Role of AYUSH for COVID-19 Prevention: A New Ray of Hope

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SUMMARY

NECESSITY: COVID-19 has emerged as the global health crisis that poses as the biggest challenge in front of the entire world. The virus is spreading its wings at an alarming rate and morbidity and mortality are also a matter of concern globally. Apart from the health sector, the pandemic has also impacted us socially and economically. Ministry's advisories have suggested measures which may help the public to remain healthy in pandemic times. The Ministry also published guidelines for practitioners for the management of this pandemic.

IDEA: National Clinical Management Protocol based on Ayurveda and Yoga for management of COVID-19. The expert committees from renowned Ayush Institutions like All India Institute of Ayurveda (AIIA), Delhi Central Council for Research in Yoga and Naturopathy (CCRYN),and other national research organizations have developed this protocol.

AIM: Ayush Ministry has developed this protocol which focuses on the management of individuals having mild symptoms of COVID-19. Individuals having moderate or severe symptoms are advised to go for informed treatment options. Ayurveda and Yoga play a key role to boost immunity as per the mentioned guidelines shared by Health and Family Welfare (MoHFW). The current comprehension of COVID-19 indicates that it is crucial to have a solid immune system for both prevention and safeguard from disease progression

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Certificate

*This is here by certified that the dissertation entitled "***Role of AYUSH for COVID-19 prevention: A new ray of hope***"submitted by the student of B.Sc. semester six (University Roll No.180611610029) for partial fulfilment of the B.Sc. degree is done under my supervision. I wish her every success in life.*

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INTRODUCTION

AYUSH:

AYUSH is an acronym for Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy and are the six Indian systems of medicine prevalent and practiced in India and some of the neighbouring Asian countries with very few exceptions in some of the developed countries. A department called the department of Indian system of medicine was created in March 1995 and renamed to AYUSH in November 2003 with a focus to provide increased attention for the development of these systems. Described by experts as a ray of hope in the time of the pandemic, AYUSH which was originally developed in 1980 for treatment of malaria, has now been repurposed for Covid 19. The trials led by reputed scientists of the country showed AYUSH 64 has notable antiviral, immune-modulator and antipyretic properties. It is found to be useful in the treatment of asymptomatic, mild and moderate COVID-19 infection. Consequently, the drug is now repurposed for COVID-19.

IMPORTANCE:

1. Ayush is found to significantly enhance the speed of clinical recovery in terms of disease symptoms and severity. It also has significant beneficial effects on general health, fatigue, anxiety, stress, appetite, general wellbeing and sleep (*Mukunth, Vasudevan et al., 2017).*

PANDEMIC:

A pandemic is a disease outbreak that spreads across countries or continents. It affects more people and takes more lives than an epidemic. An outbreak is when an illness happens in unexpected high numbers. It may stay in one area or extend more widely. An outbreak can last days or years. Sometimes, experts consider a single case of a contagious disease to be an outbreak. This may be true if it's an unknown disease, if it's new to a community, or if it's been absent from a population for a long time.

HOW TO TACKLE:

COVID-19 pandemic is a challenge to public health worldwide. In spite of implementation of prophylactic strategies such as promotion of hygiene, social distancing and global lockdown, the spread of disease remains a challenge. The pandemic has raised complex issues for health systems, communications, research infrastructure, and research governance frameworks.

The AYUSH Task Force has therefore recommended development of a guidance document for researchers that will discuss methodological components of a protocol for evaluating AYUSH interventions in COVID-19. This is an opportune time when AYUSH concepts and interventions should be evaluated for developing better arsenals to prevent and treat the disease (*Deccan Herald et al.,2019)*

SARS:

Severe acute respiratory syndrome, or SARS, was a contagious and potentially fatal respiratory illness. The respiratory illness known as SARS first appeared in China in November 2002, and scientists identified it in February 2003, but the disease is no longer circulating. It is a viral infection that causes flu-like symptoms; SARS is an airborne virus and can spread through small droplets of saliva in a similar way to the cold and influenza.

RELATION BETWEEN COVID-19 AND SARS:

Severe acute respiratory syndrome (SARS) is a viral respiratory disease caused by a SARS-associated coronavirus. It was first identified at the end of February 2003 during an outbreak that emerged in China and spread to 4 other countries.

SARS was the result of infection by a coronavirus that scientists named SARS-associated coronavirus (SARS-CoV). SARS-CoV is related to SARS-CoV-2, the virus that causes COVID-19 infection.

PANDEMIC AGENT:

Experts believe that coronaviruses, such as SARS-CoV, being a pandemic agent, spread through close human contact and in droplets from coughing and sneezing. The viruses may be airborne or travel in ways that scientists do not yet know about.

The body likely absorbs the respiratory droplets through the mucous membranes of the mouth,nose, and eyes.

Way of transmitting the virus may include**:**

- Hugging ,
- Sharing utensils for eating and drinking ,
- Speaking to others within a distance of 3 feet ,
- Touching someone directly

If droplets from one person land on an object such as a door handle or a telephone, someone else can pick up the virus if they touch these items.

ROLE OF AYUSH:

Ayush is a poly herbal formulation developed in compliance to all regulatory requirements as well as quality and pharmacopoeial standards by the Central Council for Research in Ayurvedic Sciences (CCRAS) the apex body for research in Ayurveda under the Ministry of Ayush. It has been scientifically established to be useful in the treatment of asymptomatic, mild and moderate COVID-19 infection as an adjunct to standard care through robust clinical trials conducted in the country. The results of the clinical trials demonstrated that Ayush 64 as an adjunct to standard of care (SoC) showed clinically significant improvement and thus lesser period of hospitalization as compared to SoC alone (*Krishnan, Vidya et al.,2019)*

