

# Economic burden of asthma in India

Chronic respiratory diseases are among the leading causes of mortality and morbidity worldwide, with chronic obstructive pulmonary disease (COPD) and asthma being the most common. According to the Global burden of Disease Studies in 2015, COPD and asthma ranked among the top 20 conditions causing disability globally and were ranked 8<sup>th</sup> and 23<sup>rd</sup>, respectively, as causes of disease burden when measured by disability-adjusted life years.<sup>[1,2]</sup>

Bronchial asthma is the most common chronic respiratory disease, with an case burden of approximately 358.2 million in 2015.<sup>[3]</sup> In 2015, about 0.40 million people died from asthma, a decrease of 26.7% from 1990, and the age-standardized death rate decreased by 58.8%. The prevalence of asthma increased by 12.6%, whereas the age-standardized prevalence decreased by 17.7%.<sup>[3]</sup>

The high burden has its fallacies of estimation in nonadherence to a uniform definition of asthma, with varying definitions being used by surveys across the world. Global prevalence rate of doctor diagnosed asthma, clinical/treated asthma, and wheezing in adults was 4.3%, 4.5%, and 8.6%, respectively.<sup>[4]</sup> Comparisons between countries and over time are important as much of the chronic respiratory burden is either preventable or treatable with affordable interventions. The prevalence rate of asthma varies widely across countries; from a high of 21% for Australia to a low of 0.2% for China. The prevalence of the disease might also seem to be high because of better emerging treatment and hence increased longevity of the patients. Not only do prevalence rates of asthma show wide variations across countries and regions but the rates also indicate an upward trend over time,<sup>[5]</sup> primarily in the middle and low income countries between 1993 and 2003. By 2025, additional 100 million more cases of asthma are expected globally.<sup>[6]</sup> Asthma poses greater public health challenges for most countries regardless of their economic status. Although the prevalence is observed to be high in developed countries, it is more fatal in the developing countries accounting for nearly 80% of asthma deaths worldwide.<sup>[7]</sup>

Data on the burden of asthma in India have also been plagued by inconsistent data. The Indian study on Epidemiology of Asthma, Respiratory Symptoms and Chronic Bronchitis (INSEARCH) among adults using a validated international union against tuberculosis and lung diseases questionnaire<sup>[7,8]</sup> estimated the prevalence rate of asthma at 2.05% between 2007 and 2009, with an estimated burden of about 17.23 million in 2011. More recently, Agrawal *et al.* estimated the prevalence rate of self-reported asthma at around 2% using data from the National Family Health Survey-3 conducted during 2005–2006.<sup>[7]</sup>

Asthma is a complex disease that impairs the social, physical, and psychological well-being of the affected. There is a substantial economic burden of the disease that varies from one country to the other; the determinants include:<sup>[9]</sup>

1. Gross domestic product (GDP) of the country
2. Financial spending on public healthcare
3. Geographic and demographic status
4. Type of health system (public vs. private)
5. Organization of health services (health authorities, hospitals, clinics, etc.)
6. Level of primary care (developed vs. nondeveloped)
7. Adequacy of hospital network in the country
8. Status of private clinics (complementary or fundamentals)
9. Prevention and promotion in quality of life
10. Links with organizations such as schools and pharmaceutical industry
11. Rehabilitation of asthma patients for self and work worthiness
12. Government and pharmaceutical industry relationship regarding medication, mainly the use of generic drugs to asthma treatment
13. Methodology used to collect data and robustness of the data collection modules.

Despite the heterogeneity across various health systems in different countries, a mean cost per patient per year has been put forward by different studies allowing us to gain a global perspective, albeit with considerable gaps. Based on the 2008–2013 pooled sample, annual per-person medical costs attributable to asthma in the US were \$3266, while annual per-person expenditures for prescription medications exceeded the amount spent by persons without asthma by more than \$1800, amounting to 56% of total medical expenditures.<sup>[10]</sup> The total cost of asthma was estimated at \$81.9 billion, of which 61% was for medical costs and nearly 39% was attributable to absenteeism and mortality.<sup>[10]</sup> The European figures estimated an expenditure of €4.3 billion,<sup>[9]</sup> whereas the Chinese expenditure on asthma in 2014 was found to be \$18.80 million.<sup>[11]</sup> Level of control also is a major determinant of the medical expenditures.<sup>[12]</sup> Individuals with uncontrolled asthma, when compared with those without asthma, had up to 4.6-fold greater frequency of hospitalizations, up to 1.8-fold higher number of emergency department visits and lower productivity (more likely to be unemployed, more days absent from work, and more activity limitations) and higher cost of treatment; however, hospitalization rate of individuals with controlled asthma was not different from healthy subjects.<sup>[12]</sup> Besides the economic costs, social costs such as mortality are the other adverse impacts of the

disease even as, asthma mortality is still uncommon and preventable, with higher instances seen among older adults.

