Yoga Therapy for Immunomodulation (Prevent & Cure) of COVID-19

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ABSTRACT

Corona virus disease (Covid 19) is newly discovered viral infectious disease; which has spread all over the world. World Health Organization (WHO) has declared it as a Public Health Emergency of International Concern (PHEIC) on 30th January 2020. This study is a literature review; searches were carried out to find out the role of yoga; on immunomodulation related to the prevention and cure in Covid 19, by using popular search engines, including Google and Google Scholar within the period of 04 months. The results were interpreted as percentages of collected total articles. Seventy articles were reviewed and 100 % of the articles showed (directly or indirectly) yoga has immunomodulatory role. Thirty nine articles (56%) were proved that yoga is beneficial in reducing sign and symptoms of Covid 19.

The present study found that yoga has immunomodulatory role and yoga therapy can be applied for the prevention and cure of Covid 19 (“Novel Corona Virus”). Yoga, meditation & other yogic practices enhance the overall immunity, specially Jala Nethi and Pranayama are very important yoga therapies for the prevention and cure of Covid 19.

Keywords: Corona virus, Jala Neti, Pranayama

INTRODUCTION

COVID 19 is newly identified viral disease; which has spread all over the world. First case of Novel Corona Virus was present from Wuhan city, China in December 2019. World Health Organization (WHO) has declared it as a Public Health Emergency of International Concern on 30th January 2020. Corona virus disease announced as a pandemic in 11th March 2020 by WHO. The incubation period of this disease was reported as 2-14 days at that moment [1].

In this situation the countries like America and United Kingdom with strongest health systems in the world also became helpless. Among South-East Asian countries India has the highest reported laboratory-confirmed COVID-19 cases and deaths. There are countries with community transmission such as UK and America. Clusters of cases were reported in Sri Lanka [2]. Among the confirmed total Covid 19 patients (2815) in Sri Lanka imported cases were 951 in number and total number of recovered patients were 2439; while total number of deaths from Covid 19 in Sri Lanka were 11 patients up to 01.08.2020 [1]. Kiribati, Marshall Islands, Micronesia, Nauru, North Korea, Palau, Samoa, Solomon Islands, Tonga, Turkmenistan, Tuvalu and Vanuatu are countries that have not reported any cases of the coronavirus so far (up to 31 July 2020) [3].

"Occurring over a wide geographic area and affecting an exceptionally high proportion of the population" or "an outbreak of a disease that occurs over a wide geographic area and affects an exceptionally high proportion of the population are the definitions for pandemic outbreak of a disease [4]. The meaning of Immunomodulation is modification of the immune response or the functioning of
Herath Kumara Bandarage Minrupa Suramraji Karunaratne. Yoga therapy for immunomodulation (prevent & cure) of COVID-19. *International Journal of Health Sciences and Research* (www.ijhsr.org) **Vol.11; Issue: 2; February 2021**

The immune system by the action of an immunodulator [5].

The stress can be introduced as a response to a physical threat or psychological distress. Stress increases the transportation of oxygen and glucose to the skeletal muscles and heart. Then the fight or flight reaction occurs in the body. As a result of that autonomic, cardiovascular, gastrointestinal, immune system also affected [6]. The immune system protects us from bacteria, virus, fungi, protozoa and other harmful organisms. There are many effects of stress induced immune dysregulation. Some of them are impaired wound healing, reduction of the immune response to vaccines, reactivation of latent herpes viruses (such as Epstein–Barr virus) and enhance the risk for more severe infectious disease [7]. Stress induced immune dysregulation plays a role in cell to cell interaction. It releases mediators from reacting lymphocytes. Stress and central nervous system lesions affect thymus-derived lymphocytes [8].

If a person is living with stress he/she is more susceptible to the infectious diseases such as common cold, influenza, COVID 19 (SARS-CoV-2), severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS).

