COPD: The Unrecognized Epidemic in India

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Chronic obstructive pulmonary disease (COPD) has been variably labeled in the past as chronic bronchitis (CB) and emphysema at the one end of the spectrum, and chronic nonspecific respiratory disease, chronic airway obstruction (CAO), chronic airflow limitation (CAL) and chronic obstruct lung disease (COLD) depending upon the understanding of the pathophysiology and clinical features of the syndrome of chronic cough and/or Airways obstruction. It is only in the last century that the disease has been better understood. Yet, the confusion in the terminology has persisted till now. COPD is presently accepted as an overall umbrella term for a vaeity of chronic disorders with chronic bronchitis at the one and emphysema at the other end of the spectrum.

Globally, COPD has emerged as the major cause of morbidity and mortality expected to become the 3rd most leading cause of death and the 5th leading cause of loss of ‘Disability Adjusted Life Years’ (DALYs) as per projection of the Global Burden of Disease Study (GBDS). The region-wise projections for the developing countries including India were even worse.4

**COPD as an Epidemic?**

An epidemic is defined as a widespread occurrence of a disease in a community at a particular time. It is characterized by a relatively sudden appearance which lasts for over a short period of time. On the other hand, COPD is a chronic, non-communicable disease which poses a continuous burden on health care infrastructure without any sudden increase in the “incidence rate”. It is not limited to a shorter time period. Also, it does not present with an acute threat to life in large numbers. Yet it is classified as an “epidemic” largely because the burden which it poses is huge and widespread. Moreover, the burden has become noticeable relatively recently. Factually, it still remains unrecognized in the developing countries – whatever data we have from India at present is merely a pointer to the enormous number of patients and an unassessed but huge burden of disease-attributable economic losses, disease morbidity and premature mortality.2,3

Burden of COPD like that of any other chronic disease, is cumulative and keeps on adding with time. Ironically, the economic burden grows further with an improved survival and newer treatment modalities. Undoubtedly however, the losses from loss of DALYs and premature mortality are reduced with improved management.

**Prevalence of COPD**

The COPD prevalence from various countries around the world has been variably reported in different studies depending upon the study population, the COPD definition used in the study, and the methodology employed to collect data. It has been therefore difficult to arrive at a single or a consensus prevalence figure. In the past, the prevalence rates from the Western countries had been higher than those reported from the Asian countries. The recent reports, with the combined prevalence of 6.3 percent in 12-Asia Pacific countries point to the contrary.4 This was almost double than the overall projection of 3.8 percent made from the WHO data through extrapolation.4

India: COPD in India has been studied in several small surveys which have enormously varied in their methodology, results and scope of interpretation. The prevalence rates of from 2 to 22 percent in men and from 1.2 to 19 percent in women were generally based on unvalidated questionnaire-interviews which could not be relied for any national assessment.1 One might however draw the conclusion that COPD has emerged as an epidemic of a non-communicable disease which is here to stay and grow in its enormity.

The Indian Council of Medical Research (ICMR) took the initiative to study the epidemiology of chronic respiratory diseases and sponsored the Indian study on Epidemiology of Asthma, Respiratory symptoms and Chronic bronchitis (INSEARCH) which included 4-centres in the Phase I and 12 other centres in the Phase II study. The results of the Phase I study from Chandigarh, Delhi, Kanpur and Bangalore reported the overall prevalence rates of 5.0 and 3.2 percent respectively in men and women of, and over 35 years of age.6 (The results of Phase II study, which is already completed, will also be available soon).

Importantly, it can be seen from the results of the INSEARCH (Phase I) report and the median prevalence-rates assessed from the earlier studies, that the overall rates are generally similar in both men and women (Table 1). The contemporary prevalence from several other Asian countries is also comparable (Table 1). The mean rates in India have not really changed when compared for different time periods. But the total burden of COPD has more than doubled to about 14.84 million in 2011 from about 6.45 million in 1971. This is generally attributable to the overall increase in the population of India.