Data about the economic burden in India are scant. About 18% of the world's population lives in India, and many states of India have populations similar or more than those of large countries and about 1/10<sup>th</sup> of the total asthmatics in the world live in India<sup>[13]</sup>

Direct and indirect costs related to disease constitute a significant burden on asthmatics. There has been a 43% increase in the prices over a 4-year period (2012–2016).<sup>[14]</sup> With the newer biologics for asthma becoming increasingly available and there being many more “choices” in the coming years, the maintenance treatment for severe asthma is likely to become even more expensive. While it is important to assess the economic burden, the major limitation is the lack of adequate scientific literature such as prevalence and economic figures.

The current issue of *Lung India* carries a study on cost of asthma treatment in a private healthcare facility in South India,<sup>[15]</sup> where the annual cost of asthma treatment has been calculated to be 18,737 INR. Although the study is based on small numbers (120 patients), it marks an important advance in our understanding of the economic burden of asthma treated in private facilities. With a conservative estimate of the prevalence of 2%, the cost of treatment would translate to a whopping 487.2 billion INR. However, a considerable difference exists in the cost of treatment in public and private sectors and the estimate may actually be higher than actual costs. With a rather poor public healthcare spending of only 1.2% of the GDP, a large portion of the costs would be out of pocket for Indian asthmatics. Poor socioeconomic status also contributes to nonadherence to maintenance treatment of asthma. This leads to further lack of control and then to exacerbations. In turn, this leads to further escalation of costs of treatment.

India has vastly heterogeneous and diverse health-care delivery systems, and as such, the medical costs of disease vary from one system to the other. Apart from allopathy, alternative forms of medicine (Ayurveda, Homeopathy, etc.) and faith healers treat a large number of asthmatics, and not only is the efficacy of these systems poorly documented but the economic burden also is unsubstantiated. Allergen immunotherapy is also widely used even against the backdrop of controversial role in prevention and treatment in bronchial asthma.

Adherence to published guidelines in established asthmatics is also a major determinant of the morbidity, mortality and economic costs of disease.<sup>[16]</sup> Murthy and Sastry<sup>[17]</sup> estimated the cost of treatment of guideline-based treatment of asthma and modeled that the cost of treating asthma could be reduced substantially if the treatment is carried as per the procedures recommended in guidelines.<sup>[17]</sup>

Majority of Indians do not possess health insurance and high out-of-pocket costs even for insured persons may preclude purchasing asthma medications. Further, language and health literacy barriers may also limit effectiveness of asthma self-management education. A wider penetration of the health insurance schemes with lower out-of-pocket payments may improve access to routine care and adherence to medications for persons with asthma. Interestingly, as a paradox, for the minority who have private health insurance, would rather get admitted to hospital with an exacerbation rather than be compliant to maintenance (home) treatment because the former is covered by insurance while the latter is “out-of-pocket self-funded.”

The study in question should provide an impetus to further studies on the subject so as to carve policies to tackle the burden of asthma and its economic costs. The economic burden of asthma can be decreased with access to preventive care, early treatment, and use of primary care health providers instead of emergency departments. More focus needs to be put on adherence to treatment from the patients' side and adherence to guidelines from the physician's side. Generic barriers to better health such as poverty, poor education and awareness, lack of sanitation and poor infrastructure; low spending on healthcare; inequity in facilities; and some environmental barriers that include tobacco smoking, pollution, and poor nutrition need a response from the public health perspective by way of regional or country programs. Physicians need to counsel patients for adherence to medications and avoidance of risk factors which would substantially reduce the burden of disease and its attendant costs.

**Parvaiz A Koul<sup>1,2</sup>, Raja Dhar<sup>1</sup>**

<sup>1</sup>Editorial Board, *Lung India*, Department of Respiratory Medicine, Fortis Hospital, Kolkata, West Bengal, <sup>2</sup>Department of Internal and Pulmonary Medicine, Sher-I-Kashmir Institute of Medical Sciences Soura, Srinagar, Jammu and Kashmir, India  
E-mail: parvaizk@gmail.com

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