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Research Article

Prone Asanas and Pal's Pranayama could Facilitate Recovery and Prevent Psychosomatic Stress and Complications of COVID-19

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Abstract

Introduction: Though about 80% of COVID-19 patients recover without special treatment, approximately one out of every five people becomes seriously ill and may progress to acute respiratory distress syndrome (ARDS), and about 20% recovered population continue to suffer from myalgia, headache, anosmia and sleep disorders. No effective treatment has been developed yet to prevent cardiorespiratory complications of COVID-19.

Methods: There are many reports of improvement in pulmonary functions in ARDS patients after changing the patient's posture to prone position. There are recent reports of improvement in respiratory functions following prone positioning and faster recovery from anosmia and ageusia by practice of Pal's pranayama of COVID-19 patients. Also, there are reports of improvement of autonomic, cardiorespiratory, neuromuscular and psychological functions following practice of asanas and pranayamas. A 56 years old female, known case of bronchial asthma and hypothyroidism admitted to a COVID hospital practiced prone asanas and Pal's pranayama in addition to routine medical treatment given in the hospital.

Results: It was assumed that COVID-19 patients if practice asanas in prone posture and perform Pal's slow pranayamic breathing, will recover from the COVID-19 illness faster, will not develop cardiorespiratory complications, and will have better psychological health. The postmenopausal woman, a known case of bronchial asthma and hypothyroism had comfortable recovery from COVID-19 following practice of prone asanas and Pal's pranayama.

Discussion: Practice of prone asanas and Pal's pranayama will facilitate early recovery and will prevent complications of COVID-19, possibly by improving oxygenation, cardiorespiratory functions and vagal tone, and by reducing the level of psychosomatic stress.

Keywords: COVID-19; Early recovery; Respiratory illness; Prone positioning; Prone asanas; Pal's pranayama; stress

Article Summary

Strengths and Limitations of the Study

Strengths

- Practice of asana-pranayama could facilitate early recovery from COVID-19 and prevent development of complications.
- Being non-invasive and non-expensive, likely to have wider acceptance.
- Known case of bronchial asthma and hypothyroid female had comfortable recovery from COVID-19.

Limitations

Direct and professional monitoring of asana-pranayama practice of the patients may not be possible during their hospital stay.

Introduction

In December, 2019, a novel coronavirus was identified as the cause of a cluster of pneumonia cases in Wuhan, a city in the Hubei Province of China, which sooner became an epidemic throughout China, followed by an increasing number of cases in other countries across the world. In February 2020, the World Health Organization designated the disease COVID-19, which stands for coronavirus disease 2019. The virus that causes COVID-19 is designated as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as it commonly causes Acute Respiratory Distress Syndrome (ARDS); previously, it was referred to as 2019-nCoV [1]. The main symptoms of corona virus disease 2019 (COVID-19) are fever, cough, fatigue, slight dyspnoea, sore throat, headache, conjunctivitis and gastrointestinal symptoms [1]. About 10% of all symptomatic patients present with dyspnoea, interstitial pneumonia, and may progress to Acute Respiratory Distress Syndrome (ARDS), and multiorgan dysfunction [1]. Older people and people with comorbid conditions such as diabetes, hypertension, heart and lung diseases and cancer, are at higher risk of developing serious illness. It has been reported that COVID mortality is mostly due to acute pneumonia and ARDS [2]. The full recovery of COVID-19 patients is delayed due to persistence of weakness, myalgia, headache, anosmia, ageusia, sleep disorders for many weeks and few come back to hospital with cardiorespiratory problems. To date, there is no evidence of any effective treatment for COVID-19, though antiviral drugs, chloroquine or hydroxychloroquine and respiratory therapies are being used [3]. There are several ongoing clinical trials of both western and traditional medicines for development of new therapies and vaccines for COVID-19.

Prone positioning was first proposed in 1970s as a method to improve gas exchange in ARDS [4]. Consequently, many clinical trials, and subsequent meta-analyses supported the role of prone positioning as an effective therapy in ARDS, particularly when initiated in the early stage [5]. Recent reports have suggested improvement in respiratory functions of COVID-19 patients with prone positioning [6-8].

Practice of yoga has been reported to improve pulmonary functions in COPD patients [9]. The asanas and pranayamas are the major components of yoga [10]. Based on postures in which asanas are practiced, they are divided into standing asanas, sitting asanas, supine asanas and prone asanas [10]. As prone positioning facilitates pulmonary functions, it is expected that prone asanas will promote respiratory functions. Nevertheless, among yoga techniques the practice of pranayamas (controlled breathings) has been reported to promote respiratory functions [11]. Among different types of pranayamas, the chandranadi pranayama (left-nostril breathing) and anulom-vilom pranayama (alternate-nostril breathing) have been demonstrated to have maximum beneficial effects on autonomic cardiorespiratory functions [12,13]. Recently, Pal's pranayama, a structured slow breathing exercise that comprises of both chandranadi and anulom-vilom pranayamas has been reported to facilitate the recovery from anosmia and ageusia in COVID-19 patients [14]. Therefore, we hypothesized that practice of asanas in prone posture and Pal's pranayama will improve cardio-respiratory functions in COVID-19.