TABLE 1: Traditional knowledge of anti viral plants

Herb name	Traditional uses	Study/study model	Preparation (dose)	Results	References
Rasona (Allium sativum)	Athletes for increasing stamina during the earliest Olympics in Greece. (2) Oil as an antimicrobial in *Ayurveda*. (3) In Turkish traditional medicine cloves and bulb of garlic as an immuno-tonic, anthelminthic, ringworm management, cardio-protective and rheumatism	In vivo study, BALB/c mice	Aged garlic extract (AGE) (10 µl/kg/day/I.p. route)	Protective Altering of cytokine production through raised levels of IFN-γ and IL-4. Reduced lymphocytes in the spleen	Larypoor et al. (2013)
		In vitro study, tumor cells, S180 sarcoma cell line	Diallyltrisulfide (DATS) higher concentration dose(50 µg/ml)	T cell proliferation inhibition	Feng et al. (1994)
			DATS lower concentrations dose (3–12.5 µg/ml)	Augmented the proliferation of T cells to Con A	
		In vivo study, Broiler chicks	Garlic or ginger dietary supplementation (garlic extract at concentrations of 10–15% and ginger extract at a concentration of 15 g/kg diet)	Innate immune response modulated via phagocytosis augmentation, bactericidal activity enhancement, and nitric oxide production reduction with triggering the IL-1β, IL-6, and IFN-γ cytokines expression	Elmowalid et al. (2019)
Herb name	**Traditional uses**	**Study/study model**	**Preparation (dose)**	**Results**	**References**

Jiraka (Cuminum) cyminum/Nigella sativa)	Hoarseness, jaundice, leprosy, chronic diarrhoea, bronchopulmonary disorders, and as a cough remedy. (2) Bloody diarrhea, inflamed eczema, and headache in Indonesia. (3) In *Unani* system of medicine, used for the treatment of ulcers, boils, stye, and cough. (4) Used to treat pneumonia in Russia. (5) gastrointestinal, gynecological, and respiratory disorders in Iranian traditional medicine	Cyclosporine-A immune-suppressed Swiss albino mice	*Cuminum cyminum* seed powder (25, 50, 100 and 200 mg/kg)	A dose-dependent increase in CD4 and CD8, and Th1 predominant immune response	Chauhan et al. (2010)
		Ovalbumin-induced allergic diarrhea in BALB/c mice	*Nigella sativa* seed hexanic extract and thymoquinone (intragastric gavage once a day for 4 days)	Improved symptoms and immune parameters	Duncker et al. (2012)
		BALB/c mice	Methanolic extract of *N. sativa* (sublethal dose- 20 mg/dose/animal/ I.p.)	Protective increase in total WBC count, increased spleen weight, and enhanced splenocyte proliferation	Ghonime et al. (2011)
Dhaanyaka (Coriandrum sativum)	(1) Juice of fresh leaves used as a gargle in sore throat and stomatitis. (2) Seeds are used for the treatment of fever and diarrhea. (3) A decoction of leaves used in conjunctivitis	Typhoid vaccination challenged long Evan rat model	*N. sativa* seed oil	Decreased antibody production with decreased splenocytes and neutrophil counts	Ahmad et al. (2013)
		Pigeons (*Columbalivia*)	Co-administration of *N. sativa* (2.5%) with oxytetracycline (OXT) (0.05 g/kg of feed)	Blocks the inhibitory effects on TLC and lymphocyte counts	Al-Ankari (2005)
		Broiler chicks (Ross 308)	Seed extract (750, 1000 ppm) in drinking water + control diet without coriander	IgG antibody against sheep red blood cells improved, IgM was higher in fed animals	Hesam et al. (2014)

Herb name	Traditional uses	Study/study model	Preparation (dose)	Results	References
Tulsi (Ocimum sanctum, Ocimum basilicum, Ocimum americanum)	(1) A decoction of leaves is a remedy for cold. (2) As prophylaxis against malaria, fresh *Tulsi* leaves with black pepper in the morning	Male Wistar rats, male Swiss albino mice, and guinea pigs	Ocimums anctum seed oil (3 ml/kg/I.p.)	Modulates GABAergichumoral and cell-mediated immune response	Mediratta et al. (2002)
		Wistar albino rats infected with LD50 dose of *S. typhimurium* infection	Aqueous extract of *O. sanctum* leaves (250 mg/kg)	Increased number of *S. typhimurium* engulfed peritoneal macrophages An elevated level of TNF-α, IFN-γ, and IL-2 cytokines in serum	Mukharjee et al. (2005)
		60 crossbred lactating cow sub-clinical mastitis (SCM)	Aqueous extract of *O. sanctum* leaf (100 mg/teat/intramammary route/OD for 7 days)	Inhibited bacterial growth by increased phagocytic activity and phagocytic index. Enhanced lysosomal enzyme contents of the milk polymorphonuclear cells	Jeba et al. (2011)
		Wistar albino rats	Aqueous extract of *O. sanctum* leaf (100, 200 mg/kg/day/P.o. for 45 days)	Increased level of total protein, stimulated antibody production, enhanced production of WBC, RBC, and Hb Decreased SGPT	

Herb name	Traditional uses	Study/study model	Preparation (dose)	Results	References

		Swiss albino mice	Ethanolic and aqueous extracts of *O. basilicum* leaves (400 mg/kg/day/P.o.)	Increase in circulating antibody titer production, percentage neutrophil adhesion ($p < 0.01$) to nylon fibers, phagocytic activity, and primary and secondary hemagglutination antibody titer ($p < 0.01$) Potentiate delayed-type hypersensitivity reaction	Neelam and Nilofer (2010)
		In vitro study, Cell preparation from Sprauge–Swiss albino mice Dawley male rat and suspended in RPMI 1640 medium	Methanolic extract of *O.basilicum* (250 µg/ml)	Lymphoproliferation up to 80%	Flores et al. (2008)
			Aqueous extract of *O.basilicum* (250 µg/ml)	lymphoproliferation up to 83%	
		Stress-induced anxiety and depression model of male albino rats	Aqueous extract of *Ocimum sanctum* (100 mg/kg)	Anxiolytic and antidepressant-like effect mediated through central monoaminergic neurotransmitter system	Tabassum et al. (2010)
Haridra (*Curcuma longa*)	(1) Used with cow's urine in eosinophilia. (2) with curry leaves in asthma. (3) Turmeric powder, honey, and bitter gourd leaves extract used for measles. (4) Turmeric powder, powdered black pepper with milk used for Malaria. (6) Honey and turmeric powder mixed with the juice of Indian gooseberry treats urine discharges	NP-OVA immunized C57BL female mice	Curcumin, extracted from *Curcuma longa* (200 µg/day/I.p.)	Increases humoral immunity by antibody production mediated by increased TFH cells in the draining lymph nodes. Production of high-affinity antibodies of the IgG1 and IgG2b isotypes	Kim et al. (2019)

