Kerala State COPD Control Program

Module for Medical Officers

SWAAS

(Step wise approach to Airway Diseases)

Developed by
State NCD Division, Directorate of Health Services, Government of Kerala
National Health Mission
State Health Systems Resource Center- Kerala
Academy of Pulmonary and Critical Care Medicine

The Preface

The Kerala state has launched a Public health programme for Prevention and management of COPD for the first time in India. This programme envisages its targets in par with the SDG, covering all the levels of health care.

As COPD is incurable, the SWAAS strategies are mainly focusing on the preventive aspects for which the strengthening of the primary care is given at most importance. Through this programme, the government is starting COPD clinics in all Primary Health centres in a phased manner.

This module prepared by the SWAAS Technical team with support of Association of Pulmonary and Critical care Medicine will guide the primary care physicians in understanding the disease and also operationalsing the programme in the way it is needed. I take this opportunity to acknowledge the SWAAS technical Team headed by Prof K. Anitha Kumari and Dr Sanjeev Nair for their tremendous effort in framing the SWAAS Programme and bringing out this module and also the SHSRC team headed by Dr. Shinu K.S for coordinating the activities with State NCD Division. I recommend this module cum TOG to all the primary care specialists who are taking care of Kerala's public health.

This Technical and Operational Guidelines for SWAAS - Kerala was written by the Technical Working Group (in alphabetical order)

Anitha Kumari K, Ameer KA, Bipin K Gopal, Kamala R, Manu M S, Sanjeev Nair, Shinu K S

General directions, instructions and guidance to the team were provided by Sri Rajeev Sadanandan IAS, Prof. K Vijayakumar, Dr. Saritha RL.

The technical team who contributed to the guideline development includes,

Respiratory Medicine Consultants (in alphabetical order): Asok K, Anjana Babu, Babu Varghese, Bindhu joseph, Divya Damaodharan, Jolly S.J, Jyothi Sussan, Harry Jacob, Haseena Shamli, Kalesh, Lekshmi Priya N R, Nahas C.N, Neena P.S, Praveena K.G, Rekha Gopinath, Sajeev Kumar, Sandeep B.R, Santhosh L, Salim .A, Shibu C. Anand, Shinoby Kurian, Shreeja K.R, Vipin Varkey, Venugopal and Yamuna Keeneri who attended the meeting

Anitha Mohan (Nutrition), Hari M Krishnan (Pulmonary Rehabilitation), Pradeep kumar A.S (Smoking Cessation), Vivek P and Suresh Kumar V K (Intensive Care) also contributed in the specific areas as mentioned.

SHSRC Team (in alphabetical order): Harishankar, Jaison Joseph, Kamarudheen, Nithin .V, Rekha M.Raveendran, Smitha Mariya Thomas, Soumya and Yamini Thankachi

The following experts have reviewed this documents and provided valuable suggestions: (in alphabetical order)

Davis Paul C, Madhukumar, Ravindran C

Abbreviations

AFB	**-**	**Acid Fast Bacillus**
COPD	**-**	**Chronic Obstructive Pulmonary Disease**
CRD	**-**	**Chronic Respiratory Diseases**
CXR	**-**	**Chest X ray**
FEV1	**-**	**Forced Expiratory Volume in 1 second**
FEV6	**-**	**Forced Expiratory Volume in 6 seconds**
FVC	**-**	**Forced Vital Capacity**
GBD	**-**	**Global Burden of Diseases**
GINA	**-**	**Global Initiative for Asthma**
GOLD	**-**	**Global Initiative for Chronic Obstructive Lung Disease**
ICU	**-**	**Intensive Care Unit**
INSEARCH	**-**	**Indian Study on Epidemiology of Asthma, Respiratory Symptoms and Chronic Bronchitis.**
mMRC	**-**	**Modified Medical Research Council Scale**
MO	**-**	**Medical Officer**
NCD	**-**	**Non Communicable Disease**
NIV	**-**	**Non Invasive Ventilation**
NPCDCS	**-**	**National Programme For Prevention and Control of Cancer, Diabetes, Cardiovascular Disease and Stroke**
OAD	**-**	**Obstructive Airway Disease**

PAL	**-**	**practical Approach to Lung Health**
PEFR	**-**	**Peak Expiratory Flow Rate**
PHC	**-**	**Primary Health Centre**
SDG	**-**	**Sustainable Development Goals**
UN	**-**	**United Nation**
WHO	**-**	**World Health Organization**

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Introduction

Kerala state is moving towards achieving the Sustainable Development Goals (SDG), adopted by the United Nations General Assembly on 25th September 2015. Goal 3 of the SDG addresses *"Ensuring healthy lives and promoting well-being for all at all ages"*. The sub-goal 3.4 of the SDG has the target "By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and wellbeing".[1]

Non communicable diseases (NCD) are chronic conditions of non-contagious origin having prolonged course and leading to functional impairment, disability or death. NCD constitute a set of diseases (cardiovascular diseases, cancers, chronic respiratory diseases, diabetes) responsible for substantial proportion of premature deaths, particularly in developing countries like India. The World Health Organization (WHO) attributed NCD as the cause of 60% of all deaths in India in 2010. In Kerala, the major NCD such as cardiovascular diseases, cancers, diabetes and chronic lung diseases are increasing. Chronic Respiratory Diseases were poorly addressed among the NCD in India, despite the fact that COPD is one of the leading causes of mortality in India. It was in the recent past that the National NCD program took a decision to include COPD as one of the prime NCDs to be addressed as part of the NCD control program.

Kerala has been the first state in India to address Chronic Respiratory Diseases (CRD) as a public health program, when it pilot tested the PAL strategy. Building on the experience of the state in addressing CRD in the past, and considering the inherent strengths of the public health system in the state, Kerala state is now moving towards developing and implementing a Public Health program for CRDs, which would primarily address COPD and Asthma. It is expected that this program would result in significant reduction in mortality and morbidity from COPD and Asthma, and take the state forward in achieving the SDG targets

Definitions and overview

Definitions

Chronic Obstructive Pulmonary Disease (COPD) - Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases. [2]

Asthma – Asthma is a heterogeneous disease, usually characterized by chronic inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation. [3]

Epidemiology and risk factors

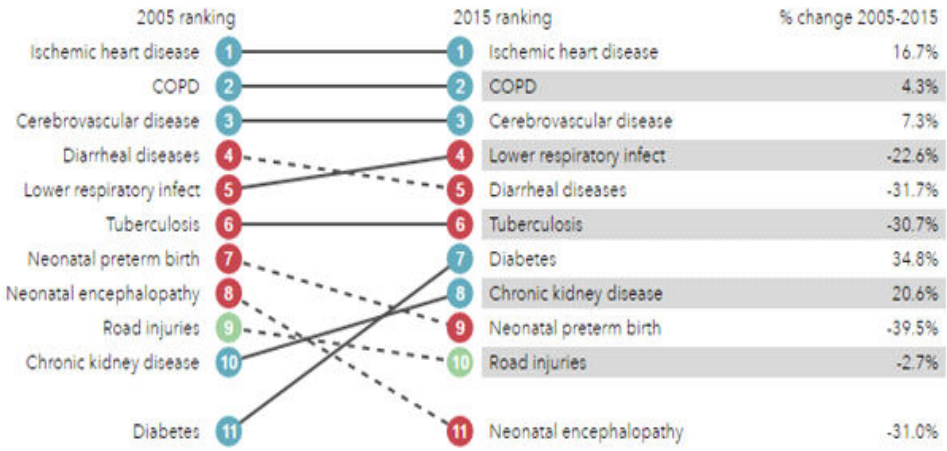
The estimated global prevalence of COPD is 384 million cases in 2010 which is a prevalence of 11.7% (95% CI 8.4%–15.0%). There are an estimated three million deaths annually due to COPD. With increasing prevalence of smoking in developing countries, and aging populations in high-income countries, the prevalence of COPD is expected to rise over the next 30 years and it is predicted that by 2030 there will be 4.5 million COPD related deaths annually. The prevalence of COPD was higher in smokers and ex-smokers compared to non-smokers and higher in the more than 40 year group compared to those less than 40 years old and higher in men than women. The major risk factors for COPD include smoking, environmental tobacco smoke exposure, biomass fuel smoke exposure, occupational exposures, age, genetic factors, previous history of diseases like Asthma and TB.

The epidemiology of COPD in India has been studied in the INSEARCH study by Dr. SK Jindal and team, they estimated the burden of COPD (as measured by chronic bronchitis) as 3.5% in persons above the age of 35 yrs. However the site in Kerala in

INSEARCH, [4] Trivandrum, had a high prevalence of COPD at 10%, which is much higher than the National average. Another study done in Kollam showed that the prevalence of self reported asthma was 2.82% (95% CI 2.52-3.12) and that of chronic bronchitis was 6.19% (95% CI 5.76-6.62) while other CRDs which did not fit to either constitute 1.89%. The prevalence of Asthma, which is confused with COPD in field conditions, in India was estimated to be 2.05% in the INSEARCH study and even in this study the highest rates for rural Trivandrum were higher than national average at 4.45 %.

The recent (2016) "Global Burden of Diseases" [5] estimated and ranked mortality due to various diseases in India. These GBD estimates for 2016 rank COPD as the second leading cause of mortality in India.

Figure. 1. **Global Burden of Disease (GBD) ranking for causes of mortality in India**



Assuming that the National estimates for Asthma and COPD reflect the situation in Kerala too, the number of COPD cases in Kerala can be estimated to be 530,000, and the number of Asthma patients among adults can be estimated to be 480,000. This is a huge disease burden which needs to be addressed with appropriate strategies.

In addition to the mortality caused by COPD, COPD also places a huge burden on the health services in terms of OP and IP work load. Almost 10 to 20% of the

patients coming to the general OPD of Health Service Department of Kerala come with COPD and asthma; and repeated hospital visits by the same patients take up a considerable amount of the time available for work for the PHC MO.

The major issues in Kerala with respect to COPD include increasing prevalence due to an aging population and increasing cost of care leading to inadequate treatment and poor symptom control. Cases of COPD are often diagnosed at late stages of the diseases whereas if they had been diagnosed in the early stages, secondary prevention could have been more successful (e.g. Smoking cessation). The risk factors for COPD that need to be addressed include Age, smoking cessation, and indoor and outdoor air pollution.

It was earlier believed that COPD was a disease of male smokers. However the INSEARCH study showed that COPD was common even among females in India. There is a 2.7% prevalence among women in India as compared to the 3.5% overall prevalence (4.2% in males). Also, most of the female patients are non-smokers, the risk factor in this group mainly being domestic cooking fuel smoke exposure. In contrast, in western countries COPD is mainly a disease of smokers. Most of the international treatment guidelines are formulated based on evidence from COPD patients who are smokers. The natural history, progression and response to treatment in patients who are non-smokers have not well been studied. As such, how women with COPD in India would progress or respond to treatment needs to be evaluated. Generally, it is believed that smoking cessation would be enough as a strategy for preventing COPD, however in the Indian scenario, where only 45% of COPD patients are smokers; a different strategy might be required.

Current strategies for COPD in India and Kerala

There was no specific public health program for COPD in India or Kerala until 2017. COPD is covered under the National NCD program. However, this program called the “National Program for Prevention and Control of Cancer, Diabetes, CVD and Stroke (NPCDCS)” only briefly addresses COPD without clear guidelines on

how facilities for diagnosis and treatment can be organized. However recently (in 2016) COPD, along with Chronic Kidney Disease (CKD), was included among the list of major NCDs in the NPCDCS, however detailed guidelines are yet to be formulated.

One of the components of the Stop TB Strategy (the strategy for TB control from 2006 to 2015), "Health System Strengthening" included the "Practical Approach to Lung Health" strategy which was meant to tackle obstructive airway diseases and pneumonias. This strategy was pilot tested for India in Kerala. The guidelines were developed and the pilot testing was done in Kollam district. A preliminary analysis done showed that this pilot study resulted in reduced usage of antibiotics and steroid injections in the PHCs where this was implemented. However a detailed evaluation is needed to evaluate if cases of COPD and Asthma were diagnosed correctly, whether they were treated appropriately and whether all COPD and Asthma patients in these areas had access to care. Also the guidelines developed for the PAL strategy address COPD only at primary care level, and only mention at certain points in diagnostic and treatment algorithms that patients should be referred to the next level hospital, however what needs to be done at the next level is not specified in the guideline.

