

9.0 APPRAISAL

9.1 CONCLUSION

The efficacy of 12 weeks of IAYT intervention was assessed, through a randomized controlled trial, on pulmonary, autonomic, physical and psychological functions of coalminers with moderate to severe COPD. The intervention was integrated yoga therapy module specifically designed for COPD, 90 minutes per day six days a week for 12 weeks. IAYT entailed *asanas*, loosening exercises, breathing exercises, *pranayama*, cyclic medication, *yogic* counselling and lectures, all derived from philosophical concepts of Indian scriptures and yogic literature. The results of the present study suggest that IAYT program may have implications for COPD that bring about improvement in pulmonary, autonomic, physical and psychological function. It obtained answers for the research questions which were asked that is, 12 week of yoga helped in reducing dyspnoea, fatigue, anxiety, depression and pain; improving health status and functional exercise capacity in COPD patients, indicating use of yoga in pulmonary rehabilitation programs as an adjunct to conventional care. Considering the scientific evidence discussed, it is fair to conclude that yoga can be beneficial as an adjunct to conventional care in COPD management.

9.2 UNIQUENESS OF THE STUDY

- a) To the best of our knowledge, this is the first study investigating pulmonary, autonomic, physical and psychological health benefits associated with yoga practice in coal miners with moderate to severe COPD.
- b) This is the first comprehensive 90 minute yoga module based on holistic health approach with multidimensional interventions at physical, mental, emotional, intellectual and spiritual levels (WHO definition of health).

c) The IAYT module was specifically designed with specific number of rounds for each practice, number of minutes and a sequence.

d) The yoga sessions were monitored and supervised by trained, certified yoga instructors unlike previous studies where the yoga routines were either not specified, too long, not supervised or were to be practiced at home.

9.3 STRENGTHS OF THE STUDY

a) Our study has several notable strengths including the use of an expert panel of yoga teachers to design a program specifically for patients with COPD and expert yoga teachers with experience in a hospital setting.

b) The results of the present study demonstrate that IAYT is a valuable, effective and feasible treatment option for COPD patients. This encourages acceptability of the program in the present day fast life.

c) Significant results seen in objective measures (spirometric variables) apart from autonomic function variables along with improvement in symptom severity sleep quality, anxiety, depression, pain and QOL among other benefits.

c) The novel aspects of this study were the randomized control design, incorporation of IAYT, reasonable sample size, active supervised intervention, and follow up for three months with good compliance.

9.4 LIMITATIONS OF THE STUDY

a) The study population came from a selected group working in a particular coalmine, hence not generalizable.

b) Blinding the subjects was not possible due to the nature of the intervention.

c) This study lacked an active control group.

- d) This study excluded severe COPD patients, which were quite prevalent in India.
- e) With adequate funding, we could have measured IL6, DLCO, CRP, which would have been helpful to understand mechanisms of change at subtle level.
- f) Robustness of response short term and long term, outcomes with repeated procedures, subgroup analysis of participants with varied degrees of severity may all help to bring forth the effects.
- g) Due to inherent challenge with adherence to special dietary guidelines, especially in the majority of study participants, we could not give emphasis on diet.

9.5 IMPLICATIONS OF THE STUDY

- a) The significant improvements observed in all the primary and secondary assessments of COPD encourage the acceptability of the IAYT intervention for relieving of COPD symptoms.
- b) The IAYT intervention could be cost effective compared to high costs of conventional medical management of COPD, thus reducing the economic burden of treating this disease.
- c) Yogic intervention does not just heal physical symptoms but also takes care of the psychological components like anxiety and depression which contribute to positive attitude and better functioning of the patients.
- (d) Yogic therapy improves quality of life which helps in coping skills and fostering a better sense of wellbeing which again helps patients to get back to normal life.
- e) Improved positive wellness is a welcome social benefit of yoga that adds to promoting a healthy society.

9.6 SUGGESTIONS FOR FUTURE RESEARCH

- a) Directions for future research may include three armed randomized clinical trials incorporating appropriate active controls.
- b) Future studies could evaluate the effectiveness of IAYT on different grades of severity of COPD patients separately.
- c) The impact of yoga on biochemical, molecular and genetic changes may unravel the hidden mechanism of yoga.
- d) Because aging limits inferences about intervention effects, there is a definite need for more directed scientific studies to be carried out to explore the effects and the mechanisms of IAYT program for COPD management.
- e) Multi centric trials including more comprehensive battery of variables and long term follow up with continued maintenance intervention for about a year could be investigated to extend the benefits of yoga to huge COPD sufferers.
- f) Objective sleep metric (polysomnography) rather than subjective (PSQI) would attain more conclusive results for effects of yoga.
- g) Generalizability of this program in different cultures and in different ethnic groups may also be explored in future studies.
- h) Large cross sectional cohort studies would be interesting to see if similar results could be obtained with different types of yoga, worldwide.
- i) Further research is warranted to confirm these preliminary findings and facilitate implementation in clinical settings.