98 the same day
P19	Oct 06	MYA-A	asymptomatic	Oct 02	no symptoms observed	-
P20	Oct 10	YAM	fever,weakness,body-ache	Oct 11	sore throat, heaviness in abdomen, headache, constipation, breathlessness after talking for long, restlessness	patient exhibited a lot of anxiety during the treatment, Yoga nidra recommended
P21	Oct 17	MYA-NS	dry cough, bad taste	Oct 15	initial symptoms were sore throat/dryness in throat, body-ache; no new symptoms observed after the first consultation	patient's blood glucose not controlled - complained to be experiencing dry mouth and muscular cramps when blood glucose level becomes high
P22	Oct 22	MYA-S	fever, mild cough, loss of appetite, weakness, body-ache	Oct 21	heaviness in abdomen, bad taste, cough	SpO2 level tending to drop below 95 –*Makarasana* and *Shithilasana* recommended
P23	Oct 24	YASP	mildcough, body-ache, weakness	Oct 23	throat irritation, fever, feels cold, body-ache, weakness, upset stomach (semi-formed stool with increased frequency), loss of appetite, chest congestion	-
P24	Oct 24	MYA-S	mild sore throat with mild pain, weakness, loss of smell, loss of taste	Oct 21	started with fever on October 17; progressed to severe body-ache, fever relapse, throat pain, extreme weakness and sweating	-

(*Contd*.)

Table 2 — History of Present Illness/COVID (Contd.)

Patient Id.	Date of first consultation	Category	Symptoms at first consultation	COVID test date (+ve)	Symptoms that appeared in due course	Other remarks
P25	Oct 20	MYA-S	body-ache, sore throat, cough	Oct 24	started with fever, throat irritation, and body-ache on October 18; progressed to loss of taste, mild stomach ache, semi-formed stools with increased frequency, loss of appetite, extremely bitter taste, body-ache, extreme weakness	SpO2 tending to drop below 95 – *Makarasana* and *Shithilasana* recommended
‘P26	Oct 26	YAM	gastric upset, burning sensation in stomach	Nov 02	cough with sputum, sore throat, fever, loose stools, weakness, loss of appetite	SpO2 tending to drop below 95 – *Makarasana* and *Shithilasana* recommended; low platelet count observed during the course of treatment
P27	Oct 28	YASP	body-ache	Nov 03	fever, weakness, loss of appetite	SpO2 tending to drop below 95 – *Makarasana* and *Shithilasana* recommended
P28	Nov 04	YASP	body-ache mildcold, feverish feeling	Nov 06	fever, weakness, loose stools	-
P29	Nov 07	YASP	body-ache, shivering, sore throat, feverish feeling	Nov 07	fever, mildcough, weakness, throat irritation, sneezing, nasal/chest congestion	-
P30	Nov 06	YASP	body-ache, mild fever	Nov 07	mild dry cough, weakness	-

Present comorbidities and past medical history

Table 3 summarizes the comorbidities and medical history of the patients.

Treatment plan

There was no standard treatment protocol employed. However, based on the etiology and pathophysiology of COVID-19 as per Ayurvedic perspective (presented in a recent paper by almost the same set of authors)[14], a pool of Ayurvedic medicines and some yogasanas, pranayama and relaxation techniques were proposed. Ayurvedic medicines and a yoga protocol (from the said pool) were recommended based on each patient’s individual condition, comorbidities and treatment already being taken (if at all). Moreover, the treatment prescribed to each patient was solely based on the treating doctor’s and yoga therapist’s judgement. Besides Ayurvedic medicines and yoga, some lifestyle modifications or practices were also recommended to the patients, such as: *pratimarshanasya* (putting 2 drops of oil in each nostril with *anu taila*/mustard oil/almond oil/*ghee* made with cow-milk)[26], drinking 2-3 glasses of lukewarm water in the morning and drinking lukewarm water throughout the day, taking steam (with *Ajwain*/turmeric/rock salt added to water or with plain water), doing gargles, adopting spiritual practices such as meditation, chanting and *Yoga nidra* for which weblinks were provided[27-30]. Also, dietary recommendations were given that included turmeric milk at night, consuming light/easy-to-digest food, increase in the intake of fruits and green vegetables, coconut water; refraining from cold, sour, fried, spicy, heavy-to-digest food such as curd, cold drinks, ice-creams, chilled water, any refrigerated food items, black gram pulse (or any food item prepared with black gram), jackfruit etc.

