Review article

Respiratory care therapists in chronic respiratory care: The need of the hour

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Abstract

Chronic respiratory diseases are one of the main causes of morbidity and mortality, not only in the world at large, but also in India. The healthcare infrastructure at present remains insufficient to cope with the present and rising burden of chronic respiratory diseases. Insufficient and lack of skilled assistance has played a key role in the poor management of cases of chronic respiratory diseases.

However, a second tier of healthcare providers, empowered with sufficient knowledge and skill sets for chronic respiratory disease management, can help in managing these patients better. Respiratory care therapists have made a significant difference in the management of acute and critical care in respiratory medicine. With chronic respiratory diseases comprising the greater burden, respiratory care therapists are in a position to make a greater impact in the management of these cases.

This article is an endeavour to highlight the growing burden of chronic respiratory diseases and a possible solution to tackle the issue with efficient disease management. This is an extensive, raw and untapped opportunity for respiratory care therapists; an opportunity to unite with physicians in making lungs the heart of their scope of work. Together with physicians, respiratory care therapists can create this much pivotal change in efficient delivery of respiratory healthcare in India. This will help improve survival and therefore ensure a better quality of life for patients suffering from chronic respiratory diseases.

Keywords: Respiratory care, respiratory therapists

Chronic respiratory diseases are now recognised as one of the top causes of suffering and death in the world. Realising the enormous human suffering caused by chronic respiratory diseases, the 53rd World Health Assembly requested the Director General of WHO to continue giving priority to the prevention and control of chronic respiratory diseases with special emphasis in developing countries and other deprived populations (WHA 53.17).[1] According to the WHO estimates, India has the largest number of deaths due to chronic respiratory diseases in the world amounting to 242-303 per 100,000 population as against 67-100 in the UK and USA. This is not because India has a very huge population, because these numbers were corrected for the population (deaths per 100,000 population). Chronic respiratory diseases have been reported to be the second leading cause of death and the leading cause of suffering in India.[2,3] Most number of asthma deaths in the world occurs in India,[4] and in deaths due to Chronic Obstructive Pulmonary Disease (COPD), India ranks number two after China.[5] A recent report highlighted the fact that Indians have the lowest lung function values in the world. Compared to gender, age and height matched Caucasians, Indians have about 30% lower lung volumes (FEV_1 and FVC as measured by spirometry).[6] A study conducted by Dr S R Kamat more than 30 years ago in Mumbai reported that Indians had lung function values that

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were 8 – 12% lower than the Caucasians, indicating that the rapid decline in lung function over 3 decades in India is most likely attributable to worsening air quality and environmental causes rather than genetic or ethnic factors.

Until recently, most people in India used biomass fuel for cooking and heating purposes. They still continue to be used in about 70% of homes. There is now overwhelming evidence to suggest that exposure to biomass smoke is a leading cause of asthma, COPD, recurrent respiratory tract infections (especially in the children and elderly), and lung cancer.[7] Apart from this, more than 90% of homes in rural India use some form of mosquito coils, and it is now well established that burning one mosquito coil in the night over a period of 6-8 hours in rooms with closed doors and windows produces as much amount of harmful smoke that is equivalent to smoking 100 cigarettes.[8] As a result, a large number of Indians are exposed to wood/ dung smoke during the day while cooking and mosquito coil smoke during the night, expose them to very high levels of particulate as well as gaseous air pollutants. Burning of agarbattis (incense sticks) indoor further adds to this exposure.

Poor socioeconomic status, overcrowding as seen in urban slums and lack of education have been shown to be independent factors associated with chronic respiratory diseases.[9] Poor nutrition has also been shown to be risk factors for chronic respiratory diseases.[10] As India is becoming more and more urbanised, increased amount of constructions, industrial exhausts and a rapidly growing number of motor vehicles on narrow streets is contributing to worsening of air quality in urban cities and towns. Chronic exposure to indoor and outdoor air pollutants have therefore been a major risk factor for the growing burden of chronic respiratory diseases in India.

