

An Observational Study on Clinical and Economic Outcomes of Drug Therapies of Asthma Patients in a Tertiary Care Hospitals

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Abstract: ***Background:** Asthma is a chronic inflammatory airway disease that impairs quality of life and causes a significant clinical and economic burden. Drug therapy can help control symptoms and prevent exacerbations. **Objective:** To assess the clinical and economic consequences of pharmacological therapy for asthma patients treated in tertiary care facilities. **Methods:** A three-month retrospective observational study of 143 asthmatic patients was conducted. Data on demographic factors, clinical history, laboratory investigations, pharmacological therapy, treatment outcomes, and treatment expenses were gathered and analysed using frequency and percentages. **Results:** Most patients had positive treatment outcomes, with 84.6% experiencing either satisfactory symptom control or clinical improvement. Common treatments were salbutamol (74.8%) and budesonide (66.4%). Hospital stays and medication accounted for much of the ₹9,37,088 total treatment cost. **Conclusion:** The study found that asthma patients had positive clinical outcomes, but asthma therapy was associated with a significant economic burden, primarily due to hospitalization and drug expenses. These findings emphasize the necessity of appropriate medication and cost-effective asthma management.*

Keywords: Asthma, Drug therapy, Clinical outcomes, Economic outcomes, Pharmacotherapy, Tertiary care hospital, Treatment cost, Drug utilization

1. Introduction

Asthma is a chronic inflammatory disease of the airways that causes recurrent wheezing, dyspnea, chest tightness, and coughing. It affects people of all ages and is a major public health issue worldwide. ¹The severity and frequency of symptoms can differ amongst people, affecting their quality of life and everyday activities. Asthma care relies heavily on drug therapy to control symptoms, avoid exacerbations, and improve lung function. ² Various drugs, such as bronchodilators and corticosteroids, are often recommended to treat asthma. The efficacy of these medicines, as well as their economic impact on patients, are crucial factors influencing treatment outcomes. ³

Long-term medication, regular follow-up, and monitoring are frequently required for asthma management to obtain optimal disease control. ⁴Clinical outcomes, such as symptom management, frequency of exacerbations, hospital admissions, and improvement in pulmonary function, are key markers of therapy efficacy. ⁵Furthermore, the economic burden associated with asthma, which includes direct medical costs such as medication, hospitalization, and diagnostic investigations, has a major impact on both patients and healthcare systems. ⁶

Therefore, optimising therapeutic approaches and enhancing overall patient care depend on evaluating both clinical and economic outcomes. ⁷ Evaluating the prescribing patterns and outcomes of drug therapies in such settings provides valuable information regarding the rational use of medications, treatment effectiveness, and cost implications. ⁸ The findings of this study may assist healthcare professionals in developing evidence-based strategies for improving asthma management and reducing the economic burden on patients. ⁹ The study will improve patient care and

healthcare decision-making by adding to our understanding of the effectiveness of prescription medications and associated treatment costs. ¹⁰

2. Materials and Methodology

Study Design: Retrospective observational study.

Study Site: Selected tertiary care hospital(s) and the hospital associated with the study institution.

Study Duration: 3 months.

Study Population: Asthma patients who had received treatment at tertiary care hospitals and whose relevant clinical and treatment information was available either through hospital medical records or direct patient interaction.

Sample Size: 143 asthma patients were included in the study.

3. Data Collection Method

Data were collected from two sources:

- Hospital medical records: Relevant patient details were collected from medical records after obtaining permission from the concerned hospital.
- Direct patient data: Relevant information was collected directly from asthma patients who had previously received treatment at tertiary care hospitals and were residing at home during the data collection period.

4. Data Collection Tool

A structured data collection form was used to collect: Demographic characteristics

Clinical history

Clinical examination findings Laboratory investigations
Drugs prescribed

Cost-related information Treatment outcome

Inclusion Criteria

- Patients diagnosed with asthma.
- Patients who received treatment at tertiary care hospitals.
- Patients whose relevant information was available through medical records or direct interaction.
- Male and female patients.
- Patients with sufficient information for the study.

Exclusion Criteria

- Patients without a diagnosis of asthma. Records with insufficient information. Duplicate records.
- Patients unwilling to provide the required information.

Parameters Assessed

- Demographic: Age, gender
- Clinical history: Duration, frequency, triggering factors, past medication history, smoking, alcohol
- Clinical examination: SpO₂ and respiratory rate at admission/discharge for inpatients Laboratory: Hb, WBC, eosinophils, chest X-ray, spirometry
- Drug therapy: Drugs prescribed
- Economic: Direct cost, indirect cost, total cost
Hospitalization: Inpatient/outpatient status, length of stay
Outcome: Treatment outcome

Data Collection Procedure

After obtaining the necessary permission, relevant information was collected from hospital medical records. In addition, eligible asthma patients who had received treatment at tertiary care hospitals and were residing at home were contacted, and the required information was collected directly using the structured data collection form.