Pool of Ayurvedic medicines prescribed to patients:

The prescriptions given to patients comprised suitable Ayurvedic medicines from the following pool: *Giloy Ghanvati*, *Sanshamani vati*, *Ashwagandha vati*, *Lavangadi vati*, *Chitrakadi vati*, *Arogyavardhini vati*, Oritus syrup, *Pathyadi Kwath -pravahi*, *Laghumalini Vasant*, *Sudarshan Ghanvati*, *Mahasudarshan Ghanvati*, *Kutaj Ghanvati*, *Laxmivilasras*, *Basant Kusumakarras*, Immunity capsules, Bacnil capsules, Fifatrol tablet, Zoemit tablet, Bowel care, Softovac, Septilin tablet, Amynity plus syrup, Himcocid syrup, Diarex syrup, Koflet-SF syrup, *Kutajarishta*, *Jirakadyarishta*, *Vasavaleh*, Jufex Forte, Chyawanprash, Ayush *Kwath*, *Nagaradi Kwath*, *Kantakari Avaleha*, *Talishadichurna*, *Amalakichurna*, Aloe-vera + *amla* juice, *Swarna*

Table 3 — Comorbidities/Medical History

Patient Id.	Comorbidities	Other (present) illnesses	Past Medical History
P01	HTN, DM-Type II (leading-to renal dysfunction), hypothyroidism		cholecystectomy (removal of gall bladder) 20 years ago
P02	DM-Type II, hypothyroidism	-	-
P03	HTN, DM-Type II	watery stools since last 2.5 months (normal frequency), chronic constipation	-
P04	HTN, DM-Type II, hypothyroidism (borderline)	constipation	-
P05	tachycardia, CAD	experiences neck pain after exertion, poor digestion, constipation (at times), gastric upset, acidity, disturbed sleep since last 6 months	cervical spondylosis
P06	HTN	anxiety, nervousness, stress, excessive thinking, indigestion, gastric upset, acidity, constipation	migraine, chikungunya
P07	ulcerative colitis	-	glaucoma, cataract, retinal detachment
P08	HTN	left humerus bone fractured	-
P09	ulcerative colitis	high cholestrol level, tendency of allergic cough in winters	-
P10	HTN	-	-
P11	HTN	sinusitis (mild)	-
P12	CAD, unstable angina	-	-
P13	none	frequent cough	pulmonary tuberculosis
P14	HTN	difficulty sleeping since last 5-6 years	-
P15	DM, hypothyroidism	cervical spondylitis, lumbar radiculopathy, OA, B\L knee, pricking pain in left breast since last 8-10 months, acidity, poor appetite, poor digestion, difficulty sleeping, anxiety	HTN, asthma, epilepsy, jaundice, TB, blood transfusion
P16	DM	weak memory since last 3 years	-
P17	DM	indigestion and acidity at times, tachycardia, renal stone	sarcoidosis in 2016, increased serum uric acid (15 years back; now normal)
P18	HTN	seasonal bronchitis, acidity, tendency to worry and get stressed	asthma until 15 years back
P19	DM-Type II, HTN	cardiomyopathy, dyspnea on exertion	-
P20	HTN	disturbed sleep since a few months; emotionally disturbed due to loss of a family member	-
P21	DM-Type II	muscular cramps and dry mouth on increase of blood sugar level, occasional constipation	-
P22	none	recent onset of DM during COVID-19 treatment	chikungunya in 2015; jaundice 25 years ago, was operated for nasal polyp at the age of 16 (relapsed after a few years), underwent lumpectomy (left breast) 15 years ago
P23	none	seasonal bronchitis	
P24	HTN	-	underwent surgery for renal stone 8 years back
P25	HTN	osteoporosis,tendencyof anxiety and worry	jaundice at the age of 19, underwent surgery due to hip injury in Jan. 2018
P26	HTN, DM, hypothyroidism	chronic insomnia	-
P27	HTN	tendency of anxiety	-
P28	HTN	cervical spondylosis	-
P29	HTN	-	elevated blood glucose levels observed on some occasions in the past - not monitored in past couple of years; dysmenorrhea 3 months ago
P30	HTN	-	-

vasantmaltiras, *Diabecon*, *Sitopaladi*, *Madhumeh kusumakar ras*, *Vijaysarchurna*, *Astha*15 syrup, *Astha*15 capsules, *Amlapittantakyog*, *Alsarex*, *Himcospaz*, *Bresol*, *Sarpagandhavati*, Coldab tablets, *Kufrakshak* syrup, Immunocare tablets, Cardiol-H tablets, Unexozim Forte tablets, Orplat tablets, Oro-T.