A decade ago, it was estimated that at least 65 million people in India suffer from chronic respiratory diseases.[3] This number would now have crossed 100 million. Asthma, chronic obstructive pulmonary disease (COPD), bronchiectasis, chronic rhino-sinusitis, hypersensitivity pneumonitis, lung cancers and neoplasms of respiratory tract, lung fibrosis, chronic pleural diseases, pneumoconiosis, diseases of the pulmonary circulation, cor pulmonale, allergic rhinitis, sarcoidosis, sleep apnoea syndrome, cystic fibrosis and more come under the gamut of chronic respiratory diseases. Among these, 75% alone suffer from obstructive airway diseases such as asthma and COPD and they alone amount to an economic burden of 47,000 crore rupees per year.[3,11]

We have shown that the prevalence of childhood asthma in Pune has almost doubled over a 5-year period from 2003 to 2008.[12] Similar increases have been reported from Bangalore, Delhi, and other cities and towns in India.[13,14] The ISAAC phase-3 study has revealed that although the overall prevalence of asthma in the age of 13-14 years in India is less than 5%, more than 50% of these are severe asthmatics.[15] Unfortunately, as many as 54% of asthmatic children are wrongly diagnosed to have lower respiratory tract infections, mainly pneumonias. These children continue to receive antibiotics and their asthma remains untreated increasing the chances of worsening severity.[16] Asthma is no longer only a genetic disease. Various environmental factors including history of a caesarean birth, early weaning, indoor air pollution, indoor wall dampness, are major contributing risk factors for development of asthma. Indiscriminate use of paracetamol has shown to increase the risk of asthma in infants.[17] Residing off a major road with heavy truck traffic density has shown to be detrimental to lung health as well as increasing the incidence of wheeze, rhinoconjunctivitis and eczema.[18] This can be explained by the 50-fold increase in allergenicity of pollen by the diesel exhaust particles emitted by trucks. This has also shown to lead to development of new sensitisations.

According to The Global Burden of Disease, WHO October 2008,[19] the prevalence of COPD is on the rise and projected to increase 160-folds in the South East Asian Region by the year 2030. Contrary to the popular belief, smoking is not the sole cause of COPD development. The incidence of nonsmoking COPD is on the rise.[20] An estimated 2 billion kilograms of biomass is burnt everyday world-wide. As opposed to the 1.1 billion global population which smokes,

3 billion people are exposed to biomass fuel and are at an increased risk of developing COPD. Nonsmoking causes of COPD are now being appreciated as important risk factors for COPD (*Table 1*).

Table 1: Risk factors for development of Chronic Obstructive Pulmonary Disease (COPD)

Tobacco smoke exposure	Cigarettes, beedies, hukkah, chillum, cheroot, etc.
Biomass fuel smoke exposure	Burning of wood, animal dung, crop residues
	Use of kerosene stoves
Genetic causes	Alpha 1 anti-trypsin deficiency
Chronic diseases	Uncontrolled chronic asthma
	Previous history of tuberculosis infection
Occupations	Farming
	Brick making
	Construction industry
	Ship building
	Mining
	Food industry: flour and grain workers
	Petroleum industry
	Pottery
	Quarries
	Rubber industry
	Plastic industry
	Stone masonry
	Textile industry
Social causes	Malnutrition
	Low birth weight
	Recurrent respiratory tract infections
	Poor lung growth

Despite the high burden of asthma, COPD and other chronic respiratory diseases in India, they remain poorly diagnosed and poorly managed by primary as well as secondary care physicians. Apart from the inadequate knowledge and diagnostic measures, India lacks in suitable health care resources. Every year, a mere 380 physicians specialise in respiratory care.[21] In spite of a sound training and skill acquisition in pulmonary medicine, pulmonologists remain limited in their outreach to the 100 million patients suffering from chronic respiratory diseases. Respiratory therapists have changed the face of management of acute and critical pulmonary care. This tier of healthcare providers has helped close in on the low doctor-patient ratio in India which has been beneficial to decrease the mortality and morbidity of patients with acute and critical respiratory illnesses. Doctors have found better utilisation and time management for their patients as the respiratory therapists have taken over the function of providing effective patient care in the field of acute and critical care in respiratory medicine. Management of chronic respiratory diseases need more time and patience than acute or critical pulmonary cases. These patients require repeated counselling on disease progression, treatment adherence and rehabilitation. Well trained and skilled respiratory therapists will help bridge the gap between the inadequate healthcare resource and the huge patient pool of chronic respiratory diseases.

Need for respiratory therapists in chronic respiratory care and their effective role

India has a total of 840,130 MCI (Medical Council of India) registered medical practitioners in modern medicine and 712,121 doctors practising alternative medicine and registered with the AYUSH (Ayurveda, Unani, Siddha and Homeopathy). International norms suggest an ideal doctor-to-patient ratio of 25:10,000. However, in India we are still struggling with a doctor-to-patient ratio of 3.8:10,000.[21] This clearly brings out the lack of healthcare facilities for a majority of ailing residents of India.