Corona virus droplets are mainly entered by nose, eyes and mouth. For some hours virus stays in the throat region and then enters in to lungs. According to the findings Heneghan and others of there are about 5% - 80% asymptomatic patients although they are positive for Coronavirus [9]. Fever, dry cough, and tiredness are most common symptoms of Covid-19 according to the WHO. Aches and pains, nasal congestion, headache, conjunctivitis, sore throat, diarrhea, loss of taste or smell or a rash on skin or discoloration of fingers or toes are less common symptoms. They are usually mild and begin gradually. Some patients show very mild symptoms while most people (80%) recover from the disease without hospitalization. Around 1 out of every 5 COVID-19 patients becomes seriously insidious and develops breathlessness. The people who are in danger of life due to COVID 19 infection are with hypertension, heart problems, lung problems such as COPD (chronic obstructive pulmonary disease), diabetes, cancer and elderly people. If person suffer with fever with or without cough associated with difficulty in breathing/shortness of breath, chest pain/pressure or loss of speech or movement should immediately be hospitalized [10].

Modern medicine was failed in this situation at present. Therefore the world is looking at Ayurveda, Naturopathy and Yoga for prevent & cure COVID 19. Specially yoga therapy can be used for immunomodulation (prevent & cure) in COVID 19 at present. A scientific study in 2001 reported; increase in Natural Killer cells activity during yoga practices pointing to the relationship between a calm mind and better cellular immunity [11]. Research studies on Pranayama (breathing techniques of yoga), Asanas (postures) & Yogic Kriya (procedures including Shat Karma) had shown the effectiveness of yoga for prevention and cure in such diseases via enhancing the immunity and improving of Respiratory health.

A study in 2015 proved that poor mental health conditions, including stress and depression increase the risk of acute respiratory infections [12]. Social distancing measures, quarantine process, information of cases and deaths, using masks always in outside, special arrangements for get rid of Coronavirus infection and stay at home without doing occupation lead to developing stress and anxiety among people. There for yoga practices (including yogic meditation and relaxation) should be done at home and quarantine places to get rid of this stressful situation.

The state of balance of body and mind is called Yoga [13]. Ashtanga yoga includes Yama (ethical rules), Niyama (Obsevances), Asana (postures), Pranayama (control of breathing), Pratyahara (withdrawal of mind from sense objects),
Dharana (concentration), Dhyana (meditation) and Samadhi (absolute contemplation) [14]. Practicing of Yama & Niyama in day today life lead to avoid stress & gain mental relaxation. Pranayama improve lung vital capacity and immunity of the respiratory system. Sooryabhedana (vitality stimulating breath), Ujjayee (psychic breath), Seethkaree (hissing breath), Seethali (cooling breath) Bhrasthika (bellos breath),Bhramari (humming bee breath), Moorja(swooning breath) and Plawani (gulping breath) are eight types of Pranayamas [14].

Examples for Asanas which has immunity enhancement functions are Bhujangasana (cobra pose), Adhomukha Shavanasana (downward dog) and Dhanurasana (bow pose). They stimulate the thymus gland. Shishuasana (child pose) helps to decongest the chest. It builds a better immunity defense system. Ananda Balasana (happy baby pose) relaxes the body. Viparita Karani (legs up the wall pose) boosts nerve connections, improves blood flow and vitalizes the body. Hastapadasana (forward bend pose) relieve congestion and protect the sinuses and mucus membranes (the first form of defense). This pose rejuvenates the immune system. Setu Bandhasana (bridge pose) improves blood circulation and increases energy in the body to gain better resistance against pathogens. Matsyasana (fish pose) expands the chest and stimulates the thymus. It improves the body’s immunity level [15].

All types of Pranayama improve lung vital capacity and immunity of the respiratory system. Among them Sooryabhedana, Ujjayee, Bhrasthika & Bhramari can be used for prevention & cure COVID 19. Soorya Bhedana makes body get warmth, purify the blood, cleans the frontal sinuses, cures and prevents from cold, cough and asthma. Ujjayi increases oxygenation, balances and calms the breath, stimulates Nadis (energy channels), brings mental clarity and focus, increases body heat. This heat gives strength to the inner organs to cleanse of any toxins that have accumulated. Bhramari cleans the sinuses, nasal canal and ear canals, helps to relax the mind, gives energy to the body and mind, maximizes the lung capacity and helps to remove toxins and impurities. Bhrastra cures sinusitis, bronchitis and other respiratory diseases, improves awareness and perceptive power of senses, balances Doshas, strengthens the immune power, reduces episodes of cold, cough and flu and improves thyroid function & tonsils. Anuloma Vilomaya Pranayama(alternate nostril breathing) increases the resistance of sinuses, relax the mind & boosting immunity. These Pranayamas can be used in prevention & cure in Coronavirus infection because of their functions [16].

