Integrated yoga and naturopathy on cardiovascular functions and mental health in a patient with COVID-19: A case report

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ABSTRACT

A 43-year-old-married male diagnosed with coronavirus disease 2019 (COVID-19) in July 2020. His symptoms as described by him began with cough and sore throat, breathlessness, generalized body weakness, irritability, stress, and mood swing for a period of one week. He was admitted in our District COVID Care Center (DCCC) located in Tamil Nadu, India. He underwent Integrated Yoga and Naturopathy (IYN) [i.e., Conventional medicine + yoga and naturopathy] for two weeks. The results showed negative Reverse Transcription Polymerase Chain Reaction (RT–PCR) test for COVID-19, improvement in cardiovascular functions (i.e., a reduction in systolic and diastolic blood pressures, pulse rate, mean arterial pressure, rate pressure product, and double product) and mental health (i.e., a reduction in depression, anxiety, and stress levels). The results suggest that IYN might improve cardiovascular and mental health of patients with COVID-19 in addition to positive to negative conversion of RT–PCR. However, further studies are required to warrant these results.

Keywords: Anxiety, cardiovascular function, COVID-19, depression, naturopathy, stress, yoga

Introduction

Coronavirus disease 2019 (COVID-19) is the infectious disease caused by a novel coronavirus, known as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2).[1] The maladaptive behaviors arising due to psychological reactions lead to poor adherence to the COVID-19 protocols, which is not just affect the individuals, but affect the community and country on the whole.[2] Primary health care is a vital component in health care delivery.[3] Primary care physicians play a major role in identifying the patients at risk for COVID-19 and treating them.[4] Yoga and Naturopathy (YN) educate and make people responsible for their own health through its holistic approach. It has reported to be an effective complementary therapy in preventing and alleviating various diseases.[5] Thus, this study was performed to evaluate the effect of integrated-YN (IYN) on cardiovascular functions and mental health in COVID-19.

Case Description

A 43-years married male diagnosed with COVID-19 on 07 July 2020. His symptoms as described by him began with...
cough, sore throat, breathlessness, generalized weakness, irritability, stress, and mood swing for three days. He visited a primary health centre on 04 July 2020 and underwent Reverse Transcription Polymerase Chain Reaction (RT–PCR) test for COVID-19. On 07 July 2020, his test for COVID-19 became positive. Then, he was referred to get admitted in our District Covid Care Center (DCCC) located at Tamil Nadu, India, and he got admitted on 8 July 2020 with the above mentioned symptoms.

### Intervention

During the hospital stay, he underwent IYN [conventional medicine + yoga and naturopathy]. Conventional medicines such as T.Paracetamol, T.Azithromycin, T.Vitamin-B-Complex, T.Vitamin-C, and T.Zinc for five days were followed by only vitamins and zinc for nine days. A detail of the YN treatments is provided in Table 1.

### Outcome Measures

**RT–PCR:** It was done in a government district hospital located in Tamil Nadu.

**Cardiovascular functions:** Systolic blood pressure (SBP), diastolic blood pressure (DBP), and pulse rate (PR) were measured with the digital BP apparatus. Assessments such as pulse pressure (PP), mean arterial pressure (MAP), rate pressure product (RPP), and double product (Do-P) were derived using following formulas: PP = SBP − DBP; MAP = DBP+⅓PP; RPP = PR × SBP/100; and Do-P = PR × MAP/100.[4]

**Depression Anxiety and Stress Scale (DASS)-21:** The DASS-21 is a self-report questionnaire consisting of 21-items, 7-items per subscale: depression, anxiety, and stress. Patients were asked to score every item on a scale from 0 (did not apply to me at all) to 3 (applied to me very much).[5]

### Results and Discussion

The results showed a conversion of positive to negative RT–PCR for COVID-19, cardiovascular (SBP, DBP, PR, MAP, RPP, and Do-P) and psychological (Depression, anxiety, and stress) parameters in the post-test assessments compared to baseline assessments [Table 2]. It suggests that IYN might not only useful to combat with COVID-19 infection, but also in improving cardiovascular function and mental health of COVID-19 patient.

