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Efficacy of Heartfulness Meditation on Improving Outcomes in COPD Patients.

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ABSTRACT

Chronic obstructive pulmonary disease (COPD) is a debilitating and life-threatening lung disease, characterized by chronic irreversible limitation of airflow in the small airways of the lung. In 2015, World Health Organization estimated COPD as the 5th biggest killer worldwide with a global prevalence of 11.7 % (8.4%–15.0%). Every hour, COPD is estimated to kill over 250 people across the globe. In India, majority of older adults are affected with COPD and spend 70 percent of their costs on treating it during hospitalization. Recent research has found that weak adherence to the treatment plan and suboptimal rehabilitation are the most important factors contributing to the impairment in quality of life in these patients. Anxiety and emotional stress worsen symptoms in these patients and make them prone to exacerbations. Meditation relieves anxiety and depression, improves positive thinking and produces a sense of well being, contributing to a better response to treatment and optimal rehabilitation, thereby improves the symptoms of COPD, reduces the frequency of exacerbations and enhances PQLI (Physical Quality of Life Index).

Keywords: Chronic Obstructive Pulmonary Diseases, Heartfulness, Meditation, Anxiety, Emotional stress.

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INTRODUCTION

A connection exists between breath and the mind. Whenever there is turbulence in the mind, breathing becomes heavy. Finding the beauty of one's inner self by plunging deep inside through meditation relieves the burden on the mind and eases the breath' **~ Unknown**

Emotional stress is the wear and tear of our minds and bodies experienced as we attempt to cope with our continually changing emotional environment. How we experience these changes, whether the situation makes us feel stimulated or threatened, encouraged or discouraged, happy or sad, depends to a large extent, on how we perceive these things. Strangely, most of this emotional stress that we experience is self-generated[1]. Emotional stress produces a variety of physiological responses in the body, mediated mostly through autonomic nervous system and hormones. A stress response classically produces increase in heart rate, respiratory rate, blood pressure, and overall metabolic rate, and thus increases the demand on cardio pulmonary system[2]. Although, physiologically, sympathetic activity produces broncho dilatation, the overall burden on the respiratory system outweighs this positive influence and finally precipitates deconditioning in patients with an already compromised cardiopulmonary system. On the contrary, a classic relaxation response, like the one produced after a deep meditation, lowers heart rate, respiratory rate, blood pressure and overall metabolic rate and thus lowers the baseline demand on the cardio pulmonary system [3].

Fundamentals of Meditation:

Meditation is defined as "inner observation in silence", which has got a positive influence on both mind and the body. For millennia, Raja yoga meditation has proved its efficacy in producing calmness and peace, improving emotional stability, managing chronic ailments, enhancing health status and quality of life. Integrating Rajayoga system as the core component, Patanjali described Ashtanga yoga system which has become the main source of many different methods of meditation/yoga available in the present times. Ashtanga yoga consists of eight steps, namely, Yama (self-restraint), Niyama (observance), Asana (postures), Pranayama (control of breathing), Pratyahara (abstraction), Dharana (concentration), Dhyana (meditation) and Samadhi (Super conscious state/ Living dead state) [4-6]. As it is not very easy for the common man of the current times to follow this method with all its rigorousness, many simplified methods have emerged with subtle modifications to suit the current lifestyles.eg Heartfulness Meditation, Transcendental meditation, Kundalini yoga, Sudarshan kriya yoga etc.

Most of these methods of meditation have four elements in common: a quiet vicinity with as few distractions as viable(Ashrams/Meditation centers); a selected, relaxed posture (mostly sitting); a focal point of attention (a word or set of words, an item, breath or the heart); and an open attitude (letting distractions come and move certainly without judging them).

In recent years, increasing inquest is being made on the efficacy of Raja yoga meditation on improving mental and physical health in both clinical and non-clinical settings.