Herb name	**Traditional uses**	**Study/study model**	**Preparation (dose)**	**Results**	**References**

		In vitro, RAW 264.7 cells derived from murine macrophages and clone-9 rat hepatocytes	Concentrations of 20% turmeric polysaccharides ukonan A, B, C, and D extracted with water (TurP)	Promotes cellular immune responses, and tissue repair (improves telomer function)	Pan et al. (2017)
		C57BL/6 mice infected with LP-BM5 murine leukemia virus (MuLV)	A mixture of *Curcuma longa* and sweet purple potato (CPM) (CPM low—2 g/kg Bw/P.o.) (CPM high—5 g/kg Bw/P.o.)	Increased expression of MHC class I and CD8(+) T helper cells, T cell proliferation, phagocytic activity and improved the imbalance of Th1/Th2 type cytokines	Park et al. (2018)
		Swiss albino male mice	Nanoparticulatecurcumin (doses of 5 mg/kg/day, 10 mg/kg/day/P.o.)	Stimulated primary humoral immunity with 9.00 ± 1.00 antibody titer ($p < 0.05$) white blood cells increased and the weight of the lymphoid organs was also increased	Afolayan et al. (2018)
		Pacific white shrimp (Litopenaeus van namei Boone) against *V.harvey i*	*Curcuma longa* Linn. extract containing 25.726% (w/w) curcuminoids (0, 12.5, 25.0 and 50.0 mg/kg feed)	Better resistance against *V. harveyi* in shrimps. Enhanced phenoloxidase activity and phagocytic activity	Kittima et al. (2010)

Herb name	Traditional uses	Study/study model	Preparation (dose)	Results	References
		Splenocyte culture made from swiss albino male mice	NR-INF-02 (an aqueous-based extract of *C. longa*) ((0.8–500 µg/mL)	Immunostimulatory activity by macrophage activation, splenocytes proliferation, and cytokine release downregulating PGE2 and IL-12 secretion	Chandrasekaran et al. (2013)
		C57BL/6J−Min/+(Min/+) mice	A diet containing 0.1% curcumin	Increased mucosal CD4(+) T cells and B cells	
Tvaka (genousCinnamomum)	(1) In Ayurveda, used for the common cold, cough, fever, sore throat, sinusitis, and herbal toothpaste to reduce dental caries. (2)In traditional Chinese medicine (TCM), used for cold, diarrhea, asthma and as an appetiser. (3) In Europe, used for ailments associated with cold. (6) In western herbal medicine, used in toothpaste because of its antimicrobial property	In vivo study, Nile tilapia, *Oreochromisniloticus (L.).* Fish challenged against hypoxia stress or pathogenic bacteria	0.0, 0.25, 0.5, 1.0, 3.0, 5.0, and 10.0 g cinnamon nanoparticles (CNP)/kg/P.o	Raised Innate immunity variables (nitrous oxide, nitro blue tetrazolium) and lysozyme activity were higher. No mortality in fish fed 3.0–10.0 g CNP/kg diet	Abdel-Tawwab et al. (2018)
		In vitro, Peripheral blood lymphocyte (PBL) culture	0.01% extract of Chinese medicinal herbs (CMH) containing Cinnamomum cassia (at the dilution of 40×)	Stimulated human lymphocytes to proliferate	Shan et al. (1999)

Herb name	Traditional uses	Study/study model	Preparation (dose)	Results	References
Maricha (Piper nigrum)	(1) In Ayurveda, used to treat respiratory congestion. (2) Used in cold and flu prevention in western herbalism. (3) Used in ear–nose–throat-related problems, including a cough, sinusitis, throat pain, throat infection, and earache. (4) Used against skin diseases, fever, and jaundice	L. donovani infected BALB/c mice	*Piper nigrum* hexane (PNH) (100 mg/kg, 200 mg/kg/I.P. and *P. nigrum* ethanolic (PNE) (100 mg/kg, 200 mg/kg/I.p.)	Increased secretion of Th1 (INF-γ, TNFα, and IL-2) cytokines and Decreased IL-4 and IL-10, Increased production of IgG2a, Upregulated expression of co-stimulatory molecules CD80 and CD86, Augmented splenic CD4 + and CD8 + T cell population, Induced strong lymphoproliferative and DTH responses and partially stimulated NO production	
		In vitro, murine cultured splenocytes	Aqueous extracts of black pepper or cardamom four doses (1, 10, 50, and 100 µg/mL)	All doses (except 1 µg/mL) enhanced splenocyte proliferation A dose-dependent increase in IFN-γ release, IL-6 and TNFα release by macrophages	Maurya et al. (2020)
		BALB/c mice	AC II, a registered Ayurvedic preparation (1 g/kg BW/P.o.)	The enhanced mitogen-induced proliferation of spleen cell lymphocytes Enhanced NK cell activity in normal and tumor-bearing animals, Elevated levels of IL-2, TNF-α, and IFN-γ in normal mice, Antibody-dependent cellular cytotoxicity was raised	Kesavan et al. (1998)