Mortality reduction in COPD can occur only by properly formulating strategies for management of COPD and incorporating smoking cessation, oxygen therapy and non-invasive ventilation for COPD care. With the state of Kerala aiming for reducing mortality from NCDs, including COPD, this can be achieved only when a strategy for addressing COPD in the form of a public health program is developed and implemented reaching out to the COPD patients at peripheral level, who might be currently undiagnosed or not getting access to ideal management. With this objective, Kerala state has developed a public health program for COPD, for the first time in India; also addressing Asthma, as both these diseases are diagnosed and treated in a similar manner and have considerable overlap.

SWAAS - The Kerala COPD control Program

What does SWAAS aim for?

The aims of the Kerala COPD control program – SWAAS would be

- Identification of COPD in the early stages of the diseases

o This would make it possible to implement preventive strategies which would address progression of the disease, so that there are fewer COPD patients in Kerala who first approach the health service in advanced stages of COPD, almost as a respiratory cripple

o Preventive measures like smoking cessation in early COPD would also aid in achieving the SDG target of reducing mortality

- Develop a structured program for COPD diagnosis and treatment, starting from the primary care level leading up to the tertiary care level, including the Medical Colleges

o This is essential to achieve the SDG target of reducing mortality. Proper management of COPD patients, including provision of oxygen when indicated, medical intensive care during exacerbations and proper management of stable COPD is needed for this. This needs a system with linkages from the PHC level to the tertiary care level

- Develop a system for generating information on disease burden of COPD, health seeking behavior and health system needs which will aid in further planning and strategizing for COPD management in Kerala.

o Current action plan is being made with the national prevalence estimates. All currently available estimates for Kerala (as on 2016) are much higher than the National average. We need more information from Kerala to plan for services

- There is a need to understand risk factors as applicable to Kerala. Worldwide a very high proportion of COPD are smokers whereas in India only 45% of COPD patients were smokers. The determination of risk factors for Kerala will help in planning the need for non-medical interventions (Pollution control and domestic air quality improvement) and preventive measures
- Health seeking behaviour of patients with COPD is not known. The proportion of COPD patients who approach alternative systems and whether these patients are willing to take the current scientific treatment (there is significant opposition to use inhaled medications in Kerala) is not known.
    - Use the option of Pulmonary rehabilitation well, using available resources and by developing indigenously acceptable pulmonary rehabilitation techniques
- A study has shown that pulmonary rehabilitation, which is widely recommended therapeutic strategy in COPD in all international guidelines, is currently not available for more than 90% of COPD patients in Kerala and a structured pulmonary rehabilitation program is available only to less than 1% of COPD patients
- With its health infrastructure and faith that the patients have in the ayurvedic system and yoga, an indigenously developed pulmonary rehabilitation program using the existing staff at PHCs could greatly benefit COPD patients in the scenario of drugs not being affordable for many COPD patients.

Structure of the proposed Kerala COPD Control Program

- The Kerala COPD prevention and control program would be implemented in a phased manner. The first phase of involvement would include select PHCs which are being developed by the government as Family Health Centres. This would include about 152 family health centres all over the state. In the next phase, the program would be expanded to all the PHCs of Kerala.

- The first Phase of the Kerala COPD prevention and control program would be organized in two mutually supportive systems.
- The primary system would start at the level of COPD Clinics at selected PHCs. The selected FHCs in the first phase will be designated to have "COPD Clinics".
- At the COPD Clinic (PHC Level), the officer in charge will be the MO of the PHC. This MO will be trained in the diagnosis and management of COPD and Asthma. Basic equipment as in annexure 1 would be made available. For cases of diagnostic delay or patients whose treatment requires care at a higher level as per treatment algorithm, patient would be referred to the next level, which would be the taluk level. The PHC field staff will also be trained to screen for symptoms of COPD to facilitate early diagnosis, as secondary prevention can bring down mortality. Nurse(s) in the PHC would be trained as Asthma-COPD nurses, as one or two doctors can't do the entire COPD care at the PHC level. This person might perform nebulisation, inhaler training, counselling, smoking cessation clinics and mini-spirometry.
- The next level would be at the district level. Here there would be two places of care. The district hospital would have a junior consultant / consultant (respiratory medicine) would act as the District level COPD consultant. This person would provide a higher level facility for diagnosis and treatment, including a spirometer and ICU care with a non-invasive ventilator (NIV) in place. The other major person would be the junior consultant / consultant (Respiratory Medicine) at the District TB Centre who would act as a District COPD Officer (DCO) and provide clinical care as well as take a public health role. He would also take up the responsibility of training, supervision and reporting. He would share resources with the District TB Officer (DTO) like the vehicle for transportation, computer, data-entry operator and office space and staff. He would assist the DTO in supervision for TB too during his / her field visits and the DTO would be expected to support him / her by supervising for COPD during the DTO's field visits.
- The system would be later expanded to have care centres at Taluk hospital level too.

- Structure of this system would be as in figure 2.
- The second system of COPD care would be Model COPD Clinics. These would include at least four PHCs in the state, one or two PHCs will be linked to one government medical college (the medical colleges with MD courses would be linked, i.e. Government Medical Colleges at Thiruvanthapuram, Kottayam, Thrissur and Kozhikode). These Model COPD clinics will provide COPD care as per the same guidelines but would have the next level of referral directly to the Medical Colleges. The Medical Colleges, as per human resource availability, might provide OP services at these Model COPD Clinics on weekly or fortnightly basis. In addition to this, the colleges (Pulmonary Medicine and Community Medicine Departments) would provide technical support for community level COPD screening at the Model COPD Clinic's area so as to generate data on COPD prevalence. The additional information generated would be on social and environmental determinants; health seeking behaviour and level of control and adherence to treatment of COPD. This would help in generating information for further health planning with respect to COPD.
- As part of the SDG strategy to reduce mortality due to COPD, infrastructure in the Medical Colleges for managing COPD will need to be strengthened. The main requirements would be provision of central oxygen to IP care facilities where COPD patients would be managed. Full-fledged Respiratory ICUs, which are already present in Medical Colleges (as it is part of MCI requirements) would be further strengthened by addition of more Non-invasive ventilations machines and beds, which would improve COPD care without the need for ventilating all patients. Full-fledged pulmonary rehabilitation units would be set up for COPD care in Medical colleges, which would serve as model units for the peripheral level hospitals. Medical colleges would be taking up responsibility for the Model COPD clinics and this would give these colleges unique opportunity for research in COPD.
- In addition to these two systems, as per the SDG targets for NCD, the risk factor reduction strategies as part of the NCD strategies would benefit COPD control.

Also treatment guidelines developed by the state level team would be available for all PHCs, including those not included in the Phase I. In view of resource limitations (financial, infrastructure and human-resources), it might not be feasible to implement the Kerala COPD prevention and control program in all PHCs at the beginning, but all PHCs would be involved in a phased manner. At the end of one year, the impact of the program would be evaluated for midway corrections and developing the best model for COPD care for Kerala.

Figure 2. **Basic structure of the Kerala COPD prevention and control program**

Level	Institution	Person responsible	Support
Primary care	PHC (COPD Clinics)	MO - PHC	NCD Nurse / COPD Nurse
*Taluk level**	*Taluk Hospital (Taluk COPD clinic)*	*MO-COPD (Respiratory Specialist)*	*MOTC Physician THQHNCD Nurse / COPD Nurse*
District Level	District Hospital (District COPD Clinic) District TB Center (District COPD Center)	District COPD Officer (Respiratory Specialist)	DMO (H) DTO NCD Nurse / COPD Nurse
Sub-state level	Medical Colleges (Government and Private)	Professor (Pulmonary Medicine)	Principal Medical CollegesProfessor and heads of Community Medicine
State Level	State COPD Center (@ Chest Disease hospital, Pulayanarkotta)	State COPD Officer	Director of Health ServicesAdditional DHS (Medical) Director of Medical Education **State COPD Technical team** (Professor and HOD, Pulmonary Medicine, Medical College, Trivandrum; State Nodal Officer NCD, State Coordinator SWAAS; other members nominated by the Health Secretary)

* *Taluk level would be involved in the next phase*

When to suspect Obstructive Airway Diseases

COPD should always be suspected in any patient who has dyspnea, chronic cough or sputum production. An added requirement to consider COPD is a history of exposure to risk factors for the disease and particular care should be taken to take a detailed history on exposure to cigarette smoke, domestic biomass fuel smoke and occupational dust / smoke exposure. Spirometry is needed to diagnose COPD. In spirometry, the presence of a post-bronchodilator FEV1/FVC of less than 70% is considered as persistent airflow limitation and is needed to make the diagnosis of COPD.

Asthma is suspected when the patient has one of the following symptoms present which include wheeze, shortness of breath, cough and chest tightness. These symptoms are generally worse at night or in the early morning and the symptoms vary over time and in intensity. A typical history is the increase in symptoms when exposed to "triggers" which include viral infections, exercise, allergen exposure (like pollen / dust / strong smells), changes in weather, laughter and irritants like smoke or fumes.

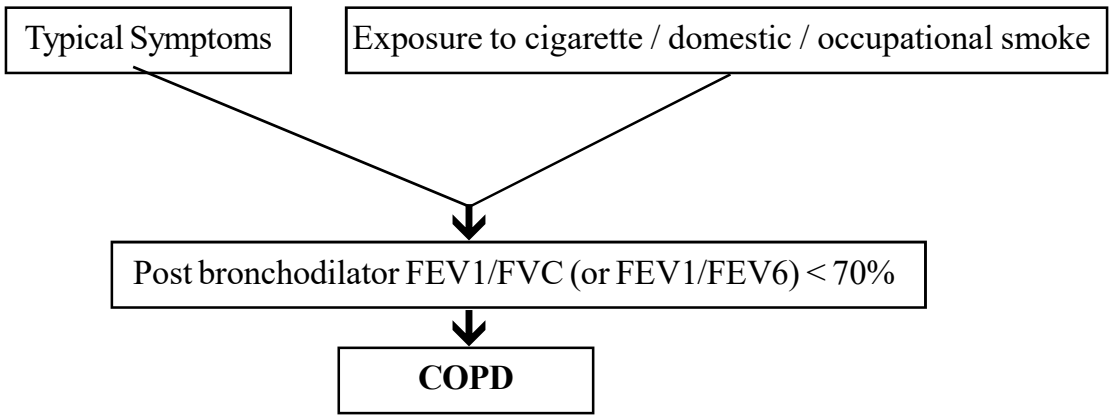
Diagnosis of COPD and Asthma

Diagnosis of COPD

At the PHC level, patients will be evaluated for COPD if the following symptoms are present

- Shortness of breath, predominantly exertional breathlessness.
- Chronic cough
- Sputum production

Figure 3. Patients will be diagnosed as COPD if the following are present



All such patients will also undergo sputum examination for AFB if not done so in the last three months as per the current RNTCP diagnostic algorithm. (Annexure 5)

The main disease to be differentiated from COPD would be Asthma. This would be done as per a tool using clinical history and spirometry / mini-spirometry.

Patients would be evaluated for severity of disease as per the treatment guidelines and started on appropriate therapy. Patients who present with diagnostic uncertainty

or with co-morbidities that require further evaluation would be referred to higher level hospital. There more detailed evaluation including Chest X-rays, ECG and assessment of co morbidities would be done. For patients who need further care / evaluation, they would be referred to a tertiary care hospital.

Patients coming with acute exacerbation of breathlessness would be provided appropriate care as per guidelines including nebulised drugs / increased dose of drugs through spacer, antibiotics / oral corticosteroids / oxygen whenever indicated. Patients who do not respond adequately to the treatment offered at the PHC and in whom complications like pneumothorax, coronary artery disease and cor pulmonale are suspected would be referred to the next level of care, where in addition to specialist care and medications, they would also be offered non-invasive ventilation whenever indicated. Patients needing further specialist care would be referred to the tertiary care hospitals where in addition to the therapy already offered might be offered ventilatory care, if indicated. In such patients, who are too sick for assessment, the diagnosis of COPD / Asthma would be made only after the control of the exacerbation and when the patient is stable. **Fig:4**

All COPD patients would also be evaluated for non communicable diseases including hypertension, coronary artery disease, depression, cancer etc. If they are detected to have any of these would be linked to the NCD program. A diagnosis of TB should be considered in all patients with cough more than two weeks.

