

Economic burden of asthma among patients visiting a private hospital in South India

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ABSTRACT

Background: The presence of asthma is associated with a socioeconomic burden due to both direct and indirect cost. **Aim:** This study aims to estimate the economic burden of asthma in terms of direct and indirect cost as also determine if the proper control and adherence to medication would result in reduced cost. **Materials and Methods:** Direct cost was calculated in terms of medications, doctors visit, investigations, and hospitalizations. Indirect cost was calculated in terms of lost wages, termed as absenteeism. Asthma control was assessed using the asthma control test questionnaire. **Results:** A total of 120 patients were included; 69 males and 51 females. The mean annual direct cost for asthma treatment was ₹18,737/year. The mean annual cost due to medications, doctor's visit, investigations, and hospitalization was ₹7,427, ₹2089/year, ₹1103/year, and ₹62,500/year, respectively. An asthma patient lost an average of 17 working days/year. The mean annual indirect cost for an asthma patient was ₹25,358, whereas, for the caregivers was ₹19,971. About 47.5% of patients had well-controlled asthma and 52.5% of patients had uncontrolled asthma. The mean annual direct cost among controlled and uncontrolled asthma patients were ₹13,010 and ₹23,918, respectively. Fifty-seven percent of patients were compliant with medication. The mean annual direct cost among compliant and non-compliant patients was ₹14,401 and ₹24,407, respectively. Percentage of hospitalization was less among the compliant group (6%) when compared with noncompliant group (17%). **Conclusion:** Asthma is not only associated with patient-specific impairment but also a significant economic burden to the family and society. Loss of productivity is another underappreciated source of economic loss.

KEY WORDS: Absenteeism, direct cost, economic burden, indirect cost

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INTRODUCTION

Asthma is a major health problem worldwide with global prevalence estimated to be approximately 4.5%.^[1] There are about 334 million patients with asthma, affecting all age groups, across the world.^[2] In India, as per the survey, "Indian study on epidemiology of asthma, respiratory symptoms, and chronic bronchitis in adults (INSEARCH), the overall prevalence of asthma and chronic bronchitis (CB) was respectively 2.05% (adults aged ≥ 15 years) and

3.49% (adults aged ≥ 35 years). The national burden of asthma and CB was estimated at respectively 17.23 and 14.84 million.^[3] The presence of asthma is associated with a socioeconomic burden due to both direct cost and indirect cost.^[4] In India, the estimated cost of asthma treatment per year for the year 2015 has been calculated to be approximately Rs. 139.45 billion.^[5] Many previous studies have shown that the cost of regular treatment of chronic diseases including asthma is unaffordable to

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families in low-resource settings.^[6,7] This results in a large proportion of asthma remaining uncontrolled, which is associated with greater economic burden to families and the health system and also deterioration in quality of life. Affordability of the medications which is an important factor is often overlooked, especially in the developing countries where one has to pay out of one's own pocket for procuring the medicines.^[7] Despite the central role of clinical control in the contemporary management of asthma, only a few studies have reported on the relationship between productivity loss and asthma control.^[8]

MATERIALS AND METHODS

This was a cross-sectional observation study which included adult (>18 years) patients with confirmed asthma diagnosis visiting a private hospital. The diagnosis was made by a respiratory physician based on GINA guidelines. Patients with asthma chronic obstructive pulmonary disease overlap syndrome were excluded from the study. Informed consent was obtained from every patient. The study began after Institutions Ethics Committee approval. The primary objective was to calculate the direct and indirect cost due to asthma. The secondary objectives were (i) to estimate the difference in expenditure among controlled and uncontrolled asthma patients and (ii) to see whether properly controlled asthma and compliance with medications can help decrease health-care cost. Direct and Indirect costs due to asthma follow-up were assessed using a pretested, structured interviewer-administered questionnaire designed by the investigators. All the patients were interviewed by the investigator himself in their preferred language. The questionnaire also included details about sociodemographic distribution, family income, and health insurance. Patients who took their medications for >70% of days in the previous 1 year were grouped as compliant, others non-compliant. Direct cost due to asthma was calculated in terms of (i) cost due to asthma medications, (ii) expenses due to doctor's visit, (iii) expenses on hospitalizations due to asthma, and (iv) expense due to investigations pertaining to asthma. Indirect cost due to asthma was calculated in terms of absenteeism from work (both patient and caregivers). The level of asthma control was assessed with asthma control test questionnaire. Data validation and analysis were carried out by SPSS ver 16.0. All $P < 0.05$ were considered as statistically significant.