Herb name	Traditional uses	Study/study model	Preparation (dose)	Results	References
Shunthi (Dr Zin giberofficinale)	(1) Ginger given orally for the common cold in India. (2) Ginger and palm tree juice (htan-nyat) are boiled and given orally to prevent the flu in Burma. (3) In China, sliced cooked ginger with brown sugar is used in the common cold. Dried ginger candies are used for coughing	Rainbow trout fish (*Oncorhynchus mykiss*)	Diet (1% of a dried aqueous ginger extract) used at a rate of 2% of body wt. for 3 weeks	Increased Non-specific immunity Phagocytosis and extracellular burst activity of blood leukocytes were higher	Dugenci et al. (2003)
		BALB/c mice	50% ethanolic ginger extract (25 mg/kg/P.o.)	Improved humoral immunity (higher antibodies and plaque-forming cells)	Puri et al. (2000)
		Cyclophosphamide immunosuppressed male swiss mice	Essential oil from *Zingiber officinale* (100, 200 and 400 mg/kg/OD/P.o. for 7 days)	Recovered humoral immune response in immunosuppressed mice	Carrasco et al. (2009)
Chyawanprash	(1) In Ayurveda, It is *Rasayana* (rejuvenating tonic) that helps in attaining longevity, memory, intellect, freedom from disease, youthfulness, luster, complexion, voice, and optimum strength of physique and sense organs	In vitro study done in dendritic cell (DC) and NK cell cultures from murine bone marrow	D-CHY (Dabar-Chyawanprash) (20–500 µg/ml for 24 h)	Discussed in manuscript	Madaan et al. (2015)
		Ovalbumin induced allergy in mice	D-CHY (1 g/kg/P.o.)	Antiallergic activity by reducing plasma histamine levels and serum immunoglobulin E (IgE) release	Sastry et al. (2014)

Herb name	Traditional uses	Study/study model	Preparation (dose)	Results	References
Lavang (Syzigium aromaticum)	(1) In tropical Asia, cloves are used to treat scabies, cholera, malaria, tuberculosis, diarrhea, and asthma. (3) It has been traditionally used in inhibiting food-borne pathogens in America	Albino Wistar rats	Flower bud oil of *Syzigium aromaticum* (200, 400, 800 mg/kg p.o.)	Exhibited increase in haemagglutinating antibody titer and delayed-type hypersensitivity response in dose-dependent manner	Umasankar and Nambikkairaj (2018)
		Male Swiss mice	Clove essential oil (CEO) (100, 200 and 400 mg/kg/P.o.) 400 mg/kg/P.o	Increase in total WBC count and stimulating cell-mediated immunity in a dose-dependent manner Protective effect against immunosuppression	Carrasco et al. (2009)
		In vitro, macrophage cells isolated from BALB/c mice	Clove ethanolic extracted essential oil (containing eugenol) or aqueous extract (ranging from 0.001 to 1000 µg/ml)	Both extracts enhance NO release by non-LPS (unstimulated) treated macrophages at a concentration of (0.001–1 µg/ml) Ethanolic extract and aqueous extract (doses up to 1 µg/ml) showed suppression of TNF-α release while aqueous extract (doses > 1 µg/ml) showed stimulation of TNF-α release	

Herb name	Traditional uses	Study/study model	Preparation (dose)	Results	References
Pudina (Mentha arvensis)	(1) Used to treat cold, cough, fever, headache, and asthma. (2) Leaves have anti-inflammatory action. (3) A decoction is used to treat diarrhea and influenza	Sprague–Dawley rats	*Mentha arvensis* (MA) extract (100 mg/kg/P.o.) and fermented *Mentha arvensis* (FMA) (100 mg/kg/P.o.)	Pretreatment reduced the serum and hippocampus level of malondialdehyde (MDA) Ameliorated the serum and hippocampus nitric oxide (NO) levels in immobilized rats	Weishun et al. (2018)
Ajwain (Trachyspermum ammi)	(1) *Ajwain* seeds, clove, and common salt are used as lozenges for pharyngitis, sore throat, and hoarseness of voice. (2) Steam inhalation with *Ajwain* seed in common cold	Wistar rats	Crude methanolic extract of *T. ammi* (500 mg/kg/P.o.)	Effective immunomodulation on skin thickness (DTH reaction)	Siddiqui et al. (2019)
		In vitro, murine splenocyte cells	*Ajowan* immunomodulatory component (ImC) (1 µg/ml)	The induced proliferation of murine splenocytes activates peritoneal exudate cells for the synthesis of NO (nitric oxide) and phagocytosis	Shruthi et al. (2017)

TABLE 2: Mechanistic properties of anti-viral herbs

Activity	Herb	Mechanistic property
Anti-obesity	Allium sativum	Decreased fat accumulation in 3T3-L1 adipocytes and stimulates apoptosis
	Zingiberofficinalis	Decreases the level of fatty acid synthase
	Piper nigrum	Reduces LDL, VLDL, HMGCoAreductase
	Cinnamomum	Reduces Serum cholesterol
	Cuminumcyminum	Reduces Serum cholesterol, LDL, and triglycerides
Anti-diabetic	Ocimum sanctum	Enhances Insulin secretions
	Curcuma longa	Act through PPAR-activation
	Zingiberofficinalis	Increases cell-mediated glucose uptake
	Cinnamomum	Enhances Insulin secretions and their action
Antihypertensive	Allium sativum	Reduces induction of NHE and activation of Na pump activity
	Cinnamomum	Increases level of ANF
	Cuminumcyminum	Reduces Sr. Cholesterol, LDL, triglycerides, act as a diuretic
Cardioprotective	Allium sativum	Free radical scavenger, Controls cardiac Na/K ATPase activity
	Piper nigrum	Reduces LDL, VLDL, HMGCoAreductase
	Chywanprash	Free radical scavenging
	Cinnamomum	Reduces Serum cholesterol, and total lipid level
Nephroprotective	Ocimum sanctum	Anti oxidative and free radical scavenging
	Curcuma longa	Reduces oxidative stress and increases kidney glutathione content
	Cuminumcyminum	Diuretic action
	Chywanprash	Free radical scavenging
Hepato-protective	Ocimum sanctum	Increase bile synthesis, reduces liver lipid synthesis
	Zingiberofficinalis	Anti-oxidant action
	Piper nigrum	Reduces superoxide dismutase, catalase, glutathione reductase
Pulmo-protective	Curcuma longa	Anti-inflammatory activity
	Cuminumcyminum	Manages inflammatory pulmonary response, increase activity of surfactant protein D
	Chywanprash	Settle pulmonary ailments, immunomodulatory