Field level screening would be done by field workers to identify patients with symptoms of COPD, and such patients would be offered smoking cessation advice by the field worker, who would be also offered consultation at the PHC for further evaluation to confirm the clinical diagnosis. Field workers would also follow up such persons on subsequent visits to strengthen the smoking cessation advice.

Diagnosis of Asthma

At the PHC level, patients will be evaluated for Asthma if the following symptoms are present

- wheeze
- shortness of breath
- cough
- chest tightness

In asthma, these symptoms are episodic and generally more severe in the early morning or night. Also a history of specific precipitating factor might be obtained like increased symptoms when exposed to allergens, cold, smoke / irritants / strong smells, emotional factors and exercise. Often a history of co-existing atopy / allergic rhinitis in the past (or currently) can also be elicited and sometimes a family history of asthma / allergic rhinitis / atopy.

Spirometry is indicated in patients who are suspected to have Asthma. Patients may have a reduced FEV1/FVC (or FEV1/FEV6), particularly when symptomatic. The other findings that might aid in the diagnosis on spirometry include

- Post bronchodilator reversibility (increase in FEV1 >12% AND >200ml)
- Significant increase in FEV1 after 4 weeks of controller treatment

However, spirometry might be normal in Asthma patients when they are well controlled, hence in many cases diagnosis might be made by MO on the basis of clinical features and a significant response to the treatment offered.

Differentiating COPD and Asthma

COPD and Asthma are similar diseases, however the risk factors are different, the treatment is different and the prognosis of the patient is different. Hence it is essential to differentiate between these two common diseases. The following table (Table. 1) can be used to differentiate between Asthma and COPD. Presence of three or more of the clinical features in either half of the table is associated with a diagnosis of either Asthma or COPD. However in about 15% of patients, three or more clinical features on both halves of the table might be present. In such patients a diagnosis of Asthma and COPD overlap syndrome is made (ACOS). Spirometry is useful in differentiating between the two conditions. Presence of a post-bronchodilator FEV1/FVC (or FEV1/FEV6) of less than 70% suggests a diagnosis of COPD whereas a post bronchodilator reversibility suggests a diagnosis of asthma.

Table 1. Differentiating COPD and Asthma

Asthma	COPD
Age of onset before 20 yrs	Age of onset after 40 yrs
Symptoms vary over time	Symptoms are persistent
Worse during night or early morning	Mainly exertional dyspnea
Triggering factors like exposure to dust, allergens, emotions, laughter, drugs and exercise	Associated with chronic cough and sputum, no triggers
Past history of Asthma, allergic rhinitis or atopy	No associations
Family history of Asthma, allergic rhinitis or atopy	Exposure to cigarette smoke / occupational exposure / Household biomass fuel smoke
Good response to treatment	Limited relief to treatment
Normal chest X ray	Hyperinflation or normal
Spirometry Post bronchodilator reversibility (increase in FEV1 >12% AND >200ml)	No reversibility

How to perform Spirometry

Spirometry is an essential tool in the evaluation of COPD and Asthma. However, this test is effort dependent and needs proper instructions to the patient and correct effort from the patient to have results that can be interpreted. The method of performing spirometry is as follows –

Things to be done before performing spirometry:

- Recording of patient's age name, age , sex , race, their height and weight without shoes. If the patient is unable to stand to have their height measured, arm span can be used as an estimate..

The activities which are best avoided before performing spirometry are

- eating a large meal within 2 hours ,
- vigorous exercise within 30 minutes,
- smoking within 1 hour and
- drinking alcohol within 4 hours
- for reversibility testing, patient should not take short acting bronchodilators within 6 hours, long acting bronchodilators within 24 hours

Contraindications for spirometry

If any of the following have occurred recently, then it may be better to wait until the patient has fully recovered before carrying out spirometry.

- Haemoptysis of unknown origin
- Pneumothorax
- Unstable cardiovascular status, recent myocardial infarction or pulmonary embolism

- Thoracic, abdominal or cerebral aneurysms
- Recent eye surgery
- Acute disorders affecting test performance, such as nausea or vomiting
- Recent thoracic or abdominal surgical procedures

The method of performing spirometry is as follows

Patient positioning: Make the patient sit in upright position with feet flat on the ground and also to loosen the tight fitting clothes if any.Then the patient is asked to completely empty their lungs and then to take in a quick full inspiration, followed by a full expiration into the hand held device through a disposable mouth piece. Enough encouragement should be given so that good results will be obtained

An acceptable maneuvers is defined as follows:

- An explosive start
- The manoeuvre was performed with a maximal inspiration and expiration.
- No glottis closure or cessation of airflow occurred during the maneuver (*e.g.* by hesitation or blocking the mouthpiece).
- No coughs (particularly during the first second), inspirations during the trace or evidence of leaks.

The maneuvers should meet the end-of-test criteria, exhaling for e”6 s

The spirometry maneuver would be performed at least three times. The best two measurements must fulfill the reproducibility criteria.

- For FEV_1 and FVC (FEV6), the best two values should be within 5% or 150 mL of each other, whichever is greater. The best FEV_1 and FVC can be taken from different maneuvers.

If this is not achieved, more maneuvers are required. There is usually an upper limit of 5 maneuvers.

When the FEV1/FEV6 is measured to be between 60 and 80% when measured by a mini-spirometer at the FHC in a suspected patient with COPD or Asthma, such patients would be referred to the District Hospital for a full spirometery.

Reversibility testing

All PFTs should be ideally followed by reversibility testing. Reversibility is a criteria to diagnose asthma and overlap syndromes and COPD severity is graded according to the post-bronchodilator FEV1. Spirometry is performed, after which a bronchodilator is given that can either be a short-acting â-agonist or other agents, such as anticholinergics. For the former, 4×100 ìg salbutamol are recommended *via* a spacer device and 15 min is given before retesting, and for the latter, 4×40 ìg ipratropium bromide is recommended, leaving 30 min before retesting. There should be at least a 12% change and a 200-mL in FEV1 improvement from baseline and for the PFT to be reversible.

$$\textbf{Reversibility} = \frac{\textbf{Post Bronchodilator FEV1 - Pre Bronchodilator FEV1}}{\textbf{Pre Bronchodilator FEV1}}$$

Minispirometer

A simple, fast and accurate battery operated handheld device which gives FEV1, FEV6, ratio and % predicted, obstructive index, COPD classification and lung age. The technique and the interpretation of the results are similar to usual spirometer. At a primary care level the mini-spirometer can be used as a simple and effective diagnostic tool.

Differential Diagnosis

The presence of the following symptoms in a patient suspected to have COPD should lead to a search for other diagnosis:

- History of hemoptysis (consider Malignancy / TB)
- Presence of clubbing (consider Malignancy / Intersitial Lung Disease (ILD))
- Presence of crepitations on auscultation (Consider Heart disease / Bronchiectasis / ILD)
- Chest pain (Consider cardiac diseases / pneumonia / pneumothorax / pleural effusion / TB)
- Oedema (Consider cardiac diseases / Renal Diseases)

The presence of the following symptoms in a patient suspected to have Asthma should lead to a search for other diagnosis:

- Isolated cough with no other respiratory symptoms
- Chronic production of sputum (consider Chronic bronchitis / bronchiectasis / TB)
- Shortness of breath associated with dizziness, light-headedness or peripheral tingling (Consider hyperventilation associated with psychiatric disorders)
- Chest pain (Consider cardiac diseases / pneumonia / pneumothorax / pleural effusion / TB)
- Exercise-induced dyspnea with noisy inspiration (stridor)

The differential diagnosis of COPD include

- Asthma
- Tuberculosis
- Lung cancer
- Congestive cardiac failure
- Bronchiectasis
- Obstructive bronchiolitis
- Interstitial Lung Disease

The differential diagnosis of Asthma include

- COPD
- Tuberculosis
- Congestive cardiac failure
- Bronchiectasis
- Vocal cord dysfunction
- Psychosomatic illness
- Acute bronchitis
- Foreign body aspiration
- Upper airway / Endobroncial obstruction

Management of COPD and Asthma

Pharmacologic management

Patients generally present to the PHC with acute exacerbation of breathlessness and they would be provided appropriate care for exacerbation as per guidelines including nebulised drugs / increased dose of drugs through spacer, antibiotics / oral corticosteroids / oxygen whenever indicated. The management of exacerbations of COPD and Asthma is described in a later section.

Once the exacerbation is controlled as the patient is stable, the diagnosis of COPD or Asthma would be established as per the diagnostic tests described in the previous chapter. Once the diagnosis is established, the pharmacologic treatment would be initiated after assessing the severity of disease in COPD or level of control in Asthma.

Pharmacologic management of COPD

The major steps required for severity assessment in COPD are assessment of symptoms based on modified Medical Research Council scale for the assessment of dyspnea (mMRC scale) and pulmonary function based on GOLD COPD staging. mMRC is assessed as per Table 2 and GOLD state is assesses as per Table 3. (GOLD COPD State is applicable only in patients who have a post bronchodilator FEV1 / FVC (or FEV1 / FEV6) less than 70%.

Table 2: mMRC dyspnoea scale

Grade	Description of Breathlessness
Grade 0	Breathlessness only with strenuous exercise
Grade 1	Shortness of breath when hurrying on level ground or walking up a slight hill
Grade 2	Breathlessness when walking with people of the same age or having to stop for breath when walking at own pace on level ground
Grade 3	Stopping for breath after walking about 100 yards or after a few minutes on level ground
Grade 4	Too breathless to leave the house or breathlessness when dressing

Table 3. Classification of airflow limitation severity - GOLD COPD stage

GOLD Stage	Severity of airflow limitation	Post bronchodilator FEV1 (percentage of predicted)
GOLD 1	Mild	More than or equal to 80% of predicted
GOLD 2	Moderate	Between 50% and 80% of predicted
GOLD 3	Severe	Between 30% and 50% of predicted
GOLD 4	Very severe	Less than 30% of predicted

Table 4. After assessment, pharmacotherapy will be as follows

mMRC grade	GOLD COPD stage	Treatment
0 – 1	1 or 2	As required bronchodilators (either inhaled salbutamol or oral salbutamol / theophyllin)
0 – 1	3 or 4	Inhaled tiotropium
≥ 2	1 or 2	Inhaled tiotropium
≥ 2	3 or 4	Inhaled tiotropium and inhaled budesonide-formoterol

Inhaled drugs will be provided using pressurized metered dose inhaler (pMDI) with a spacer device. **Dosage of drugs is given in annexure 3.**

Pharmacological management of Asthma

Management of Asthma is done on a step wise manner, either stepping up or stepping down based on level of control. Level of control is assessed by the following features

