

Knowledge on prevention and management of Chronic Obstructive Pulmonary Disease and Asthma among medical officers: a multi-center pre and post-test study

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Abstract

Background: Despite Chronic Obstructive Pulmonary Disease (COPD) and Asthma being one of the leading causes of morbidity and mortality in India, knowledge about these diseases among healthcare professionals seems inadequate. **Aims:** This study aimed to assess the knowledge gained by medical and paramedical staff in the prevention and management of COPD and asthma following a two-day training program. **Settings and methods:** This quasi-experimental (before-after) study was carried out among medical and paramedical staff of public health systems of the government of India in three training centers in Maharashtra. A questionnaire was given in the form of a pre-test before a two-day training program. The training was comprised of prevention and management of COPD and asthma. After completion of training, a post-test was given, and scores were calculated. **Statistical analysis:** A two-tailed paired sample t-test was used to assess knowledge gain. $P < 0.05$ was considered statistically significant. **Results:** A total of 77 participants completed both pre-test and post-test before and after the training programme. Twenty-Five (32.5%) were female and 52 (67.5%) were male. The mean age of participants was 42.7 ± 7.9 years. The majority (92.2%) of the participants were medical professionals. Only nine participants (11.7%) had ever attended a training program on COPD or asthma. The mean pre-test score was 14.68 ± 3.88 , while the mean post-test score was 25.60 ± 6.52 . There was a statistically significant improvement in knowledge scores at all three training centers, among both genders and across all qualifications ($p < 0.001$). **Conclusion:** Adequate training of medical and para-medical staff in public health systems across the country can result in effective and timely diagnosis, treatment, and referral for patients with COPD and Asthma. This will ensure a reduction in the social and economic burden of disease.

Keywords: Chronic Obstructive Pulmonary Disease, Asthma, Training, Public health

Introduction

Chronic Respiratory Disease (CRD) is a broad term encompassing disorders of the airways and lung parenchyma. These include Chronic Obstructive Pulmonary Disease (COPD), Asthma, occupational lung diseases, and Interstitial Lung Disease (ILD), to name a few. CRDs are one of the leading causes of morbidity and mortality in the world⁽¹⁾. Likewise, in India, there is high morbidity [6.4% of total Disability-Adjusted Life Years (DALYs) and mortality (10.9% of total deaths)] attributable to CRDs⁽²⁾. COPD and asthma are the most common chronic respiratory diseases, both in India and worldwide. The prevalence of COPD in India is 4.2%⁽²⁾ while that of asthma is around 3%⁽²⁾. Also,

COPD is the second leading cause of death in India after heart disease⁽³⁾. Other than morbidity and mortality, these conditions also put much strain on the finances of not only the patient but also the health system, with the economic burden of COPD estimated to be over 100 thousand crore rupees per year in India^(4,5).

Despite the high disease burden, awareness among the general public and medical professionals about COPD and asthma is lower in comparison to other chronic diseases like Diabetes Mellitus (DM) and hypertension. They remain underdiagnosed and underrecognized despite high prevalence. In 2010, a national program was launched to control Non-communicable Diseases (NCD) called the

National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS)⁽⁶⁾. Since 2016, COPD and asthma have been included in this program⁽⁶⁾. This was a major landmark in managing CRDs because inclusion at the primary healthcare level can lead to early diagnosis and timely referral to specialized facilities. Also, both diseases being chronic in nature, the role of primary care physicians and health care workers is paramount as they can play an important role in teaching inhalational techniques and breathing exercises, ensuring compliance to treatment, assisting in smoking cessation, and identifying exacerbation.

This project was intended to train health professionals and paramedical staff about the basics of prevention and management of COPD and asthma at the primary care level and to assess and gain knowledge after training.

Objectives

- To assess the knowledge about the prevention and management of COPD and asthma among medical officers and paramedical staff from various government facilities in Maharashtra
- To evaluate the correlation between age, gender, and qualification with improvement in knowledge scores after training

Materials and Methods

This quasi-experimental (before-after) study was a collaborative research project between Bharati Vidyapeeth Medical College (BVMC) and the National Rural Health Mission (NRHM). The training program took place from January to March 2023 at three training centers [Pune, Chhatrapati Sambhaji Nagar (formerly Aurangabad), and Nagpur] covering three provinces of Maharashtra. The study participants were medical professionals (including medical graduates, postgraduates, and allied Ayurved and Homeopath graduates) as well as paramedical staff working in various government facilities in districts of Maharashtra.