Pool of yogic practices suggested to the patients:

The suggested yogic practices were aimed at reinforcing proper functioning of *panchavayu*. Emphasis was laid on practices that are good for respiratory system, digestive system and reduce mental anxiety or stress. All practices, including the *asanas*, were advised to be done gently. The generic pool of yogic practices included: *Sukshma Vyayama* (subtle joint movements for upper and lower body parts); breathing exercises; *asanas* (a subset from the following set were included based on each patient's condition and capability: *Tadasana*, *Triyaktadasana*, *Trikonasana*, *Hastapadasana*, *Ardhachakrasana*, *Virabhadrasana*, *Parshva Sukhasana*, *Sukhasana* twist, *Utthana Mandukasana*, *Ardha Ushtrasana*, *Vakrasana*, *Meru Vakrasana*, *Bhujangasana*, *Shalabhasana*, *Ardha Halasana*– with one leg folded, *Anantasana*, *Pawan Muktasana*, *Matsyasana*), supported *Supta-vajrasana*; *Shavasana* (quick relaxation/deep relaxation); *pranayama* (Sectional breathing and full Yogic breathing, *Anulom-vilom*, *Chandra/Surya Anulom-vilom*, *Bhramari*, *Udgeet*); *Dhyana* (mindful breathing).

The benefits of the yogic practices included in the generic pool are discussed below: *sukshma vyayama* (micro/subtle joint movements for upper/lower body parts relieve joint stiffness and muscle tension, and also bring about relaxation), breathing techniques (improve the lung function, help overcome weakness and reduce anxiety), *yogasanas* (*yogic* postures selectively picked for each patient to improve lung capacity and flexibility, enhance blood circulation, and bring about a deep sense of calmness; certain postures were avoided, while some were replaced in many cases based on the patient's condition and capability), relaxation techniques (counter stress response in the body). Stress raises blood glucose levels, suppresses the immune system, and increases blood pressure; relaxation techniques, such as Quick Relaxation Technique (QRT)[31], Deep Relaxation Technique (DRT)[31] and *Yoga nidra*[32] are some effective tools that reduce stress and anxiety. Given the anxiety and stress that COVID patients go through, relaxation techniques were expected to bring about overall healing. The *yoga* sessions always concluded with *pranayama* and *dhyana* (mindful breathing), which are known to reduce anxiety and improve lung function.

A detailed description of each patient's symptoms, treatment plan, history of illness/recovery and compliance to the prescribed treatment has been provided in Additional File 1. Detailed compositions and benefits of the medicines prescribed to the patients, justifying their use, have been provided in Additional File 2.

Results

Tables 2, 3 and 4 give an overall view of the case series. Table 2 summarizes the patients' history with respect to COVID. Table 3 summarizes the comorbidities and medical history of the patients. Finally, Table 4 summarizes the result of each case undertaken; this comprises the date by which most symptoms were resolved, the symptoms that got resolved by this date and those that persisted.

Figure 1 gives a broad view of the condition of patients with progression of treatment (and illness). The day of the first consultation with an Ayurveda doctor has been considered as Day 0. The intensity of symptoms has been marked on a 4-point scale with 0 meaning absence of symptom and 1 being the maximum intensity; 0.33 and 0.66 are intermediate levels. Average cumulative intensity has been computed as follows. The sum of intensities of all symptoms observed for each patient was computed for each day after the commencement of the treatment; this measure was averaged over 28 symptomatic patients (excluding 2 asymptomatic patients) and plotted against the respective day. The symptoms experienced by the patients included fever, body-ache, sore throat/throat pain, cough/running nose, headache, nasal/chest congestion, stomach problems (such as diarrhea, constipation), nausea, loss of taste, loss of smell, foul smell or taste, loss of appetite, weakness, gastric upset, respiratory trouble (such as breathlessness or high respiration rate) and anxiety. An overall idea of the efficacy of the treatment may be derived from the following statistics. More than 53% of the symptomatic patients started experiencing improvement within 5 days and almost 90% of them within 9 days from the start of the treatment. More than 60% of the symptomatic patients reported atleast 90% recovery (approximately) within 10 days and almost 90%