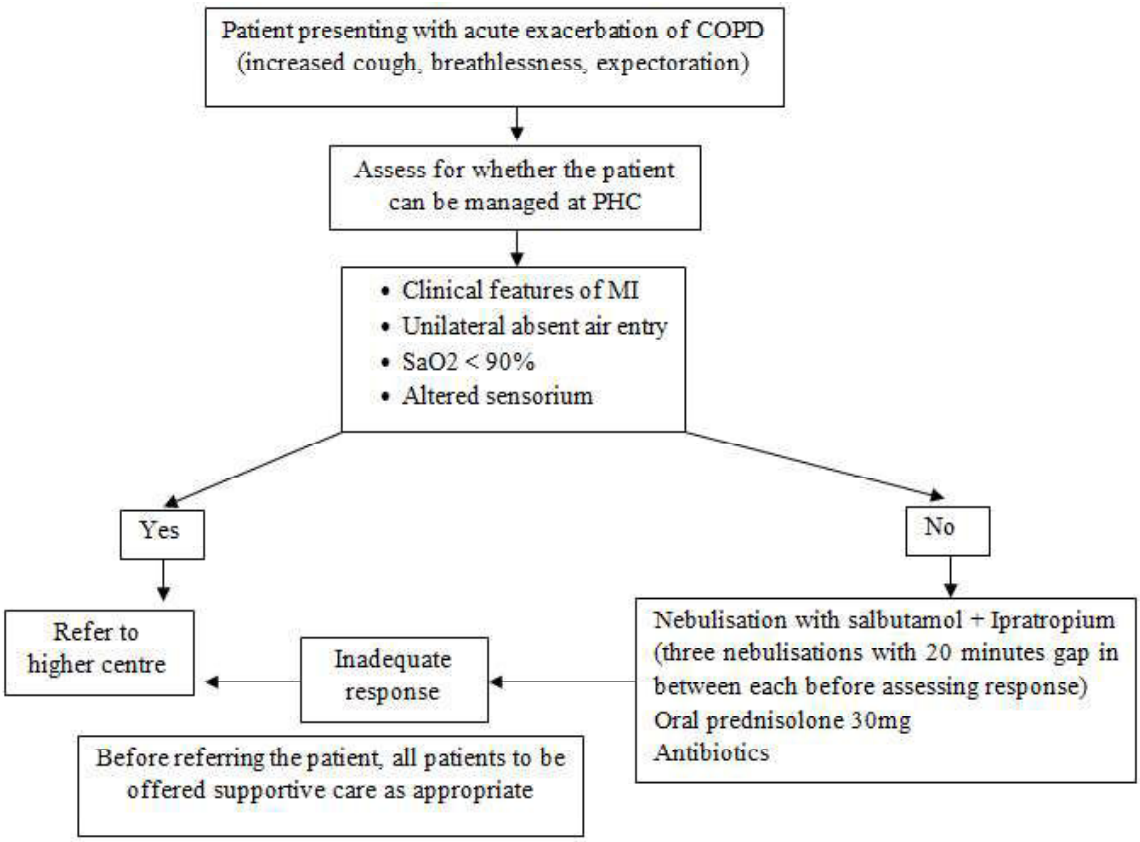
• Presence of day time symptoms more than twice a week· • Waking up at night due to asthma symptoms· • Using reliever medications more than two times a week· • Any activity limitation due to Asthma· • Poor lung function – FEV1 / FVC (or FEV1/ FEV6) less than 70% or FEV1less than 60% of predicted	• Presence of none of these = indicates good control
	• Presence of 1 or 2 of above = partial control of asthma
	• Presence of ≥ 3 = uncontrolled asthma

All patients with symptom frequency, after control of exacerbation, of at least once a month would be started on pharmacotherapy with inhaled budesonide-formoterol. Initial dose will be two puffs twice a day. Patient will be reassessed after one month, if the Asthma is well controlled inhaler will be stepped down to one puff twice daily. If the patient is only having partial control / uncontrolled, then the dose of two puffs twice daily will be continued. Further stepping down will be attempted at the end of three months. Any patient remaining uncontrolled despite offering care as per SWAAS guidelines at the FHC should be referred to a higher centre.

Management of exacerbations of COPD and Asthma

Exacerbations of COPD and Asthma are associated with significant mortality and need to be managed promptly and adequately for reduction of mortality. Exacerbation is defined as an increase in symptoms of the disease which require a change in medications.

Fig:4. Algorithm for managing exacerbations of COPD



Treatment of Asthma exacerbations

Exacerbation of Asthma would be managed with Oral Predinisolone, nebulised salbutamol and Oxygen. Patients with inadequate response with this would be nebulised

with salbulamol + Ipratropium and Oxygen at 20 minutes intervals for two more cycles. If patients are not responding adequately, they would be referred to higher center. At any point, if patient has low saturation (<90%), silent chest and altered sensorium, patient would be immediately referred to higher center.

Patient with exacerbation of Asthma / COPD, who have been well controlled with the care at the FHC (dyspnoea controlled, saturation more than 92%, respiratory rate less than 20), would be sent home with advice to take the oral bronchodilators, steroids, antibiotics (if indicated) for a period of five to seven days and then come for review at the FHC. Patients who might need other investigations (chest Xray, Sputum AFB smears, specialist consultation) would be advised to do the review at the tertiary care centre.

Non pharmacologic management of COPD and Asthma

While pharmacologic management of COPD and Asthma is important in symptom relief and prevention of exacerbations, non-pharmacologic management strategies are equally important. This is more so in COPD, where medications can't alter the long term progress of the disease or reduce mortality. The major strategies that can reduce mortality in COPD patients are smoking cessation and long term oxygen therapy in patients in whom it is indicated.

Non pharmacologic management of COPD

COPD is a leading cause of morbidity and mortality worldwide. It carries with it a significant economic, social and personal burden. The key to decreasing the burden of COPD is identification and reduction of risk factor exposure like Tobacco Smoke, Occupational Exposure, Indoor and Outdoor Air Pollution. Non- pharmacological treatments have gained in popularity as an essential part of therapy, to promote self-efficacy and relieve symptoms. Such options also improve quality of life and are cost effective. The management strategies include

SMOKING CESSATION

It is the most important intervention for all COPD patients who smoke regardless of disease severity. It is the intervention with greatest capacity to influence natural history of COPD.

Smoking cessation must be attempted by the MO and COPD nurse during every visit. Brief smoking cessation counseling is effective and every tobacco user should be offered such advice during each visit. Success of attempts at cessation of smoking depends on the number of attempts and the intensity of the efforts.

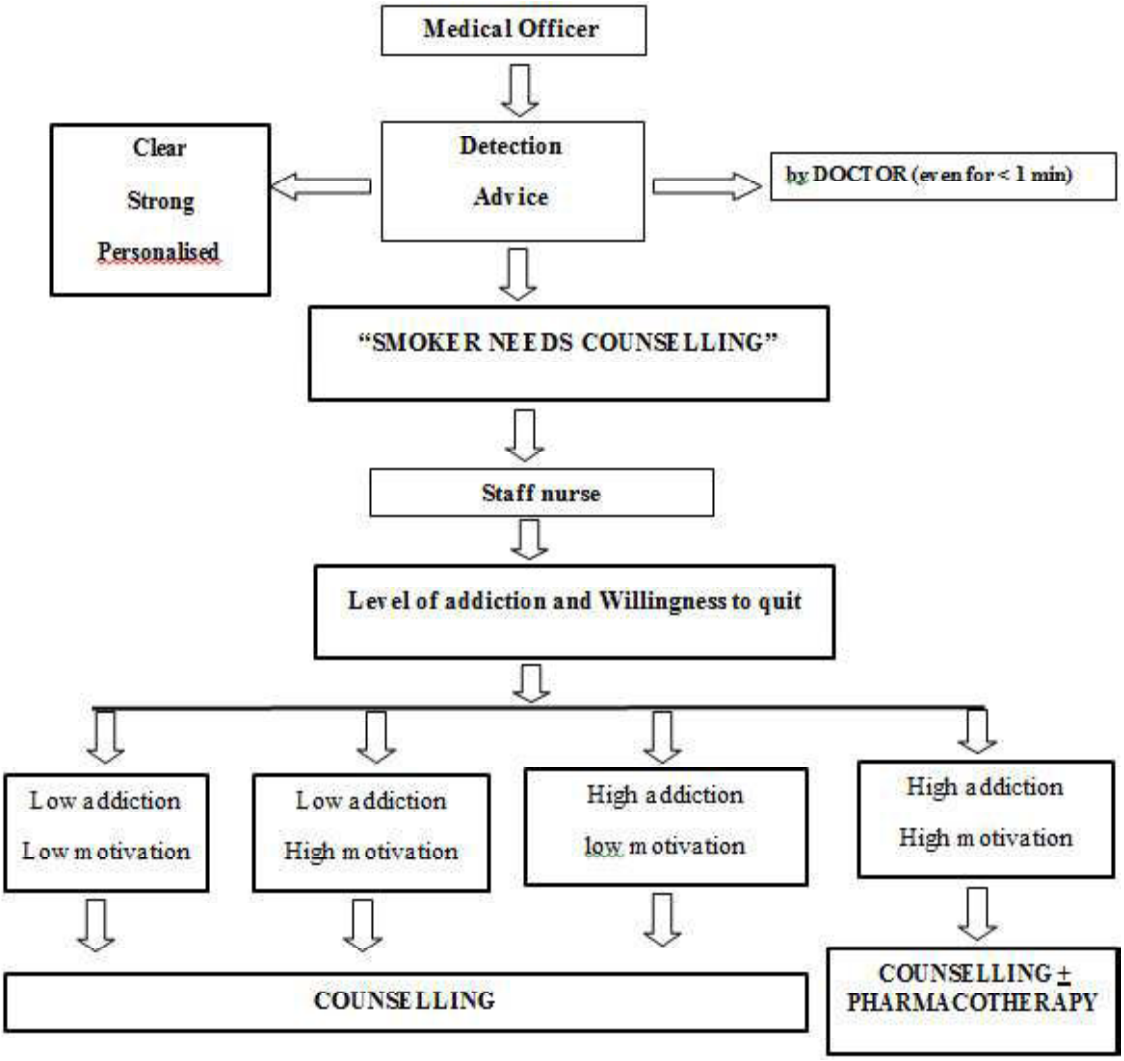
Strategies to Quit Smoking: 5 A's

1. ASK : *EVERY* patient at *EVERY* clinic visit about smoking status.
2. ADVISE : To quit
3. ASSESS : Determine willingness to quit
4. ASSIST : Aid the patient in quitting – provide practical counselling, pharmacotherapy and social support
5. ARRANGE : Schedule follow-up contact

Pharmacotherapy for Smoking Cessation

Nicotine replacement products (nicotine gum, inhaler, sublingual tablet, nasal spray, transdermal patch, lozenge) increase long-term smoking abstinence rates. When nicotine products are contraindicated as in patients with Unstable Coronary Artery Disease (CAD), Untreated Peptic Ulcer or a Recent Myocardial Infarction / stroke then other drugs recommended are Varenicline, Bupropion and Nortriptyline.

Fig:5. Flow chart: smoking cessation



PULMONARY REHABILITATION

According to ATS ERS 2013 guidelines "Pulmonary rehabilitation is a comprehensive intervention based on a thorough patient assessment followed by patient tailored therapies that include, but are not limited to, exercise training, education, and behavior change, designed to improve the physical and psychological condition of people with chronic respiratory disease and to promote the long-term adherence to health-enhancing behaviors." Pulmonary rehabilitation should be considered a part of integrated patient management.

Components of Pulmonary Rehabilitation Program

1. Exercise training.
2. Smoking Cessation
3. Patient Education
4. Nutritional support

COPD and Exercise: Breathing and Exercise Programs for COPD

Patients who are have difficulty on breathing are quite often not willing to do exercises. But exercises for COPD help in improving the breathing, allowing the patient to stay as active as possible and improves quality of life. Before beginning with a COPD exercise program, patient has to be clearly counselled on these aspects.

Few General Instructions for COPD Clinic

Patients are instructed to have prolonged expiration to favour more lung emptying, be trained in pursed lip breathing & diaphragmatic breathing — to reduce dynamic hyper inflations

Pacing Techniques

To have their daily physical activities slowly, taking adequate breaths in between. Patients have a tendency to finish off the tasks quickly holding their breaths which can worsen their disability. eg- if they are trying to climb steps they should climb slowly step by step with pauses each step preceded by voluntary deep breaths

Exercise Progression Gradually

Each day for endurance (increasing number of times) and **strengthening** (adding resistance on weights gradually) for all group of muscles of neck ,upper limb, chest , trunk and lower limbs.

How Exercises for COPD Can Help

Exercise — especially exercise that works the lungs and heart — has many benefits for those with chronic obstructive pulmonary disease (COPD). Exercise can:

- Improve how well the body uses oxygen, which is important since people with COPD use more energy to breathe than other people do.
- Decrease the symptoms and improve breathing.
- Strengthen heart, lower the blood pressure, and improve blood circulation.
- Improve energy, making it possible to stay more active.
- Improve sleep and makes patient feel more relaxed.
- Help to maintain a healthy weight.
- Enhance the mental and emotional outlook.
- Reducer social isolation, if exercise with others.
- Strengthen the bones.

Types of Exercises for COPD

Stretching exercises:	Lengthen muscles, increases flexibility. Stretching can also help prepare muscles for other types of exercise, decreasing chance of injury.

Aerobic exercises: Use large muscle groups to move at a steady, rhythmic pace. This type of exercise works the heart and lungs, improving the endurance by working the respiratory muscles. This helps the body use oxygen more efficiently and, with time, can improve breathing. **Walking and using a stationary bike are two good choices of aerobic exercise for COPD patients**.

Strengthening exercises: Involve tightening muscles repeatedly to the point of fatigue. When this is done for the upper body, it can help increase the strength of breathing muscles.