Dharana, Dhyana and Samadhi makes relax mind and act as immunity boosters.

Shat Karma (six procedures) help in keep the body strong, clean and healthy. They remove toxins and anything blocking the flow of Prana (vital energy of the body) and enhance the immunity in the body. Neti (nasal wash), Dhauti (cleansing of the whole digestive tract), Nauli (self-administered abdominal massage) using only muscles of the abdominal wall, Basti (a colonic irrigation), Kapalabhati (rapid abdominal breathing), and Trataka (eye cleansing technique in yoga) are Shat Karmas in yoga. Some of them can be used as prevention & cure in Coronavirus infection. Jala Nethi means cleansing of the nasal passage with using slightly salted (non-iodized ) purified water for clean the upper respiratory passage [17]. Therefore Jala Nethi can be used as preventive measure & treatment for Corona virus infection.

Sutra Neti helps in clearing excessive mucus from the heavy nostrils (reduce nasal congestion), cleans the sinuses, ease headache & sinusitis. It reduces symptoms of cough, cold and headache. Vamana Dhauti purifies and enhances the immunity in the digestive tract, respiratory tract, external ears and eyes. It cures cough & asthma. Nauli makes
internal organs healthy, increases mental clarity & body immunity, stimulates the digestive fire, and removes toxins, indigestion & constipation. Basti detoxifies the large intestine and enhances the immunity. Kapal Bhati removes the toxins in the body through the exhalation, increases the resistance of the respiratory tract and improves blood circulation and nervous system functioning. Therefore these Shat Kramas can be used to cure Corona virus disease. Trataka increases blood circulation to the eyes and help strengthen them. It cleanses tear glands and purifies the optical system. Therefore entering Corona virus through eyes can be avoided by using Trataka.

Yoga Nidra (yogic sleep) is a state of consciousness between waking and sleeping. It reduces stress, rejuvenates the body, improves sleep, reduces insomnia, helps in activating the relaxation response and improves the functioning of the nervous system and endocrine system, which effects on hormones. Yogic diet cleanses the body and helps it to get rid of harmful toxins. It strengthens the body’s immunity power. Consequently Yoga Nidra and Yogic diet also has therapeutic effect in this situation.

Methods to enhance the immunity of total body and some parts of the body according to Ayurveda are prescribed in Charaka Samhitha (daily regimen, seasonal regimen, therapeutic cleansing procedures, rejuvenation therapy and etc.) also play a major role in prevention and curing Coronavirus infection [18].

MATERIALS AND METHODS

Literature searches were carried out to find out the role of yoga; on immunomodulation related to the prevention and cure in COVID 19, by using popular search engines, including Google and Google Scholar within the period of 06 months.

Statistical Methods

The results were interpreted as percentages of collected total articles.