Table 3: Role of AYUSH to tackle any epidemic before Covid19

Stages	Clinical presentation	Medicines		DOSES & Timing
Uncomplicated illness	**Fever, cough, sore thoat nasal congestion,Malaise and Headache**	**First Line (jwaraAngamarda Predominant)**	**. MahasudarshanaGhanvati**	500mg-TDs
			. SanjeevaniVati	25 mg TDs
			. SamshamniVati	S00 mg TDSs
			. Talishadichuma+ . Yastimadhuchurna	2g+1g- TDS
			. sitopaladichurna	3G-TDS
			. Lozenges- Vyoshadivati . Lavangadivati . Yashtimadhughanvati	2 tab -TD
			. ChaturthakaJvaraharakwatha(Giloya stem either dry or wet 5 grms +Amlaki - dry – 5grms+ Nagarmotha- 5grms decoction with 200ml of water and reduce it upto 100ml) . PathyadiKashayam /GuduchyadiKashayam/ BharangyadiKashayam	- 10 gm boiled inneass or waterreduced to half BDempty stomach
		Second Line (ShwasaKasa Predominant)	. Trikatu Siddha jala	3g boiled in 1 liter of water
			. VyaghriHaritakileha . AgastyaRasayana . KantakariAvaleha "	10gm- BD
			. Gargle with warm water mixed with rock salt and tumeric	Qs
			Amritarishta	20 ml-BD with equal amount of water
			Shadanga-paniya	
			Gargling with YashtimadhuPhanta -3 to 4 times daily (200 ml lukewarm water+ SgmsYashtimadhuchurna)	**Qs**
			Shwasakuthara Rasa* NaradiyaLakshmivilasa Rasa	250 mg each with Honey TID
	For Myalgia		. Ashwagandharishta and/or Balarishta . Rasnasaptakakwatha"	15-20 ml with equal amount of water three times a day - 10 gm boiled in one glass of water reduced to half BD empty stomach
		First Line	. DhanwantaraGutika . SameerapannagaRas/" Shrungarabhra Rasa	2 tablets with Jeeraka water 250mg- BD with honey
			. Marsha Nasya" (Shirovirechana) with AnuTaila / ShadbinduTaila/	dose as per age

Mild Pneumonia	Difficulty in Dreathing fast breathing >40 breath s/min		SarshapaTaila	
			. Steam inhalation with Ajwain / Pudina/Eucalyptus oil	Once/ twice in a day
		Second Line	. Somasava	10 ml BD mixed with equal amount of water
			. Dashmularishta	20 ml- BD mixed with equal amount of water
		Second Line	Dashamoolakwatha with Pippalichoornmaprakshepa (lgm)	10 gm boiled in on glass of water, reduced to half BD empty stomach

Table 4: List of Uncomplicated cases and their prescribed medicines

1. Uncomplicated Cases	Prescribed Medicines
1.2 Sore throat	1.Vyoshadivati/ LavangadiVati/ Khadiradivati - 2 tab TDS 2. Laxmivilasa rasa 125 mg tid with tamboolaswarasa after food
1.3 Nasal congestion (Pratishyaya)	1. Haridrakhand- 3 -5 gm BD with lukewarm water/ milk 2. Laxmivilasa rasa 125 250 mg BD with tamboolaswarasa after food
1.4 Myalgia (Parshwa- shoola, Shirashoola, Angamarda)	1. Rasnasaptak*- Kwath-30-40ml BD before food 2. Ashwagandharista 15-20 ml BD with water 3. Balarishta 15-20 ml BD with water 4. Devadaryadikwatha* 30- 40 ml BD before food 5. Dashamoolakwath 30-40 ml BD before food 6. Godantibhasma 500 mg-1 gm BD/TDS daily with ghee, sugar, wam milk or water
1.5 Cough (VatajaKasa)	1. TalisadiChurna (4 g)+ Madhuyashtichurna (2 g) BD with honey/ lukewarm water 2. Sitopaladichurna 3-6 gm with honey BD/ TDS or as required 3. Tankanabhasma* - 250 500 mg BD 4. DashamoolakatutrayadiKashaya* 20- 30 ml TDS with water before food
1.6 Dehydration features (Trishana due to Jwara)	1. Shadangapaneeya 40 ml tid/as per requirement

Emergence of Covid19 & AYUSH action plan

If COVID-19 is spreading in your community, stay safe by taking some simple precautions, such as physical distancing, wearing a mask, keeping rooms well ventilated, avoiding crowds, cleaning your hands, and coughing into a bent elbow or tissue. Check local advice where you live and work (*Reporter, B. S. et al.,2015)*

Table 5: Protect yourself and others from COVID-19

Clinical severity	Medicines	Doses&Timing
Prophylactic care(high risk population, primary contacts)	Ashwagandha [Aqueous extract of Withaniasomnifera IP) or its powder	500 mg extract or 1-3g powder twice daily with warm water for 15 days or one month or as directed by Ayurveda physician
	GuduchiGhanavati (Samshamanivati or Giloy Ghana vati having Aqueous extract of TinosporacordifolialP) or the powder of Tinosporacordifolia	500 mg extract or 1-3 g powder twice daily with warm water for 15 days or one month or as directed by Ayurveda physician
	Chyawanaprasha	10 g with warm water/ milk oncea day
Post COVID Management	Ashwagandha (Aqueous extract of Withaniasomnifera IP) or its powder	500 mg extract or 1-3 g powder twice daily with warm water for 15 days or one month or as directed by Ayurveda physician
	Chyawanprasha	10 g with warm water/ milk once a day
	RasayanaChurna compound herbal powder made up of equal amounts of Tinosporacordifolia, Emblicaofficinalis and Tribulusterrestris)	3g powder twice daily with honey for one month or as directed by Ayurveda physiclan