RESULTS

During the study period of 1 year, a total of 120 patients were included out of which 69 (57.5%) were males, and 51 (42.5%) were females. The mean age group of the population was 51.7 ± 15.6 . Only 37.5% (45/120) subjects in our study had insurance coverage. The mean annual direct cost of asthma treatment accounted to be Indian rupees (₹) 18,737/year. The mean annual direct cost due to medications, doctor's visit, investigations, and hospitalization were ₹7427/year, ₹2089/year, ₹1103/year,

and ₹62,500/year, respectively [Figure 1]. Medication cost accounted for 49% of the total direct cost when hospitalization cost was excluded (few in numbers). 47.5% (57/120) had well-controlled asthma, whereas 52.5% (63/120) had uncontrolled asthma. The mean annual direct cost among controlled and uncontrolled asthma patients were ₹13,010/year and ₹23,918/year, respectively ($P = 0.008$) [Figure 2]. The number of hospitalizations was less (5%) in the controlled group when compared with uncontrolled (17%). About 57% (68/120) of patients were compliant with their medications, and the remaining 43% (52/120) were noncompliant. The mean direct cost among patients who were compliant with their medications was ₹14,401/year, whereas among those who were noncompliant was ₹24,407/year ($P = 0.009$) [Figure 3]. 19% (23/120) patients with asthma reported absenteeism from work due to their illness, and 21.6% (26/120) of patient caregivers (spouse, parents, and relatives) reported absenteeism as they had to look after the patient or take them to a doctor. The average days of labor lost for asthma patients were 17.3 days/year, whereas, for the caregivers, it was 16.8 days/year. The mean annual indirect cost for the patients was ₹25,358/year, and those for the caregivers were ₹19,971/year. Table 1 and Figure 4 compare percentage hospitalization, asthma control, mean annual direct and indirect costs, and absenteeism among the compliant and noncompliant patients.

DISCUSSION

It is by no means easy to calculate the health-care costs involved with the management of any particular disease in a country as large and as diverse as India. Health-care access and hence expenditure for a specific disease is variable throughout the country depending on the socioeconomic status of the patient as well as the geographical location. The patient attending this particular

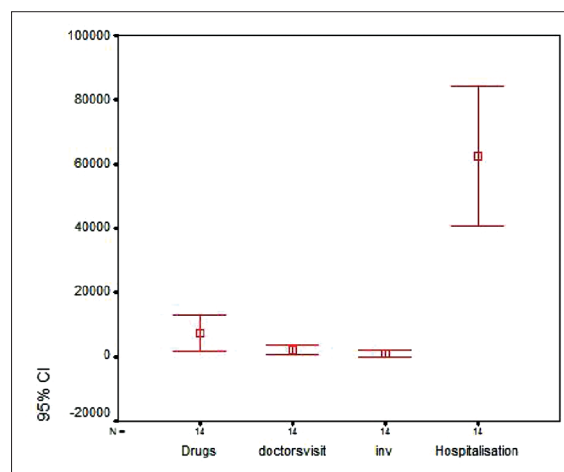


Figure 1: Box and plot graph showing the difference in the mean direct cost due to medications, doctor's visit, investigations, and hospitalization

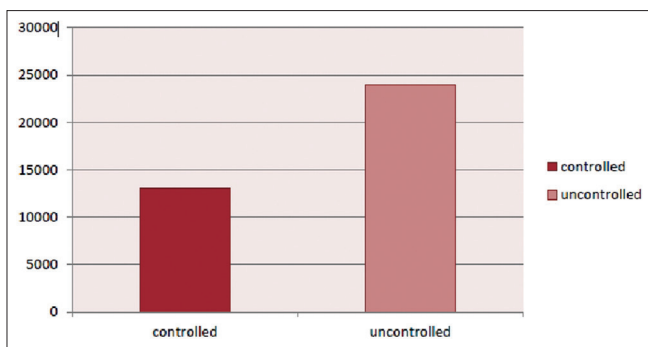


Figure 2: Bar graph showing the difference in mean direct cost among controlled and uncontrolled asthma patients

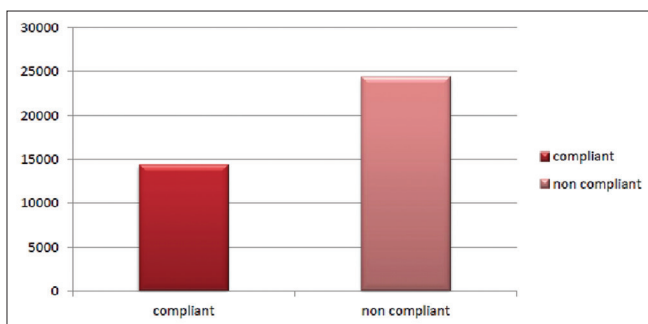


Figure 3: Bar graph showing the difference in mean direct cost among compliant and non-compliant asthma patients