Breathing exercises for COPD: Helps strengthening of breathing muscles, get more oxygen, and breathe with less effort. Here are two examples of breathing exercises that can be done for five to 10 minutes, three to four times a day.

Pursed lip breathing:

- Relax the neck and shoulder muscles.
- Breathe in for two seconds through the nose, keeping the mouth closed.
- Breathe out for four seconds through pursed lips. If this is too long for the patient, simply ask to breathe out twice as long as he can breathe in.
- Use pursed-lip breathing while exercising. If the patient experience shortness of breath, first try slowing the rate of breathing and focus on breathing out through pursed lips.

Diaphragmatic breathing:

- Lie on the back with knees bent. You can put a pillow under the knees for support.
- Place one hand on the belly below the rib cage. Place the other hand on the chest.
- Inhale deeply through the nose for a count of 3. (patient's belly and lower ribs should rise, but chest should remain still.)
- Tighten the stomach muscles and exhale for a count of 6 through slightly puckered lips.
- Diaphragmatic breathing can be done in sitting position also.

COPD and Exercise Guidelines

It helps to exercise at the same time each day; late morning or early afternoon may be a time when patients have more energy.

Some other basic guidelines for exercise for patients with COPD are:

- Set realistic goals.
- Gradually increase the number of minutes and days of exercise.
- A good goal is to exercise 20 to 40 minutes, two to four times a week.
- Start out slow. Warm up for a few minutes.
- Choose activities which are enjoyed, but vary them to stay motivated.
- Find an exercise partner.
- Keep a record of exercises to help stay on track.
- As they end their exercises, cool down by moving more slowly.

COPD and Exercise Precautions

It's good to take precautions when exercising with COPD, but shortness of breath doesn't always mean that exercise should be stopped altogether. Instead, patient can slow down and continue exercising. If shortness of breath becomes severe, then stop exercising.

Here are other exercise precautions:

- Balance exercise with rest. If feel tired, start at a lower level. If feel very tired, rest and try again the next day.
- Wait at least one and a half hours after eating before beginning to exercise.
- Remember any fluid restrictions while drinking fluids during exercise.
- Avoid hot or cold showers after exercising.
- In case of missing exercise for several days, start up slowly and gradually return to regular routine.

Exercises to avoid by COPD patients:

- Heavy lifting or pushing.
- Chores such as shovelling, mowing, or raking.
- Push-ups or sit-ups or isometric exercises, which involve pushing against immovable objects.
- Outdoor exercises when the weather is very cold, hot, or humid.
- Walking up steep hills.

COPD and Exercise: When to Stop

In case of any of these signs or symptoms, stop the COPD exercise program right away. Sit down and keep the feet raised while resting. If don't feel better quickly, seek medical attention.

- Nausea
- Dizziness
- Weakness
- Rapid or irregular heart beat
- Severe shortness of breath
- Pain
- Pressure or pain in your chest or your arm, neck, jaw, or shoulder

Optimum benefits are achieved from programmes lasting 6 to 8 weeks. Supervised exercise training twice weekly is recommended and this can include any regimen from endurance training, interval training, resistance or strength training; upper and lower limbs ideally should be included as well as walking exercise, flexibility, inspiratory muscle training and neuromuscular electrical stimulation can also be incorporated.

Patient Education

Most pulmonary rehabilitation programs include an educational component. The topics that seem most appropriate for an education program include: smoking cessation; basic information about COPD; general approach to therapy and specific aspects of medical treatment; self-management skills; strategies to help minimize dyspnea; advice about when to seek help; decision-making during exacerbations; and advance directives and end-of-life issues.

Nutritional support:

Low-to-moderate quality evidence suggests that nutritional support promotes significant gain in weight and fat-free mass among patients with COPD, especially if malnourished. In addition, significantly greater changes from baseline have been

observed in supplemented patients for six-minute walk test, respiratory muscle strength and (only in malnourished patients) overall health related quality of life.

Nutritional suggestions include:

Proteins - Primary sources like meat, fish, eggs, chicken, pulses and low fat dairy products. Add skimmed milk powder to boiled milk, soups, and ground meat dishes. This will add extra calcium and protein. Include high protein snacks like custard and other puddings in diet. Commercially prepared supplements are also available.

Fruits - Apples, apricot and peaches and melons may cause bloating which may cause breathing problems.

Vegetables - Beans, cabbage, cauliflower and onions may cause gas. Foods that are dried and deep fried or oily food can cause gas or indigestion.

Fluids - Drinking enough fluids is essential for clearance of pulmonary secretions. Recommendation is 8 to 12 cups caffeine free liquids / day. If there is fluid retention, advice fluid restricted diet. It can also be caused by excess of salt intake, and rarely by excess drinking of fluids. An excess intake of sodium can cause fluid retention and shortness of breath which can be avoided by sodium restricted diet.

Watch weight in both directions:

Underweight

If the patient is underweight ,need to include healthy high calorie snacks in diet like milk, egg, nuts, oats, healthy desserts like custards and puddings

Overweight

- Achieve healthy body weight by healthy eating plan. Try eating five to six small meals per day instead of 3 large ones. It helps to avoid filling the stomach too much making breathing easier

- Trying to eat main meal early in the day will help to boost the energy level the whole day
- Choose food that are easy to prepare.

Benefits of Pulmonary Rehabilitation in COPD

- Improves exercise capacity.
- Reduces the perceived intensity of breathlessness.
- Improves health-related quality of life.
- Reduces the number of hospitalizations and days in the hospital.
- Reduces anxiety and depression associated with COPD.
- Strength and endurance training of the upper limbs improves arm function.
- Benefits extend well beyond the immediate period of training.
- Improves survival.
- Respiratory muscle training can be beneficial, especially when combined with general exercise training.
- Improves recovery after hospitalization for an exacerbation.
- Enhances the effect of long-acting bronchodilators.

Other Supportive Treatment Options

Immunisation

- Annual Influenza vaccine reduces serious illness and deaths in COPD patients
- The pneumococcal vaccine, PPSV-23, reduces the incidence of Community Acquired Pneumonia in COPD patients aged < 65 yrs with an FEV1 < 40% predicted and in those with co-morbidities.

- In the general population of adults >65 years, Pneumococcal vaccine, PCV13 has demonstrated significant efficacy in reducing bacteremia and serious invasive pneumococcal disease.
- While these vaccines are recommended by most international guidelines and also the Indian guidelines, inclusion of the vaccine in SWAAS will depend on the adult vaccination guidelines of the government of Kerala.

Oxygen Therapy

The long-term administration of oxygen (> 15 hours per day) to patients with chronic respiratory failure has been shown to increase survival in patients with severe resting hypoxemia.

Long-term oxygen therapy is indicated for patients who have:

- PaO_2 at or below 7.3 kPa (55 mmHg) or SaO_2 at or below 88%, with or without hypercapnia confirmed twice over a three week period; or
- PaO_2 between 7.3 kPa (55 mmHg) and 8.0 kPa (60 mmHg), or SaO_2 of 88%, AND if there is evidence of pulmonary hypertension, peripheral edema (suggesting congestive cardiac failure) or polycythemia (hematocrit> 55%).

A small proportion of COPD patients will require long term oxygen therapy, however since this can be determined only after specialist opinion and detailed evaluation including ABG, the decision to initiate long term oxygen therapy should be made only at the level of District COPD officer / consultant or at the Medical College. No patient should be initiated on oxygen without at least an ABG being done.

Surgery

Surgical interventions like lung volume reduction (surgical/endoscopic), bullectomy and lung transplantation may be done in appropriately selected patients, wherever facilities are available at the tertiary care level.

Non pharmacologic management of Asthma

Asthma is a common clinical problem and the course of illness is greatly influenced by exposures, including indoor allergens, tobacco smoke and other physical and social aspects of the environment**.** Avoidance of trigger factors is therefore an important aspect of asthma management; both for symptom control as well as reducing exacerbations.

Non pharmacological interventions include:

1. Cessation of smoking and Environmental Tobacco Smoke Exposure
    - At every visit, advise smokers with asthma to quit. Provide access to counselling and smoking cessation programs.
    - Strongly encourage people with asthma to avoid environmental smoke exposure.
2. Physical activity
    - Encourage people with asthma to engage in regular physical activity to improve cardiopulmonary fitness.
    - Advise patients about prevention and management of exercise- induced bronchoconstriction.
3. Avoidance of occupational exposures
    - Ask all patients with adult-onset asthma about their work history and other exposures. It is important to identify and eliminate occupational sensitizers as soon as possible, and remove sensitized patients from any further exposure to these agents.
4. Avoidance of medications that may make asthma worse
    - Always take a detailed drug history.

- Aspirin and NSAIDs are not generally contraindicated unless there is a history of previous reactions to these agents. If asthma symptoms worsen on NSAID use advise patients to stop it.
- Decision about prescription of oral or intra-ocular beta blockers is done on a case by case basis. Initiate treatment under close medical supervision by a specialist
- If cardio-selective beta blockers are indicated for acute coronary events, asthma is not an absolute contraindication, but the relative risks/benefits should be considered

5. Healthy diet
    - Encourage patients with asthma to consume a diet high in fruit and vegetables for its general health benefits
    - Patients SHOULD NOT be given wrong dietary advice like avoiding milk / curd etc.
6. Avoidance of foods and food chemicals
    - Food avoidance should not be recommended unless an allergy or food chemical sensitivity has been clearly demonstrated, usually by carefully supervised oral challenges.
    - For confirmed food allergy, food allergen avoidance may reduce asthma exacerbations
    - Complete avoidance is not usually necessary, and sensitivity often decreases when asthma control improves.
7. Avoidance of indoor allergens
    - Allergen avoidance is not recommended as a general strategy in asthma
    - Remediation of dampness or mold in homes reduces asthma symptoms and medication use in adults

- For patients sensitised to house dust mite and/or pets, there is limited evidence of clinical benefit for asthma with multi-component avoidance strategies(only in children)

8. Weight reduction

   - Include weight reduction in the treatment plan for obese patients with asthma

9. Allergen immunotherapy

   - For adult patients with allergic rhinitis and sensitised to House Dust Mite, with exacerbations despite low to high dose ICS, adding sublingual immunotherapy (SLIT) may be considered, provided FEV1 is >70%
   - But potential benefits of allergen immunotherapy must be weighed against the risk of adverse effects and the inconvenience and cost of the prolonged course of therapy.

10. Breathing exercises

    - Breathing exercises may be useful supplement to asthma pharmacotherapy

11. Avoidance of indoor air pollution

    - Encourage people with asthma to use non-polluting heating and cooking sources, and for sources of pollutants to be vented outdoors where possible

12. Vaccinations

    - Advise patients with moderate-severe asthma to have an influenza vaccination every year, or at least when vaccination of the general population is advised.
    - There is insufficient data regarding use of pneumococcal vaccine in patients with asthma.
    - Decisions on vaccination in Asthma patients will be based on the state policy on adult vaccination

13. Avoidance of outdoor allergens

    - For sensitized patients, when pollen and mould counts are highest, closing windows and doors, remaining indoors, and using air conditioning may reduce exposure to outdoor allergens

14. Dealing with emotional Stress

    - Encourage patients to identify goals and strategies to deal with emotional stress if it makes their asthma worse
    - Relaxation strategies and breathing exercises may be helpful
    - Arrange a mental health assessment for patients with symptoms of anxiety or depression.

15. Avoidance of outdoor air pollutants/ weather conditions

    - In general, when asthma is well-controlled, there is no need for patients to modify their lifestyle to avoid unfavourable outdoor
    - It may be helpful during unfavourable environmental conditions to avoid strenuous outdoor physical activity and stay indoors in a climate-controlled environment; and during viral infections to avoid polluted environments

Managing comorbidities in COPD and Asthma

COPD is a disease wherein, while the lung is the major organ of involvement, many other systems and organs are also affected and co-morbidities play a significant role in the mortality and morbidity due to COPD. Asthma also is often associated with various co-morbidities which contribute to poor control of Asthma. Hence the management of co-morbidities is key in the management of these two diseases.