Study procedure

A structured two-day training program that was conducted over 14 hours was developed by senior respiratory physicians from BVMC. On day one, there were theoretical sessions (in the form of presentations) about the epidemiology, clinical

features, diagnosis, and management of COPD and asthma^(7,8). This was followed by a hands-on workshop about spirometry, Peak Expiratory Flow Rate (PEFR), inhaler techniques, and the importance of smoking cessation. On day two, micro-teaching was done by dividing the trainers into smaller groups and selecting one representative from each group to explain the allotted topic to the other trainers based on knowledge gained during the first day of training. This was followed by imparting knowledge about non-pharmacological treatment (nutrition, exercise, etc.) for COPD and asthma through role plays and skits. The role of palliative care was also stressed upon during the session. All the participants received kits, including a peak flow meter, a pulse oximeter, all presentations used during the training on a USB drive, and a printed copy of the medical officer's manual for the prevention and management of COPD and asthma. The training was delivered by senior respiratory physicians from Bharati Vidyapeeth (DU) Medical College in the local language (Marathi) and English. All participants undertook a questionnaire-based assessment of knowledge regarding COPD and asthma before and after training (pre and post-test, respectively). The questionnaire included 18 questions regarding risk factors, symptoms, evaluation, treatment, and prevention of COPD and Asthma, which were scored according to predefined scoring chart with a total score of 60. The collected data was analyzed both qualitatively and quantitatively.

Statistical analysis

Demographic data were presented in the form of means and percentage. Continuous data were presented as mean±Standard Deviation (SD). Each question was scored using the scoring provided in the supplementary material. The overall score was calculated before and after training. Statistical Package for Social Sciences (SPSS) version 29.0, software was used for data analysis. A two-tailed paired sample t-test was used to assess knowledge gain. All statistical tests were two-sided at alpha=0.05.

Results

Socio-demographic characteristics

The distribution of participants among the three centers is depicted in Table 1

Table 1: Distribution of participants at the 3 centers

Centre of Training	n (%)
Chhatrapati Sambhaji Nagar	32 (37.2)
Nagpur	26 (30.2)
Pune	28 (32.6)
Total	86 (100.0)

The initial number of participants was 86, out of which 77 completed both pre and post-test before and after the training program. Of these, 25 (32.5%) were female and 52 (67.5%) were male. The mean age of participants was 42.7 years with SD of 7.9 years.

The majority (92.2%) of the participants were medical professionals; the rest were paramedical staff (Table 2).

Among medical professionals, most (74.02%) participants had modern medicine degrees, while 18.2% had alternative medicine degrees (BAMS, BHMS). The mean years of practice for medical officers was 12 years with SD of 8.9 years. Only nine participants had ever attended a training program on COPD or asthma.

Table 2: Educational qualification of participants

Qualification	n (%)
Para-Medical	5 (6.5)
BAMS/BHMS	14 (18.2)
MBBS	10 (12.9)
MBBS with Diploma	13 (16.8)
MD/MS	34 (44.2)
Not available	1 (1.3)
Total	77 (100.0)

Pre and post-training evaluation

Prior to the training program, the mean knowledge-based score was 14.68 ± 3.88 , while after training, it was 25.60 ± 6.52 . This difference was statistically significant ($p < 0.001$).

Almost half (49.4%) of the participants had more than 10 point increase in knowledge scores (Figure 1).

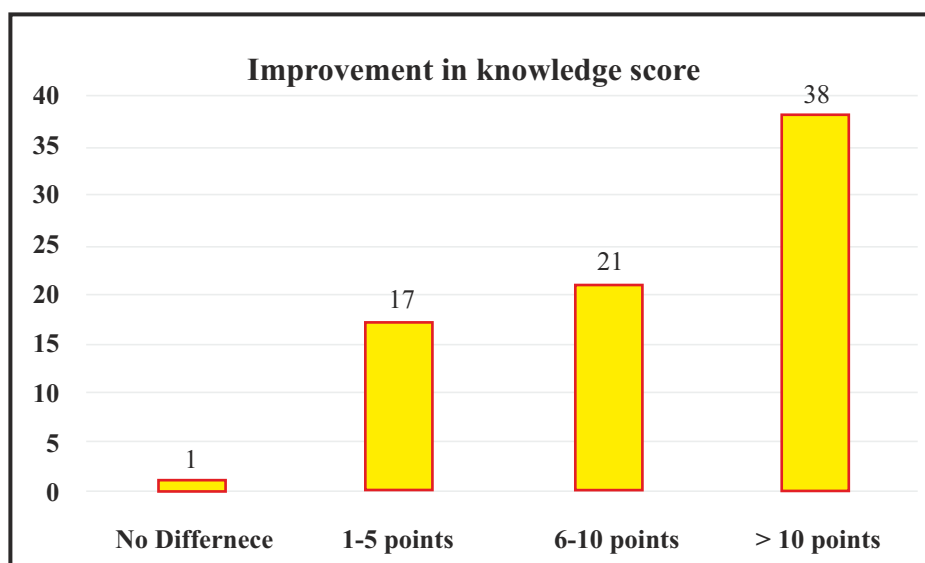


Figure 1: Improvement in knowledge score of participants

More than 10-point increase in knowledge scores was more among females as compared to males, although not statistically significant ($p = 0.195$). Similarly, a more than 10-point increase in score was for participants practicing modern medicine compared to those practicing alternative medicine, although the difference was not statistically significant ($p = 0.895$).

There was a statistically significant improvement in knowledge scores at all three training centers (i.e., Pune, Nagpur, and Chhatrapati Sambhaji Nagar) among both genders and across all qualifications. There was a significant improvement in scores after training for all questions except two: symptoms of COPD and errors while using inhalational devices (Table 3).