The following definitions of 'Heartfulness' are provided by the Oxford Dictionary- The fact or quality of being heartful; sincerity or warmth of feeling or expression[7]. According to Hindu tradition and Sanskrit scriptures this concept can be defined as: "the realization of the inner self of its eternal connection with the higher self inside one's own heart and seeking its guidance from within- so as to be free from the burden of the results of one's own thoughts and actions." This produces a state of "Dependence on the guidance from within" - in all the aspects of day to day living resulting in a well-balanced thinking and approach to life[8]. It is the unregulated mind, which is the main culprit of all the mental stress and its associated ill effects on the person[9].

Respiratory dynamics- Stress vs Meditation:

In the state of emotional stress, sympathetic nervous system triggers the body's historic fight-or-flight response - making the respiration rapid and shallow and abdominal muscles become tight, as are other muscles of the body. A surge of hormones consisting of cortisol and epinephrine is setoff, which booms blood pressure and heart rate and raises the metabolic rate, increasing overall oxygen consumption and CO_2 production in the body. This increases demand on the pulmonary system to cope up with the body's elevated

metabolic demand in such situations. But in COPD patients, who already have a high airway resistance and a weak diaphragm, this rapid shallow breathing actually results in inadequate emptying of the lungs with a further increase in the demand on the subsequent breaths. This triggers a vicious cycle with increased work of breathing finally compromising the entire pulmonary system.

Meditation, on the other hand, produces a deep and relaxed state, where the respiration becomes slower and deeper, and all the muscles of the body are relaxed. There is a dominance of parasympathetic nervous system and a reduced metabolic rate [10]. This reduces the demand on the pulmonary system. Further, slow and deep respirations allow lungs to fill and empty completely. Lung capacity increases, work of breathing decreases and thus the quality of breathing improves in these patients.

Deep and slow respiration, by itself, directly creates a perception of calmness in thoughts and the body. It activates the parasympathetic nervous system, which reverses the stress reaction- by slowing the heart rate, reducing blood pressure and harmonizing the neuroendocrine activity [11]. Similarly, with deep breathing, the abdominal muscles and diaphragm work instead of the muscle of upper chest and neck. Additionally, it reduces tension on the muscles of the neck and upper chest allowing these muscles to loosen up, permitting an overall better oxygenation and ventilation [12].

Thus meditation improves the efficiency of respiratory apparatus by minimizing the workload and maximizing the productivity.

Effects of meditation on COPD patients:

COPD patients suffer mainly due to dyspnea and frequent attacks of air hunger. One of the most important factors that compromises quality of life in these patients is air hunger [13]. Whenever a COPD patient suffers anxiety/emotional stress, it triggers hyperventilation and a sensation of air hunger. Thus, these patients frequently have dyspnea and anxiety occurring together [14]. This is a bad combination as each one will eventually trigger the other culminating in a self-perpetuating vicious cycle that eventually compromises the pulmonary system. Anxiety disorders are more common in COPD patients compared to general population [15]. Anxiety has a negative impact on the symptomatology of COPD and on rehabilitation programs [16,17]. COPD patients suffering from anxiety, when practice meditation, show improvement in their mental acuity and actively engage in their self care activities of daily living and show improved compliance with rehabilitation programs [18-20].

Studies reveal that higher levels of anxiety and depression lead to isolation of COPD patients from their support systems increasing their risk of hospitalization and death [21, 22]. Meditation enhances wellbeing in COPD patients by reducing emotional stress, anxiety and depression and thus making these patients actively engage in rehabilitation programs [23, 24]. Recent research has shown that meditation improves the perception of interoceptive information [25] by lowering chemosensitivity to CO_2 and providing faster recovery after sensory processing, thus accurately assessing the respiratory load [26]. This improved mental acuity towards pulmonary system, ability to respond quickly to the changing ventilatory needs allows better participation and performance of COPD patients in self care management programs and activities of daily living [27, 28].