Managing co-morbidities in COPD

COPD often coexists with other diseases (co-morbidities) that may have a significant impact on disease course. Some of these arise independent of COPD, others may be due to common risk factors, or one disease may increase the risk or severity of other disease. The risk of co-morbidities can be increased by reduced physical activity or continued smoking in COPD patients. Co-morbidities like lung cancer, heart failure, Tuberculosis and depression; with symptoms associated with COPD may be overlooked. In general, the presence of co-morbidities should not alter COPD treatment and co-morbidities should be treated per usual standards regardless of the presence of COPD.

Some common comorbidities occurring in patients with COPD include:

- Cardiovascular disease (CVD)
- Heart failure
- Ischaemic heart disease (IHD)
- Arrhythmias
- Peripheral vascular disease
- Hypertension

- Osteoporosis
- Anxiety and depression
- COPD and lung cancer
- Metabolic syndrome and diabetes
- Gastroesophageal reflux (GERD)
- Bronchiectasis
- Obstructive sleep apnea

Cardiovascular Disease

It is a frequent and important co-morbidity in COPD. The prevalence of systolic or diastolic heart failure in COPD patients ranges from 20-70%. Unrecognised heart failure may mimic or accompany acute exacerbations of COPD. It should be suspected when a COPD patient presents with sudden onset or worsening of breathlessness, pedal oedema, abdominal distension; examination may reveal basal creps, elevated JVP. Acute heart failure should be treated according to usual heart failure guidelines. Non invasive ventilation has been found to improve outcomes.

Ischemic heart disease should be considered in all patients depending on their risk factors. In those with ischemic heart disease, COPD exacerbations increase myocardial damage. ECG should be taken in those patients with risk factors and those presenting with chest pain associated with worsening dyspnoea to rule out CAD. Cardiac arrhythmia is another frequent problem associated with COPD. Atrial fibrillation is frequent and is often associated with severe worsening dyspnoea. Bronchodilators used in COPD can precipitate arrhythmias, though most of them are safe, Special caution should be exercised while using short acting beta 2 agonists and theophylline.

Hypertension is likely to be the most frequent co-morbidity associated with COPD. Diastolic dysfunction arising due to hypertension can cause exercise intolerance and

may mimic COPD exacerbation. Management of hypertension in COPD has no difference and is according to the usual guidelines.

Osteoporosis

Osteoporosis is often under-diagnosed and associated with poor health status and prognosis. Systemic corticosteroids significantly increase the risk for osteoporosis and repeated courses for exacerbations should be avoided as far as possible.

Anxiety And Depression

These are important co-morbidities in COPD. They are associated with poorer prognosis, smoking, younger age, poor quality of life, female gender and history of cardiovascular disease.

Studies have found that physical exercise has a beneficial effect on depression in general; therefore importance of pulmonary rehabilitation should be stressed. These conditions should be identified and referred for appropriate treatment.

Lung Cancer

There is a strong association between COPD and lung cancer. Higher age, greater smoking history and the presence of both emphysema and airflow limitation increases the risk of lung cancer. In all COPD patients presenting with a new symptom such as hemoptysis, change in character of cough, worsening of dyspnoea, hoarseness of voice, loss of weight and appetite there should be a suspicion of lung cancer. Appropriate primary investigations like Chest Xray, sputum cytology for malignant cells if facility is available and referral to a higher centre with facility for further investigation should be done. It should be stressed that, as for COPD ,the best prevetion of lung cancer is smoking cessation.

Metabolic Syndrome And Diabetes

The prevalence of metabolic syndrome has been found to be 3% in COPD, also the presence of diabetes affect prognosis. Management is according to the usual guidelines.

Gastro Esophageal Reflux Disease (Gerd)

It is an independent risk factor for exacerbations and is associated with worse health status. The presenting symptoms are heartburn, belching, reflux of contents into throat and sometimes chronic cough. Proton pump inhibitors can be used for treatment and some studies have suggested their role in reducing exacerbations.

Obstructive Sleep Apnoea

OSA is another co-morbidity presenting with symptoms of apnoeas during sleep, increased day time sleepiness, excessive fatigue, early morning headache, more in obese patients who also have associated co-morbidities like uncontrolled diabetes, hypertension, ischemic heart disease and/or hypothyroidism. COPD patients with these symptoms should be referred for a sleep study. The apneic events in patients with combined COPD and OSA tend to have more profound hypoxemia and more cardiac arrhythmias. Also the incidence of day time pulmonary hypertension is more in these patients.

COPD As Part Of Multimorbidity

An increasing number of people in any aging population will suffer from multi-morbidity, defined as the presence of two or more chronic conditions, and COPD is present in the majority of multi-morbid patients. Multi-morbid patients have symptoms from multiple diseases and thus symptoms and signs are complex and most often attributable to several causes in the chronic state as well as during acute events.

Treatments should be kept simple in the light of the unbearable poly-pharmacy that these patients are often exposed to.

Managing co-morbidities in Asthma

Several co morbidities are commonly present in asthma patients that can contribute to poor asthma control, and impaired quality of life. These include

Obesity

Asthma is more difficult to control in obese patients, also it is more common in obese than non obese patients. Document BMI for all obese patients with asthma. ICS are the main stay of treatment. Weight reduction should be included in the treatment plan for all obese patients with asthma.

Gastro Esophageal Reflux Disease (GERD)

In patients with confirmed asthma, GERD should be considered as a possible cause of a dry cough. For patients with asthma and symptoms of GERD, an empirical trial of proton pump inhibitors or motility agent may be considered. For persistent symptoms, 24 hour pH monitoring and endoscopy should be considered and referred to appropriate centre.

Anxiety And Depression

These are also associated with worst asthma symptom control and adherence to medication and worse asthma related quality of life. They also have been associated with increased exacerbations and emergency visits. Panic attacks may be mistaken for asthma. Where appropriate, patients should be referred to psychiatrists or evaluated

with a disease-specific psychiatric diagnostic tool to identify potential cases of depression and /or anxiety.

Rhinitis, Sinusitis And Nasal Polyps

Most patients with asthma have concomitant rhinitis, and 10-40% of patients with allergic rhinitis have asthma. Allergic rhinitis can be seasonal, perennial or intermittent. Rhinitis is the irritation and inflammation of the mucous membranes of the nose. Allergic rhinitis may be accompanied by ocular symptoms. Rhinosinusitis is the inflammation of the nose and PNS, characterised by more than two symptoms including nasal blockage/obstruction and /or nasal discharge. It can be acute or chronic

Examination of upper airways should be arranged for patients with severe asthma.

Evidence based guidelines recommend intranasal corticosteroids for treatment of both allergic rhinitis and chronic rhinosinusitis.

Referrral Criteria

- Difficulty confirming the diagnosis of COPD or Asthma
- Symptoms suggesting chronic infection, cardiac disease, interstitial lung disease etc
- Diagnosis unclear even after a trial of treatment
- Features of both asthma and COPD, if in doubt about treatment
- Suspected occupational asthma: Refer for confirmatory testing, identification of sensitizing agent, advice about eliminating exposure, pharmacological treatment
- Uncontrolled symptoms or ongoing exacerbations, despite correct inhaler technique and good adherence.

- Frequent health care visits
- Near-fatal exacerbation in past
- Significant systemic side-effects of medicines
- Need for oral corticosteroids long-term or as frequent courses
- Marked reduction in activity of daily living due to dyspnea
- Altered sensorium
- Presence of severe co-morbid conditions
- Lack of Social support
- Pulse oximetry < 90%
- Symptoms suggesting complications - pneumothorax, Congestive heart failure, pleural effusion, etc
- Chronic sputum production, haemoptysis, X ray shadows
- New onset cyanosis

Recording, Reporting and Logistics Management

Each PHC will maintain four registers and one patient booklet – to be kept with the patient.

1. SWAAS symptomatic register
2. Spirometry register
3. SWAAS treatment register
4. SWAAS referral register

All respiratory symptomatic will be identified from the OP by the MO or at the pre-check areas; and details (name, age, address, sub-centre area, mobile/phone number) entered in the SWAAS Symptomatic Register (Annexure 7). The symptoms to be screened and identified include

1. Cough
2. Wheeze
3. Chest tightness
4. Sputum production
5. Shortness of breath

All patients with cough more than two weeks would be offered a sputum examination for acid fast bacillus, if not done in the last three months. Details of previous diseases diagnosed Asthma / COPD / TB would be elicited.

Patients will be given appointment in the SWAAS clinic on the next available slot. It would be determined if the patient has already undergone a spirometry earlier and recorded. If the patient needs a spirometry as per SWAAS guidelines, then an appointment for spirometry would be given. This date would be noted in the appropriate

column in the Symptomatic register. Details of smoking and smoking cessation would also be noted.

Patients needing spirometry would undergo spirometry and the details recorded in the Spirometry Register (Annexure 8). Details needed for the spirometry including Age, Sex, Height, Weight would be recorded as well as the smoking history and details of smoking cessation activities. Spirometry values (either mini-spirometry at FHC or full spirometry at District hospital/Medicalcollege) would be recorded. At FHC – FEV1 and % predicted, FEV6 and percentage predicted and the FEV1 / FEV6 ratio would be recorded. If the spirometry was done with the full spirometry at District hospital or Medical College, then FEV1, and % predicted, FVC and percentage predicted and the FEV1 / FVC ratio would be recorded.

Patient diagnosed as COPD or Asthma would be registered in the SWAAS Treatment Register (Annexure 9). Details of the patient, including contact details, details of spirometry, the Oxygen saturation, diagnosis made (COPD / Asthma), details of co-morbidity, details of smoking / biomass exposure, treatment details, and follow-up details would be entered as appropriate. Each patient would be given a SWAAS number. SWAAS numbers would start from the January of each year and run consecutively with the number followed by the year of registration (eg. 54/2018/District code/PHI code, eg. for 25th patient of FHc Chemmaruthy: 25/2018/01/0025). With the advent of e -health, the SWAAS number would be linked to the patient's electronic data record.

If any patient needs to be referred to a higher centre, either for diagnosis or for treatment, then this would be recorded in the SWAAS Referral Register. (Annexure 10)

Each patient would be provided with a patient booklet, the SWAAS Diary. All details of the patient, diagnosis including spirometry, details of consultations made and treatment and follow-up details would be entered in this SWAAS diary. Patient would be expected to bring this diary for each consultation.

Reporting would be done in the SWAAS Monthly Report Form (Annexure 11). Each participating institution would provide this form on or before the 2nd working day of each month to the District Nodal Officer NCD with copy to the District COPD Officer.

The details required include the institution details, numbers of symptomatic screened and COPD / Asthma diagnosed and the drug logistics. District nodal officer / District COPD Officer will transmit the individual reports and a consolidated report to the State Nodal Officer NCD and the State COPD Officer.

Communicating with Patients and Patient Education

Patients with COPD and Asthma have chronic diseases which need prolonged treatment and often with variable response to treatment. There are also apprehension and confusion among our population regarding the use of inhaled medications, which are key in the management of COPD and Asthma. Also, these are various dubious practitioners / quacks who promise quick cure for these diseases drawing patients away from proper and scientific treatment. In view of all these factors, health education of patients and communicating to them addressing their expressed and un-expressed fears and concerns is key to successful management of COPD and Asthma.