RESULTS

<table>
<thead>
<tr>
<th>Benefits of yoga; (Related to the prevention and cure in Covid 19)</th>
<th>Examples of researches</th>
<th>Relevant part of conclusions</th>
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<tbody>
<tr>
<td>Improve total body immunity</td>
<td>Sarika A &amp; Jayashri B 2008</td>
<td>&quot;Meditation, yoga, hypnosis, and muscle relaxation have been shown to reduce the psychological and physiological effects of stress according to the results of scientific studies&quot; [19].</td>
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<td>Rocha KKF et al. 2012 West et al. 2004</td>
<td>&quot;Yoga and/or meditation practice have been shown to reduce psychological stress&quot; [20], [21].</td>
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<td>Enhancing immunity in the respiratory system</td>
<td>Vempati R et al 2009</td>
<td>&quot;...The trial supports the efficacy of yoga in the management of bronchial asthma&quot; [22].</td>
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<td>Shodi C et al 2009</td>
<td>&quot;...Yoga breathing exercises used adjunctively with standard pharmacological treatment significantly improves pulmonary functions in patients with bronchial asthma&quot; [23].</td>
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<td></td>
<td>Sing S et al 2012</td>
<td>&quot;Pranayama &amp; yoga breathing and stretching postures are used to increase respiratory stamina, relax the chest muscles, expand the lungs, raise energy levels, and calm the body&quot; [24].</td>
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<td>Yadav A et al 2015</td>
<td>&quot;Yoga regime was found to improve lung functions and diffusion capacity in patients...&quot; [25].</td>
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<td></td>
<td>Soni R et al 2012</td>
<td>&quot;Yoga breathing exercises improve diffusion capacity. They are beneficial to COPD patients...&quot; [26].</td>
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<td></td>
<td>Fulambarker A et al 2012</td>
<td>&quot;Yoga when practiced by patients with COPD results in improvement in the quality of life &amp; lung function on a short-term basis&quot; [27].</td>
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<td></td>
<td>Swami G et al 2010</td>
<td>&quot;Pranayama &amp; meditation has beneficial effect on pulmonary functions...&quot; [28].</td>
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<td></td>
<td>Malhotra V et al 2002</td>
<td>&quot;Better glycemic control &amp; pulmonary functions can be obtained in NIDDM cases with yoga asanas and pranayama...&quot; [29].</td>
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**Table continued**

<table>
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<tr>
<th>Reducing effects</th>
<th>Authors</th>
<th>Summary</th>
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<tbody>
<tr>
<td><strong>Reducing fever / body temperature</strong></td>
<td>Telles S et al 2020</td>
<td>&quot;Especially since the oxygen consumption decreased after both Sheetali and Sitkari Pranayamas (because body temperature get decreased).&quot; [34]</td>
</tr>
</tbody>
</table>
| **Reducing inflammation**                           | Vijayaraghava A et al 2015 | "Regular practice of yoga reduces the resting levels of inflammatory cytokines like TNF-α and IL-6.  
Increase in the duration of practice of yoga favorably affects pro-inflammatory cytokine levels when exposed to unaccustomed stress/physical activity.  
An excess of pro-inflammatory mediators is a predisposition to pro-inflammatory disorders, exacerbation, complications of metabolic disorders and cardiovascular disease." [39] |
| **Reducing upper respiratory tract infections**     | Meera S et al 2020 | "Upper respiratory tract infections can be greatly reduced by the practice of Jala Neti. Research supports its efficacy in managing sinusitis, allergic conditions." [40] |
| **Reducing cold**                                   | Rastogi S et al 2007 | "Jala Neti application is recommended as adjunct to the conventional therapy of common cold and sinusitis." [41] |
| **Reducing cough**                                  | Arora M et al 2018 | "Overall results in both groups based on the parameters of Nasal Congestion, Rhinorrhea, Headache and Cough, there was almost similar results noted. Whereas based on the parameters of Sneezing, Nature of onset & Frequency of Attack, it revealed that group A i.e. Jala Neti & Pranayama showed better results than Group B." [42] |
| **Reducing tiredness**                              | Beera T.K et al 1998 | "Shavasana can establish a psychophysiological relaxation in such a way that the induced physiological stress is reduced significantly in a shorter time as compared to chair sitting or lying down in a supine position." [43] |
| **Reducing aches and pains**                        | Bartlett S.J 2013 | "This holistic approach .. reduces pain and enhance function and participation, as part of a comprehensive disease management approach" [44] |
| **Reducing nasal congestion**                       | Pandey A & Tiwan M 2015 | ".. Jala Neti...can help in preventing and managing sinusitis in an effective manner by improving mucociliary clearance, thinning the mucus, and by decreasing the inflammation that blocks the sinuses ostia."