Acute exacerbations of COPD requiring hospitalization accounts for more than 75 % of total COPD treatment costs and plays an enormous burden on psychological and physical health of these patients [29, 30]. Failure to quit smoking, infections, poor adherence to treatment plans, episodes of anxiety and depression are some of the major factors contributing to the acute COPD exacerbations [31-33]. Meditation aids in treating tobacco dependence [34], improves immunity, controls anxiety and depression, promotes adherence to treatment plans and rehabilitation programs [35, 36], thus helps in reducing the frequency of exacerbations.

Regular practice of meditation has shown beneficial effects in patients with chronic inflammatory conditions like psoriasis [37], rheumatisms [38], which can also have same beneficial effects on the chronic airway inflammation in COPD patients as well. Similarly, the enhancement of the immunity in regular meditators[39] may be applicable in preventing exacerbations in COPD patients as well, if they could practice meditation systematically.

Beneficial effects of meditation on the comorbidities commonly exist with COPD

Very often, COPD patients have multiple comorbidities like cardiovascular diseases, diabetes, osteoporosis, skeletal muscle dysfunction, malnutrition, depression, metabolic syndrome, lung cancer etc which also influence their quality of life [40]. Not uncommonly, exacerbation of symptoms in a stable COPD patient may be due to the worsening of a comorbid condition [41, 42]. 60% of mortality in COPD is attributed to these comorbids rather than by COPD itself [43, 44]. More than 50 % of COPD patients have more than three comorbidities [45]. Research has revealed that, in COPD patients, there is an increased activity of pro inflammatory cytokines- especially Tumor Necrosis Factor-alpha (TNF-α), and there is increased endothelial inflammation which has been shown to aggravate the development of atherosclerosis, diabetes, muscle wasting and kidney disease [46-51]. COPD patients with more than three comorbidities are likely to die prematurely than those without any comorbids [52]. Of all the comorbidities in these patients, anxiety and depression are difficult to diagnose and treat, because they often overlap with the COPD symptoms and cause a substantial burden on the disease management [53-56]. Meditation has been shown to control hypertension [57], reduce blood sugars [58] and cholesterol [59, 60], lowers the severity of anxiety and depression, thus renders a holistic regulation of all these factors and enhances the quality of life in COPD patients.

It is estimated that 21% of those with a primary COPD diagnosis have a coexisting Heart Failure [61] and 40% of people with a primary diagnosis of heart failure have COPD also [62]. COPD and Heart failure are the most important causes of mortality and morbidity worldwide [63-66]. Both these conditions are characterized by symptoms of anxiety, depression, difficulty in breathing and tiredness [67-70]. In patients with both Heart failure and COPD, symptoms are much more serious and worse [71]. These patients struggle to cope up with their disease conditions with uncertainty in prognosis, loss of hope, faith and self-image and get isolated from the family and support systems [72-75]. Meditation relieves stress, calms the sympathetic nervous system and engages the parasympathetic nervous system [76]. In addition, it improves the functioning of cardio vascular and pulmonary systems by lowering peripheral vascular resistance and reducing work load of breathing, respectively. Meditation boosts immune functions and reduces inflammation related with chronic inflammatory diseases [77]. Consequently, disease prognosis and quality of life improves [76].

Summary:

Research findings of multiple studies from different geographical locations show a positive outcome with meditation in COPD patients by regulating autonomic nervous system, by controlling anxiety, depression and emotional stress and by suppressing chronic inflammation. So far, the available data evaluating the efficacy of meditation in COPD patients is encouraging to recommend meditation as a complementary adjunct to medical therapy, as there are no side effects associated with it. By doing a regular practice of meditation, improvements in pulmonary functions were evidenced in COPD patients along with the improvements in tolerance levels of physical activity.

Limitations in most of the conducted studies were - small numbers of participants, high attrition rate and short duration of the study period.

This shows the need for a well designed study, looking at the different effects of meditation on improving the health status in COPD patients.

As it is, Rajayoga method is not very easy to be followed with all its rigorousness by the patients with cardiopulmonary limitations, explaining the high attrition rate. Simplified Rajayoga systems matching the current lifestyles, like the Heartfulness Meditation method, are easy and effective in improving regularity and adherence - to obtain maximum benefits.

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