Table 4 — Results

Patient Id.	Date of resolution of majority of symptoms	Symptoms resolved by the specified date	Any persisting symptoms	Other remarks
P01	July 11	obstruction in throat while speaking, weakness, bad smell and taste, reduced appetite	Mild heaviness in abdomen	rejuvenated; committed to adopt yoga in lifestyle
P02	July 19	mild chest pain, nasal and throat congestion, weakness	cough with sputum	-
P03	Aug 10	loose motions, weakness, stomach ache, sore throat	none	sought consultation for other issues
P04	NA	the patient was asymptomatic to begin with and remained so	issues such as headache, constipation and gastric problems appeared on some occasions during the treatment but it was observed that the patient had such a tendency and these had nothing to do withCOVID	it is worth mentioning that despite her age and comorbidity, the patient remained asymptomatic with the integrative therapy; moreover, the patient reported being able to sit cross-legged after the therapy; patient sought Ayurvedic intervention for diabetes, which was duly done after observing the most recent HbA1c report available and fasting + PP reports on following three successive days
P05	Aug 09	sore throat, fever	weakness	-
P06	Aug 20	fever, cough (partly), weakness	cough (mild), weakness (mild)	-
P07	Sep 01	fever, body-ache, ulcers in mouth, diarrhea, headache, bad taste, reduced appetite, extreme weakness	a little trouble in stomach at times (loose stools with normal frequency)	patient developed strong belief in Yoga and Ayurveda by the end of the treatment; recommended IT for his mother later when she was tested positive
P08	Aug 29	all	none	patient reported observable improvement in bowel, by the end of the therapy and attributed it to yoga and *ushapaan*; moreover, he expressed willingness in continuing with yoga and was brought in contact with a yoga organization
P09	Sep 16	fever, body ache, sore throat, headache, bitterness in taste, nasal blockage, reduced appetite	mild dry cough, mild weakness	-
P10	Sep 04	all	none	-
P11	did not experience complete relief	-	loose motions	showed a lot of interest in yoga - continuing after the treatment
P12	Sep 16	fever, body ache, headache, weakness	mild breathlessness and dry cough that develops after speaking for long	-
P13	Sep 09	fever, sore throat, body ache, loose motions, weakness	mild cough with sputum	-
P14	Sep 11	all	none	patient continuing to pursue *yoga nidra* even after the therapy; reported improvement in sleep - able to sleep for 4-5 hours as against 2-3 h earlier
P15	Sep 24	-	very mild cough and scanty urination (though improved)	patient responded very well to *Makarasana* and *Shithilasana* wrt dropping SpO2 level - rose from 87 to 92 in about half an hour; slight improvement reported in sleeping trouble
P16	Oct 02	body ache, sputum	mild weakness	-

(*Contd*.)

Table 4 — Results (*Contd.*)

Patient Id.	Date of resolution of majority of symptoms	Symptoms resolved by the specified date	Any persisting symptoms	Other remarks
P17	Oct 02	all	none	patient committed to adopt yoga in lifestyle; started Ayurvedic medicines for DM
P18	Oct 06	fever, cough with sputum (partly), breathlessness, loss of appetite, weakness, body-ache, sore throat	mild cough	-
P19	NA	NA	NA	patient reported improved breath holding capacity with the practice of pranayama, he also reported to be feeling much better and happier
P20	Oct 22	fever, weakness, body-ache, sore throat, heaviness in abdomen, headache, constipation, sleeplessness	none	patient reported to have immensely benefited by yoga nidra w.r.t. sleeplessness
P21	Oct 22	all	none	patient continued Ayurvedic consultation for DM
P22	Nov 01	fever, mild cough, loss of appetite, weakness, body-ache, heaviness in abdomen	none	patient's SpO2 level started to remain above95 after pursuing Makarasana and Shithilasana; sought consultation for long term management of diabetes that surfaced during treatment.
P23	Nov 01	mild cough, body ache, weakness, throat irritation, fever, cold feeling, body-ache, upset stomach (semi-formed stools with increased frequency), loss of appetite, chest congestion	mild cough (chronic problem)	-
P24	Nov 02	sore throat, throat pain, severe body-ache, loss of smell, loss of taste, extreme weakness	mild weakness	-
P25	Nov 17	fever, throat irritation, sore throat, cough, body-ache, upset stomach (stool consistency normal, but frequency increased), tastelessness, loss of appetite, bad and bitter taste, weakness, body-ache, mild stomach pain	none	-
P26	Nov 12	fever, cough with sputum, upset stomach (loose stools)	none	patient’s SpO2 level improved with the practice of *Makarasana* and *Shithilasana*; patient continuing with yoga practice after the treatment.
P27	Nov 12	fever, weakness, loss of appetite	none	patient’s SpO2 level improved with the practice of *Makarasana* and *Shithilasana*; patient continuing with yoga practice after the treatment.
P28	Nov 17	fever, body-ache, cough, loose stools, weakness	none	-
P29	Nov 14	fever, body-ache, shivering, sore throat, nasal/chest blockage, weakness	mild cough	-
P30	Nov 12	fever, body-ache, dry cough, weakness	none	patient determined to adopt yoga in lifestyle

reported the same within 17 days from the start of the treatment (with some of these patients reporting complete recovery while others reporting almost complete recovery).