Table 3: Comparison between knowledge scores pre- and post-training

Knowledge about COPD and BA	Pre-test score Mean (SD)	Post-test score Mean (SD)	t-value	p-value (2-tailed)
Risk factors and symptoms				
Common obstructive airway diseases	1.83 (0.67)	2.17 (0.57)	-4.13	<0.001*
COPD risk factors	1.71 (0.98)	3.04 (1.32)	-7.37	<0.001*
Asthma risk factors	1.81 (1.18)	2.88 (1.37)	-5.56	<0.001*
COPD symptoms	2.87 (0.49)	2.92 (0.42)	-0.68	0.496
Diagnosis				
Tools for measuring airway obstruction	0.92 (0.64)	1.83 (0.41)	-12.62	<0.001*
Diagnosis by spirometry	0.45 (0.50)	0.81 (0.39)	-5.30	<0.001*
COPD versus Asthma	1.26 (0.75)	1.57 (0.71)	-3.35	0.001*
Treatment				
Role of Inhaled Cortico-steroids	0.06 (0.29)	1.17 (1.46)	-6.34	<0.001*
Role of reliever and controller	0.43 (0.78)	1.38 (0.85)	-7.48	<0.001*
Prevention of COPD	0.70 (0.46)	0.83 (0.37)	-2.29	0.024*
Indication for Oxygen Therapy	0.00 (0.00)	0.21 (0.52)	-3.46	0.001*
Role of oxygen	0.04 (0.25)	0.88 (0.88)	-7.82	<0.001*
Route of drug delivery	0.49 (0.50)	0.91 (0.28)	-6.67	<0.001*
Inhalational devices	0.81 (0.39)	0.92 (0.27)	-2.23	0.028*
Inhalational device errors	0.29 (0.45)	0.30 (0.46)	-0.19	0.849
Inhaler technique	0.66 (0.47)	1.00 (0.00)	-6.22	<0.001*
Role of pulmonary rehabilitation	0.12 (0.32)	0.90 (0.75)	-9.06	<0.001*
Role of palliative care	0.17 (0.37)	0.57 (0.49)	-6.22	<0.001*
Referral for Exacerbation	0.05 (0.22)	1.31 (1.72)	-6.51	<0.001*

*Statistically significant

Discussion

In this study, we demonstrated that a training program significantly improved the knowledge in the prevention and management of COPD and asthma among medical professionals and paramedical staff at various government health facilities across Maharashtra. Irrespective of gender, qualification, or center of training, there was significant improvement in knowledge across all groups after training.

Although India contributes to 17.8% and 13% of the global burden of COPD and asthma, respectively, it contributes to a disproportionate 27.3% and 43% of the global COPD and asthma deaths, highlighting the fact that there is mismanagement of COPD as well as asthma in India⁽⁹⁾.

Despite the high burden of disease, there is a lack of awareness about CRDs⁽¹⁰⁾. This lack translates to a missed or incorrect diagnosis. Even if diagnosed correctly, there is incomplete knowledge about treatment and the need for

referral in cases that cannot be managed at the primary health center⁽¹⁰⁾. As a result, there is increased load at tertiary care centers. Also, there are frequent exacerbations requiring oral or intravenous steroids⁽¹¹⁾. In our country, already burdened by Tuberculosis (TB), DM and hypertension, recurrent steroid use (sometimes over the counter) is a double-edged sword.

Patients with COPD and asthma require multiple interactions with healthcare facilities. The chronic nature of the disease also leads to increased chances of non-adherence to treatment⁽¹¹⁾. Therefore, primary caregivers can play an important role in prevention, early diagnosis, treatment, and referral.

In a study conducted in China (2012) to assess knowledge of COPD and asthma among 110 clinicians, Fang et al. reported a similar lack of knowledge, which improved after training⁽¹²⁾.

This study highlights the important role a training program can have in the implementation of COPD and asthma

prevention and management as envisioned by the Government of India. A structured two-day training program had an important impact on knowledge about these two CRDs, so a longer duration of detailed training can be expected to enhance knowledge even further.

Conclusion

Considering the high burden of COPD and asthma in India, CRDs have attained an important place in the priority list of diseases needing immediate attention by the government of India. By adequate training of medical and para-medical staff in public health systems across the country, there can be effective and timely diagnosis, treatment, and referral for these patients. This will ultimately lead to reducing the social as well as economic burden of disease.

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Conflict of Interest: Nil

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Ethical consideration

This study was approved by Institutional Ethics Committee.

Authors' Contribution

MB: Conceptualization, design, data collection, implementation, data analysis, interpretation, and manuscript writing; RM: Conceptualization, design, data collection, implementation; PM: Conceptualization, design, data collection, implementation; HP: Conceptualization, design, data collection, implementation; AK: Conceptualization, design, data collection, implementation; AS: Data analysis, interpretation, and manuscript writing; JL: Design, data collection, data analysis, interpretation.

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