The neem contains bioactive molecules with anti-inflammatory and antiviral properties. A previous study showed a reduction in COVID-19 infection risk in participants received neem capsules.[6] Heliotherapy is known to trigger vitamin-D synthesis that regulates immunity. In calves, low vitamin-D levels cause the bovine coronavirus infections, and thus increasing vitamin-D levels through sunbath could help the patient to combat with COVID-19.[7] Essentials oils have the following anti-viral activities: virucidal activity, inhibit viral replication, prevent cell-to-cell virus spread in infected cells, act against the intra cellular activity, directly inactivate virus particles, and thus prevent the adsorption of virion to host cells. Thus, lemon grass oil might have also helped the patient to combat with COVID-19.[8] Water Gargling is deemed to wash out pathogens from the pharynx and oral cavity and disrupt viral propagation. Thus, it might have helped the patients to combat with COVID-19.[9] Steam inhalation produces hyperthermia and enhances general and local host defense mechanisms and potentiates the antiviral activity of interferon as well as its immune-regulatory effect on suppressor cells. It elevates intranasal temperature and inhibit effect on the release of mast cell mediators, it reduces the duration and severity of nasal symptoms during common cold.[10]

Cardiovascular comorbidities are common in patients with COVID-19 and these patients are at higher risk of morbidity and mortality.[11] Results of this study also showed a reduction in PR, SBP, DBP, MAP, RPP, and Do-P in our patients. It suggests that IYN was effective in improving cardiovascular functions. RPP and Do-P are the important indirect indicators of myocardial oxygen consumption and load on the heart. Myocardial injury is present in >25% of critical COVID-19 cases.[12] The study showed a reduction in RPP and Do-P, suggests a strain lowering effects on the heart. When HR Variability (HRV) analysis is not available, the RPP can be used as a simple measure of overall HRV.[9] Hence, a reduction in both RPP and Do-P after YN treatments indicates its strain lowering effect and better autonomic regulation of the heart.[12]

Psychological stress such as anxiety and stress is commonly attributed to COVID-19.[13] Results of the study showed a reduction in the DASS [Depression (18 to 12), anxiety (8 to 4), stress (18 to 10)] score. It suggests that patient’s depression has come down from 10)

| Timings | Name of the Treatments | Duration/Frequency |
|---------|------------------------|--------------------|
| 6.30 am | Gargling using warm water with turmeric powder | 2-3 min/day, daily |
| 6.45 am | Neem leaves paste | 5 g/day, daily |
| 7.00 am | Hands in and out breathing, Hands stretch breathing, Ankles stretch breathing, Abdominal breathing, Nadi Shodhana pranayama, and Bhramari pranayama | 30 min/day, daily |
| 7.30 am | Sunbath | 10 min/day, daily |
| 7.45 am | Green gram sprouts | 50 g/day, daily |
| 8.00 am | Facial steam inhalation with 2-3 drops of lemon grass oil | 3-5 min/day, alternate days |
Table 2: Baseline and post-test assessments of the patient

| Parameters                        | Pre-test | Post-test |
|-----------------------------------|----------|-----------|
| Demographic Details               |          |           |
| Age (years)                       | 43       |           |
| Gender                            | Male     |           |
| Height (cm)                       | 158      |           |
| Weight (kg)                       | 63       |           |
| Body Mass Index (kg/m^2)          | 25.22    |           |
| RT-PCR for COVID-19               | Positive | Negative  |
| Cardiovascular functions          |          |           |
| Systolic blood pressure (mmHg)    | 138      | 127       |
| Diastolic blood pressure (mmHg)   | 94       | 82        |
| Pulse rate (beats/minute)         | 93       | 89        |
| Pulse pressure (mmHg)             | 44       | 45        |
| Mean arterial pressure (mmHg)     | 108.67   | 97        |
| Rate pressure product             | 128.34   | 113.03    |
| Double product                    | 101.06   | 86.33     |
| Depression Anxiety Stress Scale‑21|         |           |
| Depression [Score (category)]     | 18 (ES)  | 12 (Severe)|
| Anxiety [Score (category)]        | 8 (Severe)| 4 (Mild)  |
| Stress [Score (category)]         | 18 (ES)  | 10 (Moderate)|

RT‑PCR=Reverse Transcription Polymerase Chain Reaction; ES=Extremely severe

Conflicts of interest

There are no conflicts of interest.

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Informed consent

An informed written consent was obtained from the patient for reporting this case.

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