Next, statistical analysis was done on the observed outcomes, for which the results of a China-based study were used as reference[6]. While the study reports the mortality rate for hospitalized COVID-19 patients to be 3.1%, for those amongst these patients having one or more co-morbidities, the mortality rate has been reported to be 8.8%. In the same cohort, the percentage of patients for whom the illness progresses

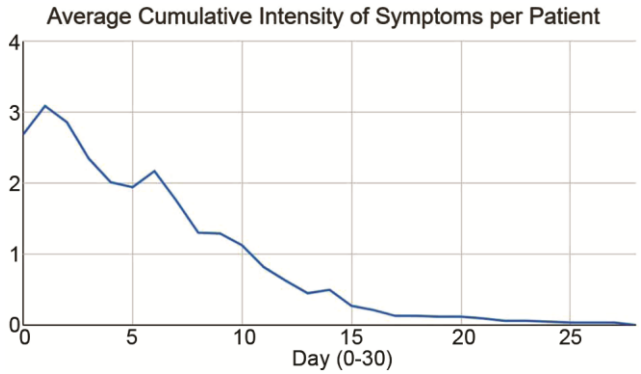

Fig. 1 — Average cumulative intensity of symptoms per patient with progression of treatment

to composite endpoints (consisting of admission to Intensive Care Unit i.e., ICU, invasive ventilation or death) has been reported to be 8.2%, whereas for patients with co-morbidities, the corresponding percentage is substantially higher at 19.3%. Since the said China-based study included symptomatic patients with specific comorbidities, analysis was performed on 23 symptomatic patients with one or more of following conditions - DM, HTN, CAD, CKD. Out of the 23 patients, no one progressed to composite end points (as defined in the China-based study); no patient required hospitalization or needed oxygen supplementation. Given that approximately 19.3% of the patients with the above comorbidities are expected to progress to composite endpoints[6], the corresponding p-value (incorporating 23 symptomatic patients with one or more of the following comorbidities: DM, HTN, CAD, CKD) turns out to be 7.21×10^{-3}, showing a significant drop in the percentage of high-risk patients requiring admission to ICU, invasive ventilation or progressing to death. With no case of mortality, and an expected mortality rate of 8.8% (ref. 6), there is clearly an improvement in the mortality rate as well, though not significant. Two comorbid patients (both aged above 70) who were initially asymptomatic, continued to remain so till the end of the prophylactic treatment. Three symptomatic patients (two of whom were above the age of 60 and one was above 70) who had no comorbidities, on an average took 7.7 days to almost complete recovery. Two patients (aged 38 and 49), who had ulcerative colitis took on average 19 days to recover almost completely.

Discussion

This study reports a telemedicine-based case series of thirty COVID-19 patients with comorbidities (28 of which may be classified as high-risk), successfully treated using integrative therapy based on Ayurveda, Yoga and modern western medicine (allopathy). The patients not only recovered from COVID-related symptoms, but also experienced improvement with respect to their comorbidities and other chronic problems, illness-induced anxiety and oxygen saturation levels (Tables 2, 3, 4 and Additional File 1). The authors attribute the success of the treated high-risk cases to the holistic approach and immunity boosting impact of Ayurveda[33-35] and Yoga[36,37] (for a detailed description see the 'Introduction' section of Mishra *et al*.)[14].

Six patients whose oxygen saturation (SpO2) level was observed to be dropping below 95 benefitted from the practice of prone-position asanas, *Makarasana* and *Shithilasana*, in that their SpO2 levels improved or were at least arrested. Two patients reported improvement in joint and muscular stiffness with yoga practice; one reported improved lung functioning with *pranayama*, four reported better sleep with the *Yoga nidra* practice. As per yogic physiology and science, the vital life force, called *prana* (*vayu*) is divided into five major types in the body, which run through the entire body and facilitate proper physiological functioning[36,37]. These five *pranas* are called *Prana*, *Apana*, *Vyana*, *Udana* and *Samana*. If any of the five *pranas* is vitiated it may lead to dysfunction of corresponding physiology and/or other *prana*[36,37]. Improving and harnessing the *panchavayu* forms the basis of yoga therapy.

Yet another dimension where Yoga gave an edge to the overall treatment was controlling the anxiety of patients[31]. It is well-known that COVID patients, go through a lot of distress due to the uncertainty associated with the disease; this is worsened by the fear of spreading it to other family members, staying in isolation and the associated social stigma owing to the highly contagious nature of the disease. To add to all this, the patients treated in the presented case series were mostly high-risk patients with one or more comorbidities and/or old age. As can be expected, most of the patients exhibited anxiety initially, which could weaken their already compromised immune system and worsen their symptoms thereby creating a vicious circle. However, authors believe that regular practice of yoga (comprising *asanas*, *pranayama*, deep relaxation, *dhyana*) came to the rescue[31], (more details can be seen in the 'Discussion' section of Mishra *et al*.)[14]. Some patients reported to be reaping

immense benefits from the practice of *Yoga nidra*, which has been found useful in the management of anxiety and other stress-related disorders[31,32,38-42].