What to do to keep yourself and others safe from COVID-19:

- **Maintain at least a 1-metre distance between yourself and others** to reduce your risk of infection when they cough, sneeze or speak. Maintain an even greater distance between yourself and others when indoors. The further away, the better (*Kakkilaya, Srinivas et ai.,2019)*
    - **Make wearing a mask a normal part of being around other people. The appropriate use, storage and cleaning or disposal are essential to make masks as effective as possible.**

      Here are the basics of **how to wear a mask:**
        - Clean your hands before you put your mask on, as well as before and after you take it off, and after you touch it at any time.
        - Make sure it covers both your nose, mouth and chin.
        - When you take off a mask, store it in a clean plastic bag, and every day either wash it if it's a fabric mask, or dispose of a medical mask in a trash bin.
        - Don't use masks with valves.

How to make your environment safer:

- **Avoid the 3Cs: spaces that are closed, crowded or involve close contact.**
    - Outbreaks have been reported in restaurants, choir practices, fitness classes, nightclubs, offices and places of worship where people have gathered, often in crowded indoor settings where they talk loudly, shout, breathe heavily or sing.
    - The risks of getting COVID-19 are higher in crowded and inadequately ventilated spaces where infected people spend long periods of time together in close proximity. These environments are where the virus appears to spread by respiratory droplets or aerosols more efficiently, so taking precautions is even more important (*Thapar, Karan et al.,2020)*
- **Meet people outside.** Outdoor gatherings are safer than indoor ones, particularly if indoor spaces are small and without outdoor air coming in.
    - *For more information on how to hold events like family gatherings, children's football games and family occasions.*
- **Avoid crowded or indoor settings** but if you can't, then take precautions:

- **Open a window.** *Increase the amount of* 'natural ventilation' when indoors.
- WHO has published Q&As on ventilation and air conditioning for both the general public and people who manage public spaces and buildings.
- **Wear a mask** (see above for more details).

Don't forget the basics of good hygiene :

- **Regularly and thoroughly clean your hands with an alcohol-based hand rub or wash them with soap and water.** This eliminates germs including viruses that may be on your hands.
- **Avoid touching your eyes, nose and mouth.** Hands touch many surfaces and can pick up viruses. Once contaminated, hands can transfer the virus to your eyes, nose or mouth. From there, the virus can enter your body and infect you.
- **Cover your mouth and nose with your bent elbow or tissue when you cough or sneeze**. Then dispose of the used tissue immediately into a closed bin and wash your hands. By following good 'respiratory hygiene', you protect the people around you from viruses, which cause colds, flu and COVID-19**.**
- **Clean and disinfect surfaces frequently especially those which are regularly touched,** such as door handles, faucets and phone screens (*Shaikh, Dr Sumaiya et al.,2019)*

What to do if you feel unwell :

- **Know the full range of symptoms of COVID-19.** The most common symptoms of COVID-19 are fever, dry cough, and tiredness. Other symptoms that are less common and may affect some patients include loss of taste or smell, aches and pains, headache, sore throat, nasal congestion, red eyes, diarrhoea, or a skin rash.
- **Stay home and self-isolate even if you have minor symptoms such as cough, headache, mild fever**, until you recover. Call your health care provider or hotline for advice. Have someone bring you supplies. If you need to leave your house or have someone near you, wear a medical mask to avoid infecting others.

- **If you have a fever, cough and difficulty breathing, seek medical attention immediately. Call by telephone first, if you can** and follow the directions of your local health authority.
- **Keep up to date on the latest information from trusted sources, such as WHO or your local and national health authorities.** Local and national authorities and public health units are best placed to advise on what people in your area should be doing to protect themselves (*Edzard Ernst et al.,2019)*

Importances of clinical studies :

Dr.BhushanPatwardhan, National Research Professor, Ayush and Chairman of the Inter-disciplinary Ayush Research and Development Task Force on COVID-19 stated that the results of AYUSH-64 study are highly encouraging and in the current crisis situations needy patients should be able to get benefits of Ayush 64. He also underlined that this multi-centre trial was monitored by Ayush-CSIR Joint Monitoring Committee (MC) under the chairmanship of Dr. V M Katoch, former Secretary, Department of Health Research and former Director General, Indian Council of Medical Research (DG, ICMR). He further added that these clinical studies periodically reviewed by an independent Data and Safety Management Board (DSMB) (*Shaikh, Dr Sumaiya et al.,2020)*

Table 6: Fighting in the battle against Covid19

Clinicalseverity	Clinical Presentation	Clinical Parameters	Medicines	Doses&Timing
Mild COVID-19 Positive	Symptomatic managementFever,Headache Tiredness DryCough, Sore throat Nascongestion	Withoutevidenceofreathlessnessorhypoxia(normal situation)	Guduchl+Pippall extracts Tinosporacordifolia IP andPiper longum IP)	375 mg twice daily with warmwater for 15 dayor as directed byAyurveda physician
			AYUSH64	500 mg twice daily with warm water for 15 days or as directed by Ayurveda physician

Flow chart of protocol of management of COVID -19

Target Group 1: Quarantine and Home isolation subjects with or without Corona positive test and health workers

Target Group 2: Subjects with Mild, Severe Symptoms, Comorbid & Immuno-compromised condition

Target Group 3: Vulnerable group (Pregnant & Lactating women, Children & Geriatric subjects)

Target Group 4: Post treatment restorative healthcare

COVID 19 Management based on Target groups & Interventions

Preventive

Target Group 1

General public & Health workers

Suspected and quarantined

Immuno-compromised

Promotive

Target Group 4

Post Recovery Maintenance

(To prevent recurrence and health restoration)

Target Group 4 - For all category

Therapeutic

Mild (Fever/URTI)

Target Group 2

Mild with co-morbid conditions

Conventional Management + Add on Target Group 2

Mild with Vulnerable population

Target Group 2 + 3 + Conventional support

Moderate

(Pneumonia with no signs of severe disease)