Fear of death is a major psychological stress of a COVID-19 patient as soon as he or she is diagnosed to have the disease. Further, individuals who have recovered may be stigmatized, contributing to psychological issues like depression and anxiety [15]. It has been reported that people are developing lungs and cardiac problems after recovery from COVID-19, [15]. Hence, it is necessary to provide the appropriate management for this dreadful disease in terms of physical, psychological and social well-being. Therefore, we proposed that practice of asana-pranayama will be the best way to manage the problems of COVID-19. A case study was conducted to assess the effect of the practice of prone asana and slow pranayama on recovery from COVID-19 in a post-menopausal woman having pre-existing comorbidity of bronchial asthma and hypothyroidism.

Materials and Methods

For conduct of a pilot study on the effects of prone asanas and Pal's pranayama on the outcomes of COVID-19 patients, the prior approval of the Institutional Ethics Committee of Sri Aurobindo Society (ID No. SAS/IEC/2020-01, dated 6th October, 2020), Puducherry, India, was obtained. Sri Aurobindo Society, Puducherry is an international organization approved by Government of India for integral development of the society and for conduct of therapy and research in alternative medicines that include yoga, naturopathy and homeopathy, which has a memorandum of understanding (MoU) with Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Puducherry, India, for health-related research and development.

The details of the proposed asanas and pranayama schedule as approved by the Human Ethics Committee are described below.

Asanas in prone posture

The patient will practice following eight asanas in prone posture as described in yoga book [10].

a) Ardha-shalabhasana (half-locust pose): 2 min.

- Lying flat on abdomen with chin placed on the floor slightly

stretched forward to give the best possible stretch to the neck muscles and nerves, the right leg is raised with full extension at knee joint to a comfortable height possible, keeping the other leg straight, relaxed and in contact with the floor (Figure 1).

- This position is retained for about 30 seconds or as long possible without strain and then the leg is lowered to the floor.
- After 1 min, the same movement is repeated in the opposite leg.

Figure 1: Ardha shalabhasana (half-locust pose).

b) Shalabhasana (locust pose): 1 min

The procedure is same as ardha-shalabhasana, but instead of raising one leg, both the legs are raised at a time (Figure 2).

Figure 2: Shalabhasana (locust pose).

c) Bhujangasana (cobra pose): 2 min

- Lying flat on abdomen with the legs straight, feet closer, with the support of forelimbs the head, neck and shoulder are raised slowly. Keeping the elbows straight, the trunk is raised as high as possible, using back muscles more than the arm muscles.
- The head is gently tilted backward. In this position, the lower part of the pelvis remains in contact with the floor and the navel part is raised about 5 cm (Figure 3). After spending 30 seconds in this position, return slowly to lie-down flat in prone position and relax the lower back muscles for one min.

Figure 3: Bhujangasana (cobra pose).

d) Sphinx asana: 3 min

- Lying flat on abdomen, with legs straight, feet together, the forearms are placed on the floor with palms downward, the head is raised with shoulder and chest by bringing the upper arms to the vertical position. The elbows, forearms and hands remain on the floor (Figure 4).
- Relax in this position for a comfortable length of time (about three minutes) and then slowly lower the body.

Figure 4: Sphinx asana.

e) Makarasana (Crocodile pose): 3 min

It is same as sphinx asana, but instead of keeping the forearm on the ground, the head is supported with forearms by placing palms on the cheek (Figure 5). With eyes closed, relax the whole body for about 3 min.

Figure 5: Makarasana (crocodile pose).

f) Jyestikasana (superior posture): 3 min

- Lying flat on abdomen with the legs straight and the forehead resting on the floor, interlock the fingers and place the palms on the back of the head or neck. Allow the elbows to rest on the floor (Figure 6).
- Relax the whole body and spend about 3 min in this position.

Figure 6: Jyestikasana (superior posture).

g) Matsya kridasana (flapping fish pose): 5 min.

- Lying on abdomen with the fingers interlocked under the head, the left leg is bent sideways, and the left knee is brought close to the chest. The right leg remains straight (Figure 7). The right side of the head is rested on the crook of the right arm or a little further down the arm for more comfort.
- Relax in this pose for about 5 min. The posture may be changed to lie down in the same position on the left side.