As indicated by the case series, the intervention can possibly be administered through telemedicine. Thus, besides accelerating the recovery of the patients, the presented mode of treatment eliminates the exposure of healthcare professionals to the virus and possibly prevents overwhelming of healthcare systems. The fact that most of the presented cases were high-risk and none of them required hospitalization is a new hope since such cases are most likely to deteriorate and need attention. The success of integrative therapy in treating high-risk cases of COVID-19 may not only bring down the costs associated with setting up and maintaining additional health care infrastructures for COVID-care, but also bring down the load on the existing facilities. Finally, the said intervention may be suitable for prophylactic use by frontline workers who form the pillars of the entire infrastructure to face and fight this disease.

Many patients, who experienced improvement with respect to their comorbidities with Ayurveda-and-Yoga-based intervention, consulted the Ayurveda doctors in the team for long-term management. Many patients were so convinced about the role Yoga played in accelerating their recovery and bestowing an overall sense of well-being post-illness that they got committed to adopting Yoga in their lifestyles. Thus, the present case-series offers a sufficiently strong evidence supporting that incorporating the elements of Yoga and Ayurveda (in combination with MWM) in the treatment plan of high-risk cases of COVID-19 with mild to moderate symptoms can be very promising. If found effective, the integrative therapy would offer multitudinous benefits.

A suitably designed randomized controlled trial (RCT), while incorporating the personalized treatment principles of Ayurveda and Yoga in combination with MWM, is strongly advised to take the full advantage of these ancient sciences while searching for a viable and effective cure for the COVID-19 pandemic. Yet another dimension that needs to be explored scientifically is the possible use of Yoga and Ayurveda for patients having moderately low SpO2 levels. Given that dropping oxygen saturation levels is one of the most common symptoms faced by COVID-19 patients leading to requirement of intensive care, the observation that integrative therapy improved (or at least arrested) the SpO2 levels of patients who showed tendencies of dropping oxygen saturation levels calls for rigorous investigation.

Conclusions

A telemedicine-based case series of 30 high-risk COVID-19 patients treated using integrative therapy based on Ayurveda, Yoga and modern western medicine (allopathy) has been reported in the present study. The successful treatment of all the patients presents a strong evidence that incorporating the elements of Yoga and Ayurveda (in combination with MWM) in the treatment plan of high-risk cases of COVID-19 with mild to moderate symptoms can be very promising. As indicated by the results, inclusion of Yoga and Ayurveda in the standard treatment offered to COVID-19 patients (particularly in places where these traditions of medicine are already in use) can not only help the patients in manifold ways, but can substantially reduce the economic burden as well as risk-exposure of healthcare professionals through the use of telemedicine. Integrative therapy incorporating the elements of Yoga and Ayurveda may improve the clinical outcomes of high-risk COVID patients.

Supplementary Data

Supplementary data associated with this article is available in the electronic form at http://nopr.niscpr.res.in/jinfo/ijtk/IJTK_21(03)(2022)475-488_AdditionalFile1.pdf
http://nopr.niscpr.res.in/jinfo/ijtk/IJTK_21(03)(2022)475-488_AdditionalFile2.pdf

Acknowledgements

We would like to express sincere gratitude to Dr. Saurabh Mishra, Dev Sanskriti Vishwavidyalaya, for his continued guidance and valuable suggestions. We immensely benefited from his all-rounded expertise. We also acknowledge the help and support extended by Prof. Bharat Bajirao Bhoyar, Chaudhary Brahma Prakash AyurvedCharakSansthan. Last, but not the least, we thank Prof. Bhanu Duggal, AIIMS Rishikesh for her valuable inputs.

Funding

No funding from any source was received for carrying out the presented case series.

Ethics Approval and Informed Consent

This study did not require explicit ethics approval as the cases were treated following the Telemedicine

Practice Guidelines for Ayurveda, Siddha and Unani Practitioners (issued by Central Council of Indian Medicine)[43] and the notification from the Ministry of AYUSH for undertaking research on COVID 19 through Ayurveda, Unani, Siddha and Homeopathy systems[44]. An informed consent for participation was duly taken from each subject prior to commencement of the treatment.

Conflict of Interest

The authors declare that they have no competing interests.

Authors' Contributions

SB designed the Yoga intervention, conducted guided Yoga sessions for some patients and wrote corresponding parts of the manuscript. AM administered Ayurveda treatment to some of the patients and wrote the corresponding sections of the manuscript. YK administered Ayurveda treatment to the remaining patients. ST set up the telemedicine infrastructure, coordinated with the patients for routine follow-up, managed/analysed the data, handled the software requirements and wrote some sections of the manuscript. S conducted yoga sessions for some patients. RG conceptualized the project, coordinated the team and wrote some parts of the manuscript.