**Differences in prevalence**

There are significant differences in prevalence of COPD in different groups and subpopulations. The cumulative prevalence, with the disease onset after 35-40 years of age increases with age. It is very rare in the younger age groups but for the alpha-1 antitrypsin deficiency patients. It is distinctly more common amongst men and smokers. Since tobacco smoking is the most known and established risk factor for COPD, the male predominance is partly explained on the basis of the male: female differences in smoking habits, particularly in India.6,5 Significantly, both the M:F and the smoker: nonsmoker ratios for COPD in India are not as high as in the Western populations.6,5 This is largely attributed to the indoor-air pollution from domestic combustion of solid fuels for cooking and heating to which the women are significantly more exposed.8 This is particularly so in the rural and hilly areas where the solid biomass fuels are primarily used. Exposure to environmental tobacco smoke (Passive smoking) from male smokers in the house is another important risk factor for COPD in nonsmoker women.8

There are also some regional and geographical differences in occurrence of COPD. In the past, it was reported as less frequent in South than in North India.1 Most of the recent studies do not support that belief. It is also more commonly seen in the hilly states possibly due to factors of higher indoor air pollution as discussed earlier. The state-wise distribution of COPD has not been worked out. The INSEARCH study reports prevalence of COPD from multiple centres spread across different states, but do not represent the state-wide prevalence rates. There is some available information from State Health Systems Resource Centre to suggest that COPD is the leading cause of death in Maharashtra.39

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2. estimated number of deaths (Millions) 3.12 0.57 0.72

In the present context, COPD is defined as a ‘systemic disorder’ with predominant involvement of the lungs. The increased injury to the airways. COPD is also an important but relatively unrecognized condition. COPD being a chronic, progressive disease poses a huge economic burden on the patient as well as the health-care systems. At individual level, it frequently proves to be financially ruin-some for families with average income.

The cost-estimate assessed in an ICMR sponsored project in 1998 showed about Rs. 2440 as direct per capita expenditure, Rs. 1340 on smoking products and Rs. 11454 as indirect losses annually (Table 3). The assessment was however an underestimation considering the facts that the State’s expenditures on treatments and health-care related infrastructure were not accounted for. Importantly however, the costs reflected an important financial burden of about 30 percent of the patient’s income. The total burden of treatment at the then existing levels of prevalence and costs was assessed as Rs. 10248.5 crores (Background paper for National Commission for Macroeconomics and Health).

Undoubtedly, the estimates per patient have enormously risen now with an escalation of costs of medicine, other treatment modalities and of hospitalization. There is no available published work to assess the current economic burden. This remains an important issue of concern for continued assessment, surveillance and audit.

Why is the COPD Burden Poorly Recognized?

The community-prevalence of a chronic disease does not directly conform to the patient load in the hospitals and other health-care settings. Similarly, the diagnostic criteria used for epidemiological survey tools cannot be fully translated while treating individual patients. COPD is one important example of exertional breathlessness. It slowly progresses to marked disability and respiratory failure to limit the daily activities of an individual finally confining him to bed. It is therefore, an important cause of loss of work. There are no reports on quantitative assessment of loss of DALYs. About 3 percent loss of DALYs from chronic non-communicable diseases was attributed to chronic respiratory disease (Table 2).

Table 2 : Estimates of total COPD burden in India

<table>
<thead>
<tr>
<th>Year</th>
<th>No.</th>
<th>Age-range</th>
<th>% prevalence</th>
<th>M</th>
<th>F</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996/1998</td>
<td>Median of studies (up to 1995)</td>
<td>Total 63,334</td>
<td>Variable in different studies</td>
<td>5.0</td>
<td>2.7</td>
<td>-</td>
</tr>
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<td>INSEARCH I (2006)</td>
<td>35295</td>
<td>&gt;35</td>
<td>5.0</td>
<td>3.2</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
<td>2. Japan</td>
<td>2343</td>
<td>&gt;40</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3. Thailand</td>
<td>3094</td>
<td>&gt; 60</td>
<td>-</td>
<td>-</td>
<td>7.11</td>
<td></td>
</tr>
<tr>
<td>4. Iran</td>
<td>4636</td>
<td>&gt;35</td>
<td>-</td>
<td>-</td>
<td>4.65</td>
<td></td>
</tr>
</tbody>
</table>

Source: References – 2,4,5,6

Table 1 : Prevalence rates of CB / COPD in India and some other Asian countries

<table>
<thead>
<tr>
<th>Population Studied</th>
<th>No.</th>
<th>Age-range</th>
<th>% prevalence</th>
<th>M</th>
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<th>Total</th>
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<td>4.65</td>
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Source: References – 2,4,5,6

COPD Morbidity

Airway obstruction in COPD is an important cause of chronic bronchial irritation which may also progress to airway obstruction after prolonged and persistent injury to the airways.

COPD Mortality

The limited data on mortality statistics from India point to the enormity of COPD as a cause of death. Based on the Rural Household Survey and Death Certification, the estimate of over 0.57 million deaths in 1998 was the second most common cause (after injuries) amongst the non-communicable diseases. Similarly, the survey data from multiple sources (Survey of Causes of Death, Annual reports of Registrar General of India, Census of India 2001, NFHSI I and II and other community studies) point to bronchitis and asthma as the most common cause of death in both men and women in rural India.