Figure 7: Matsya kridasana (flapping fish pose).

h) Advasana (reversed corpse-pose or opposite shavasana): 5 min

Lying on the abdomen, both the arms stretched above the head with palms facing downward and the forehead resting on the floor (Figure 8). Relax the whole body and spend about 5 min in this position, or as much time as possible.

Figure 8: Advasana (reversed corpse pose).

Pal's Pranayama schedule

The patient will practice slow breathing exercise as described in Pal's pranayama schedule [14].

- Sitting comfortably in nasika mudra (placing one hand below the nose with the provision to close a nostril either by thumb or index finger), gently close the right-nostril by the thumb and inhale deeply in the left-nostril (Figure 9) while counting 1–5 in mind and then slowly exhale in the same nostril counting 1–10 in mind (or as much possible, but not more than 10 counts).
- Repeat the same process of breathing in left-nostril.
- Then, inhale deeply in the left nostril counting 1–5 in mind and close the left nostril by the index finger and exhale slowly in the right nostril counting 1–10 in mind (Figure 10) and then inhale deeply in right nostril counting 1–5 in mind and close the right nostril by thumb and exhale slowly in the left nostril counting 1–10 in mind (or as much possible, but not more than 10 counts).
- This completes one pranayama cycle that takes about 60 seconds, in which 30 seconds are utilized for two rounds of the left-nostril (Chandranadi) breathing, followed by 30 seconds of one round of alternate nostril (Anulom-Vilom) breathing.
- In this slow pranayama, during inspiration, gradually make chest expansion while inhaling, and during each expiration, relax the body and mind with the gradual escape of air from the respiratory passage while slowly exhaling.
- Practice about 12 to 15 cycles of this pranayama.

Figure 9: Pal's pranayama (pose 1 for left nostril breathing, right nostril closed).

Figure 10: Pal's pranayama (pose 2, for alternate nostril breathing).

The asana-pranayama schedule should be performed once in the morning between 7.00 AM to 8.00 AM and once in the evening between 5.00 PM to 6.00 PM, each session lasting about 45 minutes. During other time, patient will be advised to lie-down on the bed in matsya-kridasana (Figure 7) or adavasana (Figure 8), whenever he/she find it comfortable.

After obtaining informed consent from the patient, a PDF file of the brief procedure with all the asana-pranayama pictures and a video of the entire practice session can be sent to the mobile phone (WhatsApp/Telegram-App/e-mail) of the patient and doctors/nurses posted in the COVID ward will be trained/sensitized to follow up the practice by the patient.

The Case Study

Written informed consent was obtained from the patient to participate in the study and for publication of the data.

A 56 years old postmenopausal woman, known case of chronic hypothyroidism for six years and bronchial asthma for 20 years, developed fever, cold and cough with mild dyspnea. The COVID testing was positive and she was admitted to a notified COVID Hospital of Govt. of Puducherry, India. As another member from the same family was diagnosed to have COVID-19 four days before, the family had apprehension of her becoming COVID-19 positive soon due to her chronic respiratory problem and hypothyroidism. Therefore, in two days she was trained to practice asanas in prone posture and Pal's pranayama technique, as described before. Thus, before getting admitted to COVID hospital, she had learned asana-pranayama schedule and practiced the programme once in the morning between 7.00 AM to 8.00 AM and once in the evening between 5.00 PM to 6.00 PM, each session lasting about 45 minutes. During rest of the time she was advised to lie down in matsya-kridasana (Figure 7) or advasana (Figure 8), on the bed, whenever she found it comfortable. The family members continued to encourage her to practice the asana-pranayama schedule through her mobile phone. Moreover, the attending nurse in the COVID ward was informed about this asana-pranayama practice being done by the patient, who continued to motivate her to practice it regularly.

For fever, patient was given Paracetamol tablet 500mg twice for three days. For cold and cough, she was given cetirizine 10 mg once daily and non-narcotic cough syrup (5 ml, twice daily) for three days. The patient was given Vitamin C and B complex tablets for 10 days. She had taken Thyroxine sodium tab 75 microgram daily in the morning, which she takes routinely since she was diagnosed to be hypothyroid. Her pulse, blood pressure, oxygen saturation (SpO_2, measured using finger-tip pulse oximeter) and random blood glucose (using Accu-Chek glucometer), were monitored every-day. All these parameters were within the normal range throughout her hospital stay, except the SpO_2, which was 93 mmHg on first day of admission, but was above 96 mmHg on subsequent days. Patient was recommended home-quarantine for 10 days and was advised to continue to practice prone asanas and slow pranayama during the home-quarantine period.