References

1 Worldometer, Countries where COVID-19 has spread, Accessed May 08, 2022. https://www.worldometers.info/coronavirus/countries-where-coronavirus-has-spread/

2 Wang B, Li R, Lu Z & Huang Y, Does comorbidity increase the risk of patients with covid-19: evidence from meta-analysis, *Aging* (Albany NY) 12 (7) (2020) 6049.

3 Singh A K, Gupta R & Misra A, Comorbidities in COVID-19: Outcomes in hypertensive cohort and controversies with renin angiotensin system blockers, *Diabetes Metab Syndr*, 14 (4) (2020) 283-287.

4 Espinosa O A, Zanetti A D S, Antunes E F, Longhi F G, Matos T A D *et al*., Prevalence of comorbidities in patients and mortality cases affected by SARS-CoV2: A systematic review and meta-analysis, *Rev Inst Med Trop S˜ao Paulo*, 62 (2020) e43.

5 Medscape, Comorbidities Increase COVID-19 Deaths by Factor of 12. Accessed May 08, 2022. https://www.medscape.com/viewarticle/932486.

6 Guan W J, Liang W H, Zhao Y, Liang H R, Chen Z S, *et al*., Comorbidity and its impact on 1590 patients with COVID-19 in China: A nationwide analysis, *Eur Respir J*, 55 (5) (2020).

7 Zhu L, She Z G, Cheng X, Qin J J, Zhang X J, *et al*., Association of blood glucose control and outcomes in patients with COVID-19 and pre-existing type 2 diabetes, *Cell Metab*, 31 (2020) 1-10.

8 Sinclair A J, Abdelhafiz A H, Age, frailty and diabetes–triple jeopardy for vulnerability to COVID -19 infection, *E Clin Med*, 22 (2020) 100343.

9 Ministry of Health and Family Welfare, G.o.I., Clinical Management Protocol: COVID-19. Accessed May 08, 2022.https://www.mohfw.gov.in/pdf/ClinicalManagementProtocolforCOVID19.pdf

10 Beigel J H, Tomashek K M & Dodd L E, Remdesivir for the treatment of Covid-19-final report, *N Engl J Med*, 383 (19) (2020) 1813-1826.

11 DeFrancesco L, COVID-19 antibodies on trial, *Nat Biotechnol*, 38 (11) (2020) 1242-1252.

12 Saraswati S S, Asan Pranayama Mudra Bandha, Fourth (revised) edition, Yoga Publications Trust, Munger, Bihar, India, 2008.

13 Verma G L, Patanjali Yoga Sutra, Chaukhamba Surbharati Prakashan, Varanasi, Uttar Pradesh, India, 2010.

14 Mishra A, Bentur S A, Thakral S, Garg R & Duggal B, The use of integrative therapy based on Yoga and Ayurveda in the treatment of a high-risk case of COVID-19/SARS-COV-2 with multiple comorbidities: A case report, *J Med Case Rep*, 15 (1) (2021) 1-12.

15 Barth J, Canella C, Oehler M & Witt C M, Digital consultations during COVID-19: A multi perspective mixed-methods study in an integrative medicine setting in Switzerland, *J Altern Complement Med*, 27 (7) (2021) 569-578.

16 Omboni S, Telemedicine during the COVID-19 in Italy: A missed opportunity? *Telemed J E*-Health, 26 (8) (2020) 973-975.

17 Meyer B C, Friedman L S, Payne K, Moore L, Cressler J, *et al*., Medical undistancing through telemedicine: a model enabling rapid telemedicine deployment in an academic health center during the COVID-19 pandemic, *Telemed J E-Health*, 27 (6) (2021) 625-634.

18 Lee J M, Carlson E, Albanese-O'Neill A, Demeterco-Berggren C, Corathers S D, *et al*., Adoption of telemedicine for type 1 diabetes care during the COVID-19 pandemic, *Diabetes Technol Ther*, 23 (9) (2021) 642-651.

19 Miner H, Fatehi A, Ring D & Reichenberg J S, Clinician telemedicine perceptions during the COVID-19 pandemic, *Telemed J E-Health*, 27 (5) (2021) 508-512.

20 Vosburg RW & Robinson K A, Telemedicine in primary care during the COVID-19 pandemic: Provider and patient satisfaction examined, *Telemed J E-Health*, (2021).

21 Park H Y, Kwon Y M, Jun H R, Jung S E & Kwon S Y, Satisfaction survey of patients and medical staff for telephone-based telemedicine during hospital closing due to COVID-19 transmission, *Telemed J E-Health*, 27 (7) (2021) 724-732.

22 Wakimizu R, Kuroki H, Ohbayashi K, Ohashi H, Yamaoka K, *et al*., Perceptions and attitudes toward telemedicine by clinicians and patients in Japan during the COVID-19 pandemic, *Telemed Rep*, 2 (1) (2021) 197-204.