The major issues that need to be addressed are

1. Explaining to patients how the disease occurs and what the prognosis is, what the scientific treatment of the disease is, and why prolonged treatment is required
2. Explaining to patients on the necessity and safety of inhaled medications
3. Making patients understand what should be avoided in COPD and Asthma
4. Promoting health diet and exercise
5. Facilitating the screening for co-morbidities in COPD and Asthma

<u>Understanding the disease –</u>

COPD – Points to explain

1. Symptoms
2. Why the disease occurs – that is risk factors (smoking, passive smoking, domestic smoke and occupational exposures)

3. Why only some smokers develop the disease (genetic factors)
4. That the disease is progressive, but preventable and treatable
5. Importance of smoking cessation
6. Importance of regular use of drugs
7. Importance of exercise (pulmonary rehabilitation) and diet

Asthma – Points to explain

1. Symptoms
2. Why the disease occurs genetic factors, childhood factors
3. Help understand triggers which cause exacerbations
4. That the disease can be fully controlled and the person can live a normal life, however that it is not "curable"
5. Importance of allergen avoidance
6. Importance of regular use of drugs, particularly the controller medications
7. Importance of exercise and diet

Explaining to patients on the necessity and safety of inhaled medications

Patients often have apprehensions on the safety and necessity of inhaled medications, and their questions and unexpressed concerns have to be addressed. The points to explain include

1. Why inhaled medications are preferred over oral drugs
2. Why the inhaled drugs need to be used for a long period of time
3. Teaching how to use Inhaled Medications (Annexure 2)

4. Reviewing inhaler technique during follow-up visits and importance of bringing inhalers to check technique
5. Importance of absolute compliance with medications, regular use of drugs

Making patients understand what should be avoided in COPD and Asthma

1. Smoking cessation in COPD (and also Asthma)
2. Avoiding allergen exposure in Asthma
3. Drugs to avoid in Asthma

Promoting health diet and exercise

1. Proper diet is essential in COPD (and also Asthma) but patients might not be able to take proper meals due to dyspnoea and GERD, they have to be advised on what diet to take and the need for small frequent meals
2. Avoiding food which cause allergy in Asthma. However food fads like avoiding milk and curd, etc should be discourages as these are nutritious food that patients need

Facilitating the screening for co-morbidities in COPD and Asthma

1. Co-morbidities cause morbidity and mortality in COPD and Asthma and also lead to poor control of symptoms despite proper treatment. Hence patients should be encouraged to get screened for the common co-morbidities
2. Linking of patients to the appropriate public health program for management of these co-morbidities is also important

Annexure 1:

Equipment and Drugs required for the Kerala COPD Prevention and Control Program

PHC level

1. Mini-spirometer (COPD - 6 or equivalent) – 2
2. Pulse oxymeter – 1
3. Oxygen concentrator – 1
4. Weighing machine – 1 (exclusively for spirometry and COPD care)
5. Apparatus / facility for measuring height (exclusively for spirometry and COPD care)
6. Nebuliser- 1
7. Oxygen masks
8. Nasal prongs for oxygen inhalation
9. Mouth pieces for using with minispirometer/COPD 6

Taluk level

1. Mini-spirometer (COPD-6 or equivalent) - 2
2. Pulse oxymeter – 2 (exclusively for spirometry and COPD care)
3. Oxygen concentrator – 2 / Oxygen plant (exclusively for COPD care)
4. Weighing machine – 1 (exclusively for spirometry and COPD care)

5. Apparatus / facility for measuring height (exclusively for spirometry and COPD care)
6. Nebulisers – 2
7. Oxygen masks
8. Nasal prongs for oxygen inhalation
9. Mouth pieces for using with minispirometer/COPD 6
10. Masks for using with NIV

District level

1. Mini-spirometer (COPD-6 or equivalent) – 1
2. Spirometer – 1
3. Pulse oxymeter – 2 (exclusively for spirometry and COPD care)
4. Oxygen concentrator – 3 / Oxygen plant (exclusively for spirometry and COPD care)
5. Weighing machine – 1 (exclusively for spirometry and COPD care)
6. Apparatus / facility for measuring height (exclusively for spirometry and COPD care)
7. Nebulisers – 2
8. Non-Invasive Ventilation (NIV) machine - 2
9. Mechanical ventilator (can be shared with a general ICU)
10. Oxygen masks
11. Nasal prongs for oxygen inhalation

12. Mouth pieces for using with minispirometer/COPD 6

13. Masks for using with NIV

1. Apparatus for setting up a pulmonary rehabilitation unit

a. Weights – (10 – various weights)

b. Bands – (10 – various strengths)

c. Cycle ergometer

d. Measure for 6 minute walk

e. Pulse oxymeter – 2

f. Mats

Drugs required

1. Nebuliser solutions

a. Salbutamol

b. Ipratropium

c. Budesonide/ Fluticasone solution

2. Meter dose inhalers

a. Formeterol + budesonide.

b. Salbutamol, salbutamol + Ipratropium

c. Tiotropium

3. *Tablets*

    a. Salbutamol – 2mg and 4 mg

    b. Deriphyllin (plain 100mg / retard 150mg)

    c. Montelukast 5mg / 10 mg

    d. Antihistamines (levo-cetrizine and desloratidine)

    e. Prednisolone 10mg

4. *Nasal sprays*

    a. Fluticasone

5. *Injectables*

    a. Inj. Deriphylline

    b. Inj. Methyprednisolone / Inj. Hydrocortisone

Annexure 2:
Instructions on use of Inhaler Devices

Inhaled medications are preferred in COPD and Asthma due to the following reasons

- Quick onset of action. Due to this they are the preferred drugs in management of exacerbations too.
- Lower dosage used.
- Lesser side effects.

Various devices are available for drug delivery of inhaled medications in COPD and Asthma. However for the SWAAS program the two types of devices being used are pressurised metered dose inhalers with spacers (pMDI) and nebulisers. However since patients might also prefer other forms of devices, all type of devices are being discussed in this section. The common drug delivery devices for inhaled medications include

- Pressurised Metered Dose Inhaler (pMDI or MDI)
- Pressurised Metered Dose Inhaler (pMDI or MDI) with spacer
- Dry powder inhaler
- Nebulisers.

While inhaled medications are essential for the treatment of COPD and Asthma, patients are often unable to take these medications properly. Studies Show that the majority of patients on inhaled medications were not using their devices in the ideal way. Hence training of patients and regular follow-up, review of technique and re-training are essential in ensuring proper use of these medications.

The technique of the commonly used inhaler devices is described below

Pressurised Meter Dose Inhalers (pMDI / MDI)

1. Remove cap and shake inhaler
2. Breathe out gently to the maximum possible extent
3. Put mouthpiece in mouth and at start of inspiration, which should be slow and deep, press canister down and continue to inhale deeply
4. Hold breath for 10 seconds, or as long as possible then breathe out slowly
5. Wait for a few minutes before repeating steps 2-4

Pressurised Meter Dose Inhalers (pMDI / MDI) with spacer

1. Remove cap, shake inhaler and insert into the spacer device
2. Place mouth piece of the spacer in mouth
3. Start breathing in and out slowly and gently. (This will make a clicking sound as the valve opens and closes)
4. Once breathing pattern is well established, depress canister and leave device in same position as you continue to breathe (tidal breathing) several more times (about five to eight times)
5. Remove device from mouth
6. Wait about five minutes before repeating sections 1-5

Dry Powder Inhalers (DPI). There are various kinds of dry powder inhalers available in the market and these have various techniques of use.

1. Insert a medicine capsule, transparent end first, into the raised square hole of the device.
2. Rotate the base of the DPI in order to separate the two halves of the capsule.
3. Breathe out gently to the maximum possible extent
4. At the start of inspiration, place the mouth piece of the device firmly in the mouth and breathe in as deeply and quickly as possible.
5. Hold your breath for 10 seconds or as long as possible.
6. Breathe out slowly.

After use of the inhaled drugs, mouth and throat must be gargled to wash out the drug deposited in the mouth and throat.

Nebulisers

1. Unscrew the top of the nebuliser chamber. Measure out the correct amount of drug solution and pour into the nebuliser chamber.
2. Sometimes you may need to dilute the drug solution. Add the required amount of normal saline. DO NOT dilute the drug solution with water. You need around 4-5ml solution in the nebuliser chamber for it to work properly.
3. Screw on the top of the nebuliser chamber and attach the face mask or mouthpiece to the top of the chamber.
4. Place the facemask over your mouth and nose and place the strap over your head; alternatively, if you use a mouthpiece place it between your lips.
5. Sit up, well supported, in a chair or in bed and keep the nebulizer chamber upright.
6. Switch the compressor unit on and breathe in and out as normal.

7. Whilst your nebuliser is in use, small drops of drug solution may form on the sides of the nebuliser chamber. You can knock these droplets back into the drug solution by gently tapping the side of the nebuliser chamber with your fingernail.

8. When the nebuliser starts to 'splutter' the treatment has finished - this will take between 10 and 20 minutes. A small amount of solution may be left in the nebuliser at this stage, but this is normal.

Nebulisers are devices to be used in health care settings, under supervision and monitoring of health care providers. Never prescribe a nebuliser for self use at home by patients unless there is a compelling and justifiable reason for the same.

Annexure 3:

Commonly used oral and inhaled medicines and doses

Inhalers

Salbutamol (SABA)	-	100- 200 mcg upto qid
Ipratropium (SAMA)	-	20 mcg upto qid
Tiotropium (LAMA)	-	18 mcg od
Formoterol (LABA)	-	6mcg bd
Formoterol (LABA) + Budesonide (ICS)	-	available in 100 mcg, 200 mcg and 400 mcg MDIs (metered dose inhalers) and DPIs (dry powder Inhalers) used twice daily

Nebulisation

Salbutamol	-	2.5 mg Dosage in solution
Ipratropium	-	500 ig

Oral

Tab. Salbutamol	-	2 - 4 mg bd/tds
Tab. Methyl Xanthines (Deriphylline)	-	100 - 400 mg/day

Inhaled medications are preferred over oral medications

Steroids (prednisolone 30 – 40 mg/day)

Annexure 4:
Pulmonary Rehabilitation Protocol
(6 week Protocol)

1st week :

Day 1 – Assessment (6MWT, Gold Criteria, Bode Index, SGRQ/CAT score), Induction and Patient education (the disease, correct use of medications, importance of exercise)

Day 2 – Breathing pattern retraining, diaphragmatic breathing ex's, purse lip breathing ex's, pacing methods, dyspnea relieving positions, range of motion and stretching ex's

Day 3 – Airway clearance techniques, thoracic expansion ex's, inspiratory muscle training, walking retraining **&** Advice range of motion & stretching ex's at home

2nd week :

Day 4 – Review status, warm up ,lower limb endurance training, cool down

Day 5 – Progression of endurance training (lower limb)based on patient response

Day 6 – Same as Day 5 & Initiation of walking exercise regime at home

3rd week :

Day 7 – Review status, warm up, endurance training (upper limb & lower limb), cool down

Day 8 – Progression of endurance training (upper limb & lower limb)based on patient response

Day 9 – Same as Day 8 & Inclusion of upper limb endurance training to home programme

4th week :

Day 10 – Review status, warm up, endurance training, strengthening exercises, cool down

Day 11 – Progression of strength training (upper limb & lower limb) based on patient response

Day 12 – Same as day 11 & Addition of strength training to home exercise regime

5th week :

Day 13 – Review status, warm up, training using functional activities, cool down

Day 14 – Progression of strength and endurance training using functional activities

Day 15 – Same as day 14 & Functional activities included to home programme

6th week :

Day 16 – Review status, designing an appropriate home based exercise programme

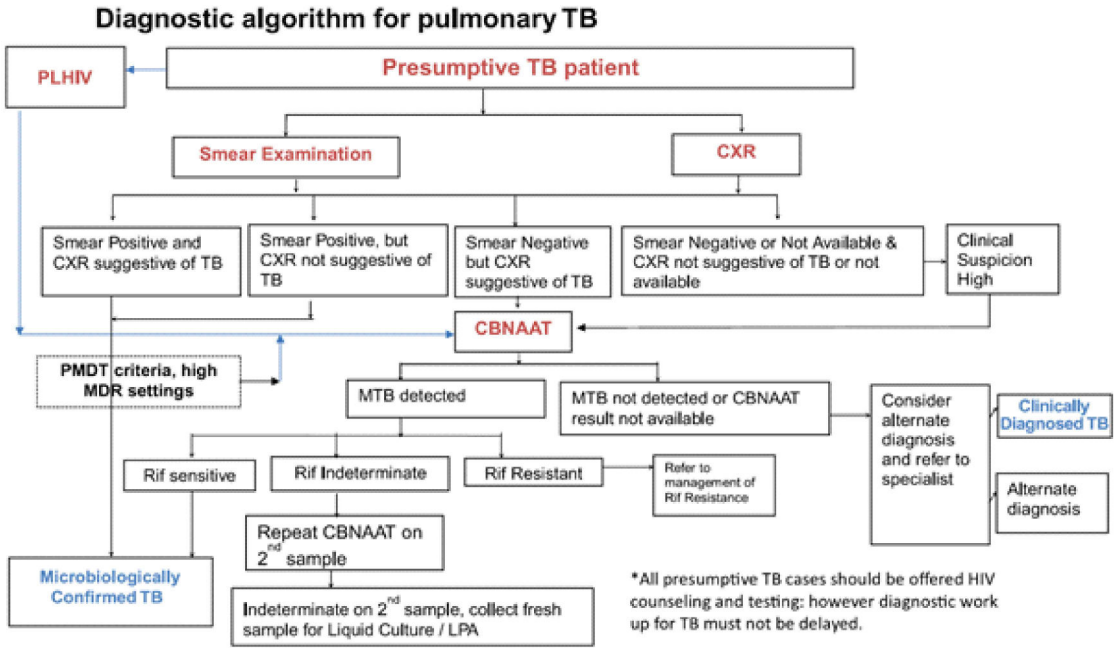
Day 17 – Final assessment of the patient and modification of the regime, if necessary