(RR 15 to 30/min, SpO2 90%-94%)

Target Group 2 + Conventional Management

Moderate with co-morbid conditions

Conventional Management + Add on Target Group 2

Moderate with Vulnerable population

Conventional support + Target Group 2 + 3

Severe

(RR >30/min, SpO2 less than 90%)

Conventional Management + Add on Target Group 2

Severe with co-morbid conditions

Conventional Management + Add on Target Group 2

Severe with Vulnerable population

Conventional + Add on therapy with Target 2 + Target 3

- Stand alone Management
- Stand alone with Target Group 2 Management
- Conventional Management along with Target group 2 Management
- Target Group 2 + 3 and Conventional Management
- Conventional Management and Target Group 2 + 3 as add on therapy
- Stand alone therapy in Target Group 4

AYUSH 64:

In the middle of the havoc wreaked by second wave of the pandemic, AYUSH-64 has emerged as a ray of hope for the patients of mild and moderate COVID-19 infection. The scientists of reputed research institutions of the country have found that AYUSH 64, a poly herbal formulation developed by the Central Council for Research in Ayurvedic Sciences (CCRAS), Ministry of Ayush is useful in the treatment of asymptomatic, mild and moderate COVID-19 infection as an adjunct to standard care. It is worthwhile to mention that initially the drug was developed for Malaria in the year 1980 and now is repurposed for COVID-19.

Described by experts as a ray of hope in the time of the pandemic, the polyherbal drug AYUSH- 64 which was originally developed in 1980 for treatment of malaria, has now been repurposed for Covid 19. The trials led by reputed scientists of the country showed AYUSH 64 has notable antiviral, immune-modulator and antipyretic properties. It is found to be useful in the treatment of asymptomatic, mild and moderate COVID-19 infection. Consequently, the drug is now repurposed for COVID-19 (*Shaikh, Dr Sumaiya et al.,2109)*

The announcement by the Ministry of the findings of the clinical trials in a press conference on 29th April 2021 has led to considerable interest in AYUSH -64 among the public as well as medical practitioners. Responding to the numerous queries received in the matter, the Ministry has now released replies to the same in the Frequently Asked Questions (FAQs) format, and the same are reproduced below**:**

- **What is Ayush-64:**

Ayush-64 is an Ayurvedic formulation, developed by the Central Council for Research in Ayurvedic Sciences (CCRAS), the apex body for research in Ayurveda under the Ministry of Ayush. Originally developed in 1980 for the management of Malaria, this drug has now been repurposed for Covid 19 as its ingredients showed notable antiviral, immune-modulator and antipyretic properties. The in-silico study done on Ayush 64 showed that 35 out of 36 of its Phyto-constituents have high binding affinity against COVID 19 virus. The formulation has also shown very promising results in Influenza like illnesses. With scientific evidence generated from 06 clinical studies across India, Ayush 64 has been identified as a potential adjunct to

standard care in the management of asymptomatic, mild and moderate COVID 19 to improve the clinical recovery and quality of life.

- **Composition:**

  AYUSH 64 comprises of *Alstoniascholaris* (aqueous bark extract), *Picrorhizakurroa* (aqueous rhizome extract), *Swertiachirata* (aqueous extract of whole plant) and *Caesalpinia crista* (fine-powdered seed pulp). It is extensively studied, scientifically developed, safe and effective Ayurveda formulation. This medicine is also recommended in National Clinical Management Protocol based on Ayurveda and Yoga which is vetted by National Task Force on COVID-19 Management of ICMR.

- **Safety:**

  The Ministry of Ayush-Council of Scientific and Industrial Research (CSIR) collaboration has recently completed a robust multi-centre clinical trial to evaluate the safety and efficacy of AYUSH 64 in the management of mild to moderate COVID-19 patients.

- **Randomized Clinical Study:**

  Dr Arvind Chopra, Director, Centre for Rheumatic Diseases, Pune and honorary chief clinical coordinator of the Ministry of Ayush - CSIR collaboration informed that the trial was conducted at three centres. KGMU, Lucknow; DMIMS, Wardha and BMC COVID Centre, Mumbai involving 70 participants in each arm. Dr Chopra stated that AYUSH 64 as an adjunct to standard of care (SoC) showed significant improvement and thus lesser period of hospitalization as compared SoC alone. He also shared that several significant beneficial effects of AYUSH 64 on general health, fatigue, anxiety, stress, appetite, general happiness and sleep were also observed. Dr. Chopra concluded that this controlled drug trial study has provided substantial evidence that AYUSH 64 can be effectively and safely used to treat mild to moderate cases of COVID-19 as adjuvant to SoC. He also added that, patients on AYUSH 64 will still require monitoring so as to identify any worsening of disease requiring more intensive therapy with oxygen and other treatment measures provided during hospitalization.

- **Additional Studies :**

Dr. N. Srikanth, Director General, CCRAS elaborated that additional studies on Ayush 64 are underway at reputed research institutes including CSIR-IIIM, DBT-THSTI, ICMR-NIN, AIIMS Jodhpur and Medical Colleges including Post Graduate Institute of Medical Education & Research, Chandigarh; King George's Medical University, Lucknow; Government Medical College, Nagpur; DattaMeghe Institute of Medical Sciences, Nagpur. Results received so far have shown the usefulness of AYUSH 64 in dealing with mild and moderate COVID-19. He also added that the outcome of the seven clinical studies has revealed that AYUSH 64 exhibits early clinical recovery in COVID-19 cases without further progression. In all clinical studies, AYUSH 64 was found to be well tolerated and found clinically safe.

- **Who can take Ayush-64:**

  It can be taken by patients at any stage of the COVID-19 disease. However, its efficacy was scientifically studied in asymptomatic, mild and moderate disease without risk factors for poor outcome and those not requiring emergency interventions or hospitalization are eligible to take Ayush-64. Patients of mild to moderate COVID-19 cases showing initial symptoms like fever, malaise, body ache, nasal congestion, nasal discharge, headache, cough etc. and of asymptomatic cases of COVID-19 can start taking Ayush 64 within 7 days of diagnosis of the disease through RT-PCR for better outcome.