**Research**

- Agnihotri S et al 2018 | "The practice of Jala Neti and Pranayama can be helpful in Allergic Rhinitis with asthma" [45]. |
- Anheyer D et al 2020 | "This review found preliminary evidence of short-term efficacy of yoga in improving headache frequency, headache duration, and pain intensity in patients suffering from tension-type headaches." [46]. |
- John P.J et al 2007 | "Integrated yoga therapy can be an effective treatment for migraine" [52]. |
- Kim.S.D 2015 | "Yoga practice can effectively alleviate symptoms associated with primary headaches" [5]. |
- Kisan R et al 2014 | "Yoga therapy showed an additional beneficiary effect on patients with migraine by reducing frequency and intensity" [53]. |
- Gopinathan G et al 2012 | "Tratak is effective ocular fatigue according to the results of this study" [53]. |
<table>
<thead>
<tr>
<th>Reducing sore throat &amp; bronchitis</th>
<th>Telles S et al 2006</th>
<th>&quot;Yoga practice (including Trataka) appeared to reduce visual discomfort (in [66]).&quot;</th>
</tr>
</thead>
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<tr>
<td>Reducing diarrhea</td>
<td>Kuttner L et al 2006</td>
<td>&quot;.. Adolescents had significantly lower scores for gastrointestinal symptoms and emotion-focused avoidance following the yoga intervention. Adolescents found the yoga to be helpful and indicated they would continue to use it to manage their Irritable Bowel Syndrome (IBS)&quot; [59].</td>
</tr>
<tr>
<td>Inhibiting replication of virus in nasal passage.</td>
<td>Chandran R et al 2016</td>
<td>&quot;Since we use lukewarm water in Neti procedure, the increased temperature will inhibit replication of rhinovirus since the virus can replicate above temperature 37°C. The lukewarm water will irritate nasal passages &amp; create a correct flow pressure &amp; will cause shedding of virus&quot; [57].</td>
</tr>
<tr>
<td>Reducing loss of taste and loss of smell</td>
<td>RamR N &amp; Venkateswaran S T 2018</td>
<td>&quot;Jala Neti alone could improve the overall hygiene of Nasal cavity and its function. Regular practice of Jala Neti maintains healthy secretory and drainage mechanisms of the entire ear, nose and throat area.&quot; [47].</td>
</tr>
<tr>
<td>Reducing rash on skin</td>
<td>Sing S et al 2015</td>
<td>&quot;Different Yogic practices reduce the physical and mental stress and help in immunomodulation which is the mainstay in the etiopathogenesis of psoriasis. These yoga practices increase the quality of life in the patients of psoriasis which results in reduction in the frequencies of flares of psoriasis, improvement in clinical symptoms and increase ability to cope up with psoriasis&quot; [61].</td>
</tr>
<tr>
<td>Reducing discoloration of fingers or toes.</td>
<td>Not found (Asana, Kunjal Kriya (special technique for cleaning the digestive system by induced vomiting), Lagushanka Prakshalana (special yogic bowel cleansing technique) and Vamana Dauthi are effective for reducing discoloration of fingers or toes according to the yoga text books because they promotes blood circulation.&quot; [42, 44].</td>
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<td>Improve quality of life in chronic disease conditions.</td>
<td>Singh V.P &amp; Khandelwal B 2020</td>
<td>&quot;Yoga is superior to exercise alone as a lifestyle modification program in improving glycemic control, anxiety, depression, and quality of life as well as exercise self-efficacy.&quot; [65].</td>
</tr>
<tr>
<td>Reducing the risk and improving management of CVD (cardio vascular diseases)</td>
<td>Yadav R et al 2014</td>
<td>&quot;A yoga-based lifestyle intervention appears to be a promising option in reducing the risk for CVD as well as management of patients with CVD...&quot; [68].</td>
</tr>
</tbody>
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| Reducing anxiety | Gupta N et al 2006 | "Short educational programme for lifestyle modification and stress management (yoga based lifestyle intervention) leads to remarkable reduction in the anxiety scores." [71]. |
| Reducing cancer symptoms | Kashla D.S.S 2005 | "A case history demonstrating rapid onset of acute relief of intense fear in a terminal breast cancer patient using a Kundalimi Yoga (KY) technique specific for fear is presented. A second case history is reported for a surviving male diagnosed in 1988 with terminal prostate cancer who has used KY therapy long term as part of a self-directed integrative care approach." [79]. |
| Reducing pain & Rheumatic Diseases | Bartlett SJ.2013 | "Yoga is a reasonably safe and feasible option for many people living with rheumatic conditions..., reduce pain and enhance function and participation, as part of a comprehensive disease management approach." [74]. |
| Reducing Hyperlipidemia | Nagarathina R et al 2019 | "Although the available evidence proves the significance of the beneficial impact of Yoga on the cholesterol levels, Tg, LDL, and VLDL." [79]. |
| Reducing Hypertension | Hagnis M et al 2013 | "Yoga was associated with a modest but significant reduction in blood pressure (≥4 mmHg, systolic and diastolic) in this population. *" [80]. |
| Reducing Bronchial Asthma | Mossie A & Mekonnen D 2010 | "Yoga decreased the number of day and night asthma attacks." *" [80]. |
| Reducing Diabetes Mellitus | Bijlani R L et al 2005 | "The changes were more marked in subjects with hyperglycemia according to the findings..." *" [22]. |
| Reducing risk factors for diabetes mellitus | Bijlani R L et al 2005 | "Yoga reduces risk factors for diabetes mellitus" [74]. |
| Reducing respiratory diseases | Soni R et al 2012 | "Pranayamic breathing exercises when used adjunctively with standard pharmacological treatment, can significantly improve gas transfer test in yoga with mild-to-moderate grades of chronic obstructive pulmonary disease." [83]. |
| Reducing stress | Yadav K.R et al 2012 | "This brief yoga-based lifestyle intervention reduced the markers of stress..." [85]. |
Seventy articles were reviewed and 100% of the articles showed (directly or indirectly) yoga has immunomodulatory role to prevent and cure from Covid 19. Seventeen articles (24%) were mentioned directly that yoga helps to increase immunity in the human body; while ten articles (14%) were mentioned that yoga enhances the immunity in the respiratory system. Thirty nine articles (56%) were proved that yoga is beneficial in reducing sign and symptoms of Coronavirus disease. Thirty articles (43%) showed yoga improves quality of life in chronic disease conditions.