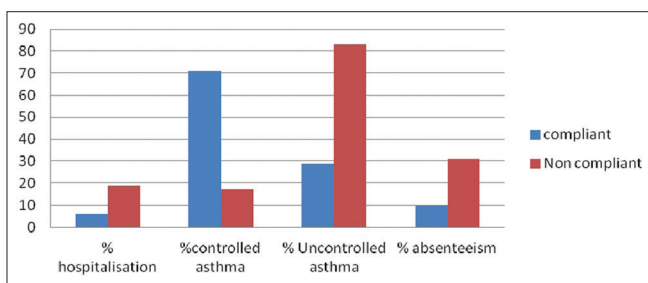


Figure 4: Bar graph showing percentage-wise difference in hospitalization, asthma control, absenteeism among compliant and non-compliant patients

South Indian corporate hospital is not the typical Indian asthmatic but will probably represent the top layer of the Indian socioeconomic strata. Nevertheless, the principle that well-controlled asthma may indeed be less expensive in the longer term may be applicable in most scenarios.

This study is an attempt to look into the economic aspect of asthma management in this select group of patients. Such studies are not common but contribute hugely to the development of public health-care policies and fund allocation.

The mean annual cost of asthma treatment for an individual in our study was ₹18,737/year. The medication cost contributed to 49% (when hospitalization charges were excluded) of the total direct cost which is at

Table 1: Difference in percentage hospitalization, asthma control, mean annual direct and indirect costs, and absenteeism among the compliant and non-compliant patients

	Non compliant (n=52)	Compliant (n=68)
% hospitalisation (n)	19 (10)	6 (4)
% controlled asthma (n)	16 (9)	71 (48)
% Uncontrolled asthma (n)	8 4 (43)	29 (20)
Mean annual direct cost in Indian rupees	24,407	14,401
Mean annual indirect cost in Indian rupees	19,550	19,018
% absenteeism (n)	31 (16)	10 (7)

par with other studies.^[9,10] Hospitalization adds on a significant burden (mean annual direct cost = 62,500/year). Keeping asthma under control can minimize untoward hospitalizations as well as reduce the health-care cost. Indirect cost was measured in terms of absenteeism (i.e., absent from work due to sickness). Not only the patients but also the caregivers (e.g., spouse, parents, and relatives) are affected by the patients' illness. The indirect cost becomes significant when the patient is the sole bread earner in the family. Since vast majority of the Indian population are daily wage earners without regular jobs, the whole family depends on the day to day earnings. In such a situation, if the working member falls ill, then the whole family is affected. The productivity loss may also sometimes be a roadblock toward the development of the nation. Eighty-four percent (48/57) of the controlled asthmatics were compliant with their medications compared to only 32% (20/63) in the uncontrolled group. Thus, the regular use of controller medications not only keeps asthma under control but also help reduce the economic burden as shown in other western studies.^[11]

Insurance coverage plays an important role in the management of disease. Studies have proven that patients with adequate insurance coverage not only had less number of emergency visits but also, they used their controller medications more appropriately.^[12] Although schemes like RSBY in India are an important step in addressing the impoverishing effects of out of pocket payments for health, particularly for the poor, it has its own constraints. Universal health coverage for all should be the motto; wherein, no individual is deprived of treatment merely because of unaffordability.

CONCLUSION

In summary, asthma is not only associated with patient-specific impairment but also a significant economic burden to the family and society. The major contributors to the burden are the medication cost and hospital admissions. Appropriate use of regular controller medicines can help keep asthma under control, thereby decreasing the economic burden and also emergency hospital admissions. As most of the economic risk from ill health appears to be related to out of pocket payments,

introducing health insurance, that prefinances these expenditures, may contribute significantly to alleviate economic hardships of families. Productivity loss is another underappreciated source of economic loss contributing to the indirect cost. The rising costs of investigations, interventions, and treatment of chronic diseases compel us to look at pragmatic solutions which are cost-effective and safe. Studies which not only look at the efficacy of interventions but also their cost-effectiveness and affordability are therefore imperative.

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Conflicts of interest

There are no conflicts of interest.

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