  Ayush-64 is found to significantly enhance the speed of clinical recovery in terms of disease symptoms and severity. It also has significant beneficial effects on general health, fatigue, anxiety, stress, appetite, general wellbeing and sleep.

- **Ayush-64 efficacy:**

  Ayush-64 is a poly herbal formulation developed in compliance to all regulatory requirements as well as quality and pharmacopoeial standards by the Central Council for Research in Ayurvedic Sciences (CCRAS) the apex body for research in Ayurveda under the Ministry of Ayush. It has been scientifically established to be useful in the treatment of asymptomatic, mild and moderate COVID-19 infection as an adjunct to standard care through robust clinical trials conducted in the country. The results of the clinical trials demonstrated that Ayush 64 as an adjunct to standard of care (SoC)

showed clinically significant improvement and thus lesser period of hospitalization as compared to SoC alone.

- **Ideal dose for Ayush-64:**

It can be taken as a standalone treatment in mild cases under the supervision of an Ayurvedic physician, provided there is availability of appropriate referral facilities. However, it is advised that Ayush64 should be taken as adjunct to the SoC in mild to moderate disease, when the patient is under home isolation. Ayush-64, shall only be used as per the advice of a qualified Ayush practitioner.The dose for asymptomatic COVID 19 case is 2 tablets of 500 mg twice daily one hour after meals with warm water for 14 days. The dose for mild to moderate cases is 2 tablets of 500 mg thrice daily one hour after meals with warm water for 14 days.

Patients with co-morbidities like hypertension, diabetes etc., can take Ayush-64 for asymptomatic, mild to moderate disease and are advised not to discontinue their respective medications.

It may be used for prophylaxis also, in a dose of 2 tablets of 500 mg twice daily, but its efficacy as a prophylactic agent has not been demonstrated through clinical studies**.** But if a person is exposed to a COVID-19 case, Ayush-64 can be taken when symptoms appear. In such instances, the person should get tested for COVID-19 through RT-PCR or Rapid antigen test and should follow SoC.Ayush-64 can be taken for a minimum period of 14 days. However, if required, it can be taken up to 12 weeks, as per the advice of a qualified Ayush practitioner. It has been scientifically proven to be safe up to 12 weeks, through clinical studies.

If a person gets infected even after vaccination, Ayush-64 can be taken within 7 days of testing RT-PCR positive for SARS CoV-2, in consultation with an Ayush Physician. However, evidence in favor of it has not been elicited through scientific studies.The safety of Ayush-64 in cases pregnant and lactating women is not established through scientific studies.

- **Market availability:**

It is available in market and can be purchased from Ayurvedic pharmacies. However, it should be ensured that, it should not be used as an over the counter prescription (OTC) and shall only be used under the supervision of Ayurvedic physicians.

- **AyushSanjivani' Mobile Application:**

  Marked as the initiator to combat with the existing COVID-19 pandemic, the Ministry of Ayush has published useful guidelines for the registered practitioners of Ayush Systems. These Guidelines incorporate advisories and information that are the key players in the management of Coronavirus Pandemic.In the direction of understanding and guiding the public, Ayush presents "AyushSanjivani" mobile application. The application conducts a survey to comprehend the measures being adopted by the public to stay healthy in this tough time. All participants who participate to share information through this application will contribute to public health in the country. Data analyzed will be helpful for the further development of Ayush Systems.

- **Side effects of Ayush-64:**

  Loose motions can occur in some patients, which is self-limiting and does not require any medical intervention

CONCLUSION

The Ministry of Ayurveda, Yoga, Naturopathy, Unani, Siddha, Sowa-Rigpa and Homoeopathy (abbreviated as AYUSH) is purposed with developing education, research and propagation of indigenous alternative medicine systems in India,as per a recent notification published in the Gazette of India on 13 April 2021.The Ministry is headed by a Minister of State (Independent Charge), which is currently held by ShripadYessoNaik.

The ministry has faced significant criticism for funding systems that lack biological plausibility and are either untested or conclusively proven as ineffective. Quality of research has been poor, and drugs have been launched without any rigorous pharmacological studies and meaningful clinical trials on Ayurveda or other alternative healthcare systems.The ministry is well known for promoting pseudoscience and quackery in the form of unscientific alternative medicine.

From time to time, scientific advisory released by the national government of a country has great significance and is considered as an important medical guideline but the modern medical fraternities have some apprehension for the unconventional method like AYUSH.

The information discussed in this article is the rationale behind advisory and will gradually increase the wisdom to provide an alternative to a large Indian community. The detailed immunological and other scenarios of herbal medicine are portrayed in Fig. 1a in terms of B-cell/T-cell response, cytokines release, and antimicrobial activity. It can be concluded that AYUSH-advised herbs and *Yoga* promote the state of immunity preparedness to threat, and equipoise the immunity in COVID-19, COVID-19 related co-morbidities and stress management. It may be a simple, safe, cost-effective, accessible, acceptable, infrastructure compatible, pragmatic for a longer duration, and sustainable preventive and prophylaxis approach for COVID-19. AYUSH ministry advisory not only supports the health of COVID-19 people but also creating a mental state that one can remain safe following home remedies (Rajkumar 2020). It is adoptive in nature and in the long run, it will change an individual's habits that may reduce the burden of overall health care. It was an advisory release for pan India which may have a pan globe following. We have thoroughly searched the scientific domain for each component of advisory for its pharmacological relevance. We conclude that this advisory comes up with a strong scientific rationale and further indicated more precise research in clinical/observational trials concerning COVID-19 and prevention of other infections. This advisory can pave the way to overcome this pandemic and may open a new window for the effective use of traditional medicines throughout the world. Considering the properties of flora, *Yoga*, and procedures, this advisory encouraging us to get closer to the natural way of healing.

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