DISCUSSION
Jala Neti helps to remove the Corona virus from nasal cavity according to the findings. It is very important in prevention of Covid 19.

Jala Neti can be applied to reduce nasal congestion, sinusitis, common cold, catarrh, tonsillitis, sore throat, bronchitis, bronchial asthma and to improve mucociliary clearance. It helps to restores lost sense of smell and taste. These activities are beneficial in curing signs and symptoms related to nasal area and upper respiratory passage in Coronavirus infection. Jala Neti can be used to reduce the frequency of disease recurrence in COVID 19. Therefore Jala Neti is very important treatment for Covid 19.

Headache in Coronavirus disease can be reduced using Jala Neti and Pranayama according to the findings. Pranayayama and Kunjal Kriya can be used to improve the functions of respiratory system in COVID 19.Trataka is useful in reducing watering from eyes, burning sensation of eyes and ocular fatigue. Therefore Trataka can be used to cure conjunctivitis in Covid 19.

Yoga therapy is useful in reducing diarrhea, aches, pains, skin rashes, mental stress and physical stress. Asana, Kunjal Kriya, Lagushanka Prakshalana and Vamana Dauthi are effective for reducing discoloration of fingers or toes according to the concepts of yoga text books (but it couldn’t find from any study). These findings from present study are useful in curing COVID 19.

Yoga improves quality of life in chronic disease conditions such as CVD and diabetes mellitus. It is also an important finding; because these diseases lead to COVID 19 infected person in to more dangerous situations including death.

CONCLUSION
The present study found that yoga has immunomodulatory role in COVID 19 and yoga therapy can be applied for the prevention and cure of Coronavirus disease. Especially Jala Neti and Pranayama are very important yoga therapies for the prevention and cure of COVID 19.

REFERENCES
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47. Rani RN, Venkateswaran ST. Immediate effect of Jala Neti(nasal irrigation) on nasal peak inspiratory flow on healthy volunteers. [Internet]. 2018. Available from http://repository.tnmguru.ac.in/10176.