23 Rastogi S, Singh N & Pandey P, On the brighter side of COVID-19 induced lockdown: Devising the collateral methods to provide Ayurveda consultation during impasse, *J Ayurveda Integr Med*, (2020).https://eurekamag.com/research/070/107/070107987.php

24 Ministry of Health and Family Welfare, Discharge Policy of nCoV Case, Accessed May 08, 2022.https://www.mohfw.gov.in/pdf/Corona%20Discharge-Policy.pdf

25 Ministry of Health and Family Welfare, Revised Discharge Policy for COVID-19, Accessed May 08, 2022. http://health.delhigovt.nic.in/wps/wcm/connect/b6af6e004e9fefb89ce8bd5dc9149193/Order11620.pdf?MOD=AJPERES&lmod=-1471732290&CACHEID=b6af6e004e9fefb89ce8bd5dc9149193

26 Kumar S, Debnath P, Banerjee S, Raj A G R & Rao P N, Clinical investigations on the ayurvedic management of Allergic Rhinitis (Vatajapratishyaya) by Pratimarshanasyaas nasal drug delivery system, *Explor Anim Med Res*, 4 (2) (2014), 194-205.

27 Spiritual Practices Recommended during Present Times. Accessed May 08, 2022.https://sites.google.com/ dsvv.ac.in/dahh-dsvv/notices/spiritual-practices-present-times

28 Yoga Nidra by Swami NiranjanandaSaraswati,Accessed September 26, 2020. https://youtu.be/iAX rQPOIAQ

29 Yoga Nidra by Swami NiranjanandaSaraswati, Accessed September 26, 2020. https://youtu.be/RMrVVfIMOTE

30 Saraswati S N, Yoga Nidra– Intermediate, Accessed May 08, 2022. https://youtu.be/WN6q9xQHojI

31 Nagendra H R & Nagarathna R, New perspectives in stress management, Swami Vivekananda Yoga Prakashana, Jayanagar, Bengaluru, Karnataka, India, 1986.

32 Saraswati S S, Yoga Nidra, Sixth Edition, Yoga Publications Trust, Munger, Bihar, India, 2015.

33 Nesari T & Kajaria D, Combating COVID-19 with holistic approach of Ayurveda, *Indian J Tradit Know*, 19 (Suppl) (2020) S37-S46.

34 Kumar A, Rai A K, Chiluveri A C, Chiluveri S K, Londhe D, *et al*., Ayurvedic paradigm for COVID-19 prophylaxis and management strategies: perspective and evidence-based review, *Indian J Tradit Know*,19 (Suppl) (2020) S25-S36.

35 Rao S & Shenoy K B, Role of Indian traditional medicine in mitigating novel corona virus ffects, *Indian J Tradit Know*, 19 (Suppl) (2020) S124-S132.

36 Saraswati S N, Prana and Pranayama, Yoga Publications Trust, Munger, Bihar, India, 2009.

37 Sharvananda S, Taittiriya-Upanishad, The Ramakrishna Math, Mylapore, Madras, 1921.

38 Banerjee B, Vadiraj HS, Ram A, Rao R, Jayapal M, *et al*., Effects of an integrated yoga program in modulating psychological stress and radiation-induced genotoxic stress in breast cancer patients undergoing radiotherapy, *Integr Cancer Ther*,6 (3) (2007) 242-250.

39 Eastman-Mueller H, Wilson T, Jung AK, Kimura A & Tarrant J, iRest yoga-nidra on the college campus: Changes in stress, depression, worry, and mindfulness, *Int J Yoga Ther*, 23 (2) (2013) 15-24.

40 Kumar K, A study on the impact on stress and anxiety through Yoga nidra, *Indian J Tradit Know*, 7 (3) (2008) 401-404.

41 Kumar K & Joshi B, Study on the effect of Pranakarshan pranayama and Yoga nidra on alpha EEG & GSR, *Indian J Tradit Know*,8 (3) (2009), 453-454.

42 Pritchard M, Elison-Bowers P & Birdsall B, Impact of integrative restoration (iRest) meditation on perceived stress levels in multiple sclerosis and cancer outpatients, *Stress Health*, 26 (3) (2010) 233-237.

43 Central Council of Indian Medicine, Telemedicine Practice Guidelines for Ayurveda, Siddha and Unani Practitioners, AccessedMay 08, 2022.https://www.ayush.gov.in/docs/CCIM_Telemedicine_Guidelines.pdf

44 Government of India, Ministry of AYUSH, Notification from the Ministry of AYUSH for undertaking research on Covid 19 through Ayurveda, Unani, Siddha and Homeopathy systems, Accessed May 08, 2022. https://www.ayush.gov.in/docs/127.pdf