Day 18 – Review by pulmonologist, physiotherapist and other specialists, as required

[Note:. Protocol could be modified locally based on availability of resources and patient conditions]

Annexure 5:

RNTCP



Annexure 6:
YOGA AND PRANAYAMA IN COPD

Yoga essentially comprises of **asanas** (postures) and **pranayama** (breathing exercises) for cleansing the bodily system. The practice of yoga acts in different dimensions such as preventive, promotional, corrective and curative manner, which improves the functional aspects of the respiratory, circulatory, digestive, hormonal systems, etc. Yoga exercises have been claimed to have positive effects on people with asthma, cardiac diseases, diabetes, tuberculosis, depressive disorders, osteoarthritis, and pleural effusion. Yogasanas and pranayama can be developed to support and strengthen breathing exercises which are key components of Pulmonary Rehabilitation in COPD

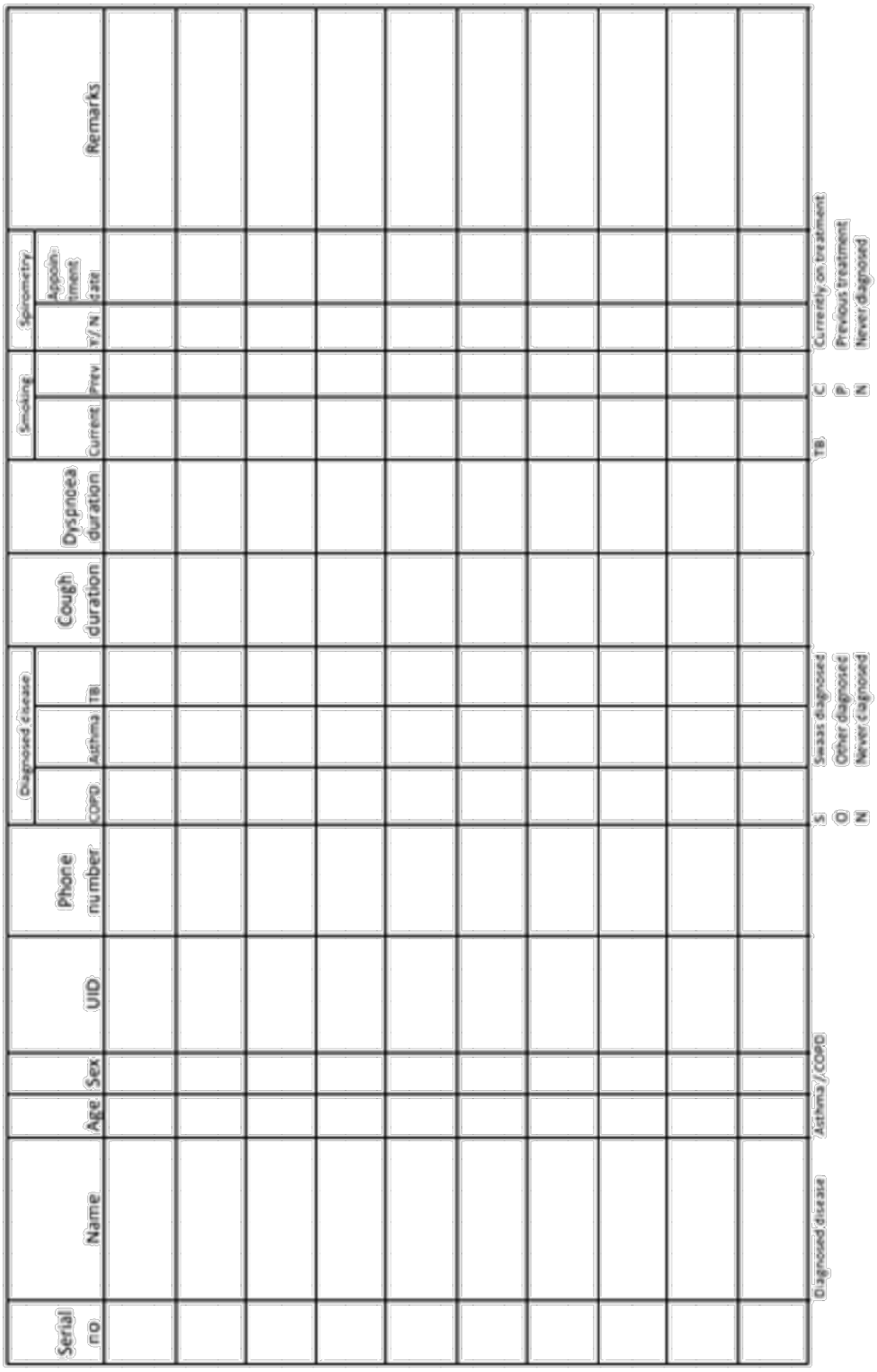
Most of these studies indicate that Yogic exercises can play a role in minimizing symptoms of COPD.

Reviews had reported significant effects of yoga on the relief of dyspnea and fatigue, and improved quality of life. Yoga training that lasts from 12 weeks to 9 months may improve lung function and functional exercise capacity in patients with COPD". Yogic exercises may not be a feasible option for severely ill as these exercise often involve strenuous physical movements, which can prove more detrimental than beneficial without proper supervision.

Most of these studies highlight the positives of Yoga on patients suffering from COPD, they go on to suggest that Yoga be taken up as an adjunct to conventional pulmonary rehabilitation procedures. While this would be make the treatment package more adaptable, it could also potentially lead to better outcomes.

Annexure 7:

SWAAS Symptomatic Register



Annexure 8:

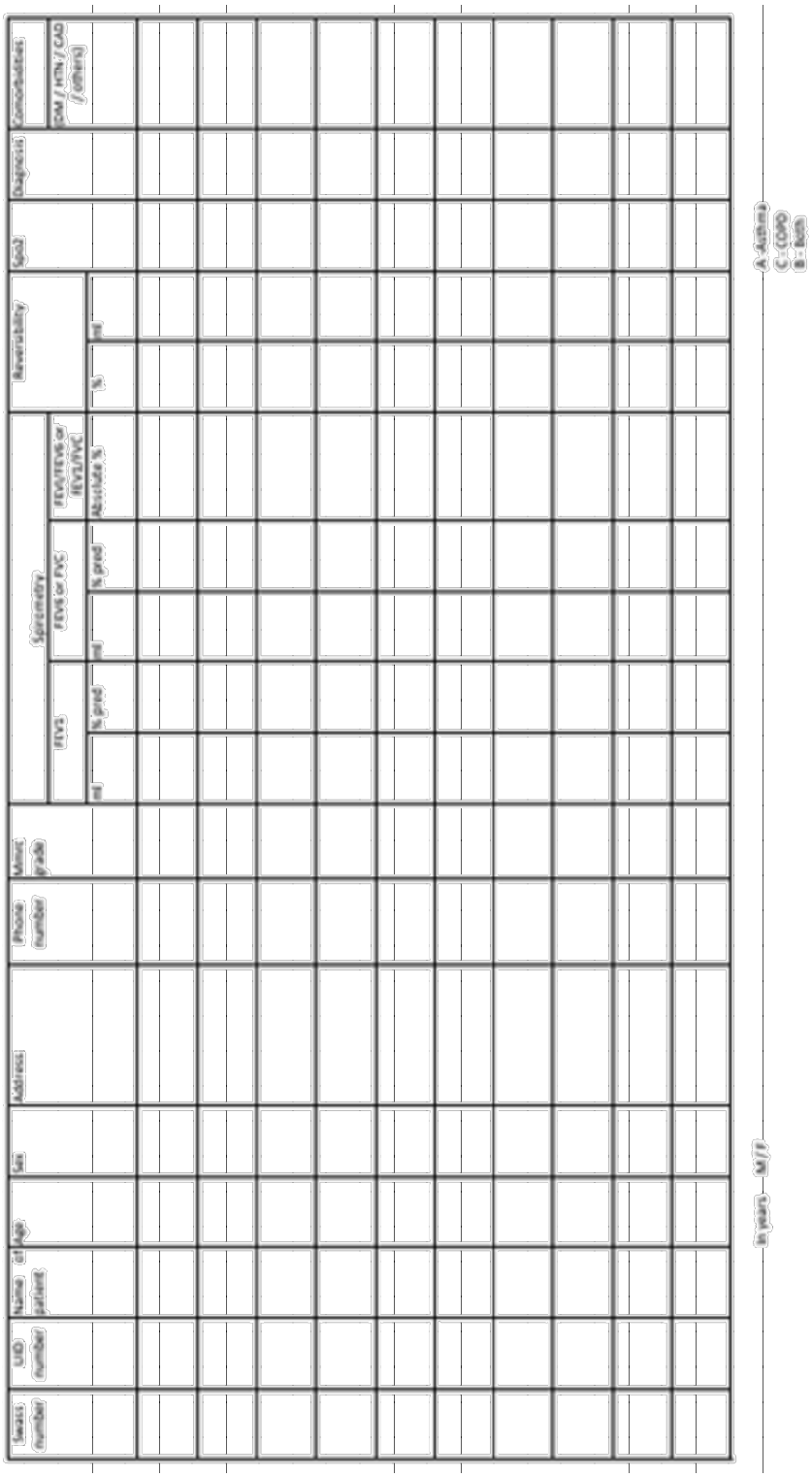
Spirometry Register

Spirometry number	Sl no from symptomatic	Phone number	Name	Age	Sex	Height	Weight	Smoker	Smoking cessation	FVC or FEV6		FEV1		FEV1/FVC or FEV6	Diagnosis by doctor	Remarks
										Value	%	Value	%			

Age in YRS | Sex M/F | Ht in m | Weight in Kg | Smoker Y/N | Adv given? Y/N

Annexure 9:

Treatment Register (1)



Annexure 9:

Treatment Register (2)

Smoking	Biomass smoke exposure	Smoking Index/Bio mass Emission Index	Allergic rhinitis (YES / No)	Past h/o TB (YES / NO)	Treat-ment started on	Inhaled started	medication	Follow-up 1 month	Follow up 3 month	follow up 6 month	Follow up 9 month	Follow up 12 month	NO: of Exacerbations in				Referral to higher centre	Venti-lator care required or not	Remarks
													3m	3-6m	6-9m	9-12m			

B - Beedi
C - Cigarette
B - Both

Yes / No

Smoking index = Number smoked per day x number of years smoked
Biomass index - Number of hours of biomass exposure x number of years of exposure

Annexure 10:

Refferal Register

Referral number	SWAAS reg number	Name	Age	UID	Mobile number	Referral to	Reason for referral	Date of referral	Date of reaching referred center	Diagnosis at referred center	Remarks

Annexure 11:

SWAAS Monthly Report Form

SWAAS - Monthly Report: Name of Institution: .....

PHI code		**District code**	
_____Month		**Years**	

Number of new OP in the last month (a)	
Of (a), the number with COPD / Asthma symptoms (b)	
Of (b), the number who underwent spirometry (c)	
Of (c), the number newly diagnosed as COPD	
Of (c), the number newly diagnosed as Asthma	

Number of patients already registered as COPD in SWAAS until the previous month	
Number of patients already registered as Asthma in SWAAS until the previous month	
Number of patients registered in smoking cessation clinic	
Number of patients given counseling in smoking cessation clinic	
Number of patients followed up in smoking cessation clinic	
Number of patients quitted smoking	
Number of patients registered in Exercise clinic	
Tiotropium metered dose inhaler	
Budesonide - Formoterol Metered dose inhaler	
Spacer Devices	
Mini Spirometer mouth pieces	

Drug logistics

Drug	Opening balance	Number consumed during the month (b)	Closing balance (c)	Number requested (2xb-c)
Salbutamol nebulising solution				
Itratropium nebulising solution				
Salbutamol - Ipratropium respules				
Salbutamol Metered dose inhaler				

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