Diagnosis of obstructive airway disease (OAD) patients

More than 65% of patients of obstructive airway diseases remain undiagnosed. This is primarily due to lack of use of objective tools for the diagnosis of these cases. The basic tests of peak flowmetry and spirometry are simple procedures but require certain skill sets to get effective results from patients. Respiratory therapists can specialise in performing and analysing spirometry and peak flow meter assessment as well as establishing themselves in advanced lung function tests such as body box plethysmography, impulse oscillometry, diffusion

capacity, exhaled nitric oxide, sputum testing, allergy testing and bronchial challenge tests.

Patient counselling

Unlike acute and critical respiratory cases, management of chronic respiratory care expands more often beyond prescriptions. These patients need extensive counselling which helps them with better understanding of their disease. Post-diagnosis, explaining the concept of disease and its management through the inhalation route of treatment along with effective and correct technique of the use of inhalation devices becomes an imperative step towards effective disease management. Ensuring a regular follow up of the OAD patients and re-assessing inhalation technique at every follow up, is an important arena for the respiratory therapists. Regular counselling regarding disease progression, home monitoring, acute attack recognition and self management plans facilitates more effective disease management. A major issue in the management of obstructive airway diseases is adherence to treatment. Defaulting from regular treatment worsens their disease prognosis. Cost of therapy is also a major hindrance to continuation of therapy which is further detrimental to the patient's health. Very often patients remain in an uncontrolled state of the disease and yet they do not come for a regular follow up and invariably stop treatment on their own. This issue can be managed by regular counselling and home based therapy for such patients. Considering the current health resource situation, it becomes practically impossible for doctors to reach out to this stratum of patients.

Pulmonary rehabilitation

Patients with COPD typically manifest various systemic comorbid conditions such as cardiovascular abnormalities, metabolic diseases, osteoporosis, skeletal muscle weakening, peripheral vascular diseases and more. Such cases warrant a more holistic approach of management. Need for effective pulmonary rehabilitation becomes necessary in these patients. Instead of draining the already meagre health care resource, it is advisable to offer home-based pulmonary rehabilitation programmes for such patients. Pulmonary rehabilitation is thus a major arena of responsibility which a respiratory therapist can undertake.

Other chronic respiratory diseases

Patients suffering from bronchiectasis usually require long term antibiotics and chest physiotherapy. Respiratory therapists can play a major role in home-based management of these patients. The care giver of the family along with the patient needs to be trained and retrained on the postural drainage techniques.

Chronic infectious cases such as tuberculosis need regular follow up and face similar issue of compliance. With the emerging trend of multi-drug resistant tuberculosis and total drug resistant tuberculosis, it is imperative that patients be followed up on regular use of antituberculous therapy. Repeated sputum checks and monitoring of treatment needs to be conducted at regular intervals until the patient is free of active infection.

Patients on home ventilators need to be educated on the correct maintenance practices and they need specialised care even for their home-based management. Patients of obstructive sleep apnoea need noninvasive positive pressure ventilation. Patients and their family members face a lot of challenges with this form of ventilation. Respiratory therapists find a major role in this field with their sound knowledge of ventilators.

Conclusion

Respiratory therapists can provide a much needed second tier of healthcare providers who can reduce the morbidity levels of chronic respiratory care in India (*Table 2*). Chronic respiratory disease management would therefore provide an encouraging career opportunity for respiratory therapists who in turn would create a major impact on the disease burden and morbidity in India. They would play a crucial role in management of these cases by catering to bridge the widening gap between trained respiratory consultants and the patients of chronic respiratory diseases. This would be a pivotal step in efficient delivery of respiratory healthcare in India.

Table 2: Role of the respiratory care therapist in chronic respiratory diseases

Diagnosis	PEFR
	Spirometry
	Body box plethysmography
	Impulse oscillometry
	DLCO
	Exhaled NO
	Allergy testing
	Sputum testing
Treatment	Inhalation device training
	Home-based oxygen therapy
	Home-based NIV
	Ventilator support
Patient counselling	
Pulmonary rehabilitation	Chest physiotherapy
	Breathing techniques
	Upper limb exercises
	Endurance training

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