Results

The patient became afebrile on 3rd day of admission and cold, cough and respiratory symptoms disappeared on 4th day. As the patient was asymptomatic for one week, she was discharged on 11th day from the hospital. This postmenopausal woman inspite of having pre-existing comorbidities such as bronchial asthma and hypothyroidism had an early recovery, and she became totally asymptomatic in just 4 days compared to other patients of her age and gender. In general, quite a few female COVID patients in the same hospital above 50 years of age had morbidities and had longer days of hospital stay. Further, there was no complications during her home-quarantine period.

Discussion

One of the major objectives of treatment of COVID patients is to prevent the development of respiratory illness, especially ARDS [3]. The main purposes of prone positioning are to improve oxygenation and respiratory mechanics, homogenise the pleural pressure-gradient, the alveolar inflation and the ventilation distribution, increase lung volume and reduce the amount of atelectatic regions, facilitate the drainage of secretions, and reduce ventilator-associated lung injury 5]. As prone positioning improves pulmonary mechanics and oxygenation, we hypothesized that a COVID-19 patient practicing asana in prone position and lying-down in advasana (prone-shavasana) for a longer time will strengthen his respiratory functions and will prevent respiratory problems. Though there are many prone asanas, we have selected only those asanas that a conscious and cooperating COVID-19 patient can perform. Further, these asanas help in strengthening

the muscles of neck, thoracic cage, abdominal wall and pelvic wall and facilitate the functioning of respiratory apparatus [16]. Among them, jyestikasana, matsya-kridasana and advasana are mainly for relaxing the body in prone position and decreasing the stress level of the patient.

Practice of pranayamic breathing has been shown to be effective in improving cardio-pulmonary and autonomic functions [17]. Compared to normal breathing, the duration of expiration is more than inspiration in slow pranayamic breathing, especially meant to facilitate vagal strength and cardiorespiratory functions. In Pal's pranayama schedule, which is a combination of chandranadi (left-nostril) and anulom-vilom (alternate-nostril) breathings, the duration of expiration is more prolonged to further strengthen the cardiopulmonary functions [14]. As slow nostril breathing has been reported to promote vagal tone while strengthening the sympathovagal balance [18], the increased duration of expiration in this Pal's slow pranayamic breathing will further potentiate the vagal tone, as already observed earlier [19]. Increased vagal tone is known to improve oxygenation and pulmonary functions in hypoxic human beings [20]. Further, in slow breathings, the more expansion of chest wall and increased afferent discharge from thoracic cage and lungs will improve the functions of the breathing apparatus, as documented earlier [16,17]. Nevertheless, with the practice of this asana-pranayama schedule, the body-mind of the subject will be relaxed, in addition to improvement of cardiorespiratory functions.

It was heartening to note that the postmenopausal woman with comorbidities of bronchial asthma and hypothyroidism had smooth recovery from COVID-19 following practice of prone asanas and Pal's pranayama. Pranayama is more than a simple breathing exercise. Especially, practicing Pal's pranayama ensures robust vagal potency while maintaining autonomic balance [19]. As slow-breathing exercises are known to facilitate vagal tone and cardiorespiratory functions, the cardiopulmonary functions of this case of 56-year-old women following practice of Pal's pranayama was anticipated to be improved. The subject is asked to relax the body and mind during the entire process of exhalation in Pal's pranayama. Thus, the relaxation resulted during longer period of expiration in this pranayama ensures physical and mental relaxation. The patient did not develop any complication during the two weeks follow up in the post-recovery period.

It is reported that fear (20%), nervousness (18%), sadness (18%), anxiety disorders and sleep disorders are common in COVID-19 patients [1-3]. Recently we have reported decrease in stress level and increase in cardiovascular functions following practice of slow breathing exercises [21]. Therefore, we expect that asana-pranayama practice will not only prevent cardiorespiratory complications in COVID-19 patients, but also will prevent development of psychological distress in them. Also, it will prevent the development of complications in post-recovery period. As there are no expenses involved in these practices, the interventions are noninvasive and nonpharmacological, and these techniques can be performed without much difficulty, it will be less cost-effective, and there may be wider acceptability.

Declarations

Conflict of Interest: Authors declare they have no conflict of interest.

Ethical Clearance: Approvals of the Scientific Advisory Committee and Institutional Ethics Committee of Sri Aurobindo Society, Puducherry, India, were obtained for the study.

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Author Contributions: GKP: Conceptualized the study, Prepared the manuscript; Prepared the demonstrations of asana-pranayama; NN: Helped in hypothesis generation and preparation of manuscript; MR: Helped in demonstration of the asana-pranayama practice to the patient and preparation of the manuscript; PP: Helped in hypothesis generation and preparation of manuscript.

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