The information as available is however patchy, merely to provide an indication of the existing problem. A concerted and elaborate effort is obviously required to define the mortality and the morbidity burden.

Economic Burden of COPD

There is very meager data on economic burden from COPD related morbidities responsible for worsening of a stable condition. COPD is also an important but relatively unrecognized cause of pulmonary thromboembolism, hyperviscosity and hyperuricaemia due to chronic hypoxia and secondary polycythemia. Systemic thromboembolic phenomena can also occur in COPD and present with varied manifestations, depending upon the site of vascular block.

Several comorbidities have been recognized in the recent past in association with COPD. Osteopaenia, weight loss, cardiovascular disease and hormonal disorders such as diabetes are some of the more well-known syndromic associations. In the present context, COPD is defined as a ‘systemic disorder’ with the predominant involvement of the lungs. The increased cardiovascular mortality in COPD has added a totally new dimension to this epidemic, making it all the more urgent for adoption of control measures. The co-morbidities tremendously expand the various disability-indices such as the loss of DALYs, management costs and all other kinds of losses.
Handling the Epidemic?

Handling the COPD burden requires huge economic, administrative and social inputs. Strong and regulated policy decisions are required to manage the crisis. Management of chronic respiratory disease should be included on top priority in the National Control Programme for Non-Communicable diseases. Guideline-directed management is essential at the primary levels of care for early recognition and treatment. Strengthening of facilities of peripheral hospitals and wider availability of domiciliary care will help to reduce the disease morbidity, acute exacerbations and hospitalizations. More importantly, it is essential to emphasize and adopt measures for reduction of risk factors particularly tobacco-smoking and air pollution, both for prevention of disease and occurrence of complications.

References


Table 3 : Projected Economic burden (Rs.) of COPD in India

<table>
<thead>
<tr>
<th>Year</th>
<th>Per capita costs of patient</th>
<th>Direct treatment</th>
<th>Losses from morbidity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996-97</td>
<td>1340</td>
<td>-</td>
<td>-</td>
<td>1340</td>
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<tr>
<td>2011</td>
<td>-</td>
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<tr>
<td>2016</td>
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<td>-</td>
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Table 4 : Causes of poor recognition of COPD-burden and other pitfalls

1. Under-diagnosis and under-assessment of COPD
   - Nonspecific symptomatology
   - Absence of awareness of a definite diagnosis – overlap of terminology
   - Poor appreciation of symptom-severity
   - Non-availability / non-use of spirometry
   - Slow progression
2. Lack of statistical information
   - Inadequate epidemiological data
   - Poor hospital-records
   - Poor recording of mortality data
   - Absence of burden-assessment studies
3. Pitfalls of management
   - Nonspecific management
   - Absence of guideline-directed treatment
   - Inadequate preventive measures

which is often misdiagnosed and under-assessed in clinical practice (Table 4). An average clinician in India is generally dismissive of the progressive and disabling nature of the illness, frequently ignoring COPD as simple bronchitis or asthma. Patients often consider the symptoms of cough (with or without expectoration) as inconsequential and insignificant. Even exertional breathlessness is not appreciated by relatively sedentary individuals. A valuable time is often lost before appropriate steps are taken in the earlier stages for purposes of prevention of complications and delay of the lung function decline. Even the minimum steps, for example to quit smoking and to reduce exposure to other risk factors are neither advised nor initiated. Unfortunately, such an advice does not even form an essential component of routine medical prescription.

A failure to appreciate the disease-severity and the onset of respiratory-disability is common in view of the poor availability of spirometric assessment of lung functions. Chest radiography which is more frequently employed for follow-up monitoring in general practice is misrepresentative of the disease stage. The subtle findings of hyperinflation and early emphysema are frequently missed on plain radiographs.

Management of COPD is fraught with even more pitfalls than the diagnosis and assessment of severity. Routine expectorants and cough syrups along with courses of antibiotics constitute the bulk of treatment. Guidelines for management of COPD based on the Global Initiative for Chronic Obstructive Lung Disease (GOLD) are available for different levels of health care in India.16,17 But a guideline-directed strategy is rarely adopted. Respiratory rehabilitation and domiciliary care are practically non-existent. Consequently, there is more frequent occurrence of complications, co-morbidities, acute exacerbations and respiratory failure. All these factors add to the enormity of burden from COPD related morbidity and mortality.