Cost Analysis

Direct cost, indirect cost and total treatment cost were assessed based on the available patient/hospital information.

Data Analysis

Data were entered into Microsoft Excel and analysed using frequency, percentage, tables, bar charts and pie charts as appropriate.

Ethical Considerations

Patient confidentiality was maintained. Necessary institutional/hospital permission was obtained, and patient information was used only for academic research purposes.

Study Outcome

The study assessed the clinical and economic outcomes of drug therapies among asthma patients treated at tertiary care hospitals.

5. Result

Demographics Characteristics

Demographic Characteristics	Frequency (N)	Percentage (%)
AGE GROUPS		
0-18	25	17.48
19-30	35	24.48
31-45	38	26.57
46-60	26	18.18
>60	19	13.29
GENDER		
MALE	73	51.05
FEMALE	70	48.95
TOTAL	143	100

Among the 143 asthma patients, the highest proportion belonged to the 31–45 years age group (26.57%), followed by 19–30 years (24.48%). Males constituted 51.05% of the study population, while females accounted for 48.95%.

Clinical Characteristics of Asthma Patients

Clinical Characteristic	Main Findings, (n)%
Duration of Asthma	<1year:10(6.99%) 1-5years:85(59.44%) 6-10years:29(20.28%) >10years:14(9.79%) Not recorded:5(3.50%)
Frequency of Attacks/Symptoms	Daily:8(5.6%) Weekly:19(13.3%) Monthly:68(47.6%) Yearly:15(10.5%) Occasional:27(18.9%) Not recorded:6(4.2%)
Types of Asthma	Allergic:31(21.7%) Acute exacerbation:21(14.7%) Moderate persistent:21(14.7%) Intermittent:14(9.8%) Mild persistent:12(8.4%) Other:44(30.7%)
Comorbidity	Allergic condition:57(39.86%) Hypertension:20(13.99%) Diabetics:15(10.49%) No comorbidity:37(25.87%) Others:14(9.79%)
Smoking Status	Non-Smoker:118(82.5%) Smoker:22(15.4%) Ex-Smoker:3(2.1%)
Alcohol Consumption	No:121(84.6%) Yes:16(11.2%) Occasional:6(4.2%)

Most of the patients had asthma for 1–5 years (59.44%) and experienced monthly symptoms or attacks (47.6%). Allergic asthma was the most frequently observed type (21.7%), while allergic conditions were the most common comorbidity (39.86%). Most patients were non-smokers (82.5%) and had normal BMI (69.2%).

Laboratory/Diagnostic Findings

Investigations	Category	n (%)
Hemoglobin	Low(<12gm/dl)	31(21.7%)
	Normal(12-16gm/dl)	110(76.9%)
	High(>16gm/dl)	2(1.4%)
Eosinophil Count	Normal (4,000-11,000cells/cu.mm)	104(72.7%)
	Elevated(.11,000cells/cu.mm)	39(27.3%)
	Normal (<6%)	43(30.1%)
	Elevated (>6%)	97(67.8%)
	Not recorded	3(2.1%)

Chest X-Ray	Normal Hyperinflation	85(59.4%)
	Other abnormal findings	40(28.0%)
		14(9.8%)
	Not recorded	4(2.8%)
Spirometry	Obstructive	58(40.6%)
	Normal/Near normal	25(17.5%)
	Other abnormal	29(20.3%)
	Not recorded	31(21.7%)

Laboratory findings showed elevated eosinophil levels in 67.8% of patients, while 27.3% had elevated WBC counts. Chest X-ray was normal in 59.4% of patients, whereas hyperinflation was observed in 28.0%. Spirometry showed an obstructive pattern in 40.6% of patients.

Drug Utilization Pattern Among Asthma Patients

DRUG	Frequency (n)	Percentage (%)
SALBUTAMOL	107	74.80%
BUDESONIDE	95	66.40%
MONTELUKAST	61	42.70%
IPRATROPIUM	40	28.00%
HYDROCORTISONE	37	25.90%
CETIRIZINE	37	25.90%
FORMOTEROL	30	21.00%
LEVOSALBUTAMOL	30	21.00%
PREDNISOLONE	26	18.20%
PANTOPRAZOLE	25	17.50%
FLUTICASONE	15	10.50%
PARACETAMOL	13	9.10%
LEVOCETIRIZINE	10	7.00%
METFORMIN	6	4.20%
AMLODIPINE	6	4.20%
AMBROXOL	6	4.20%
METHYLPREDNISOLONE	5	3.50%
SALMETEROL	5	3.50%
TIOTROPIUM	5	3.50%
THEOPHYLLINE	5	3.50%

Salbutamol was the most frequently prescribed drug (74.8%), followed by budesonide (66.4%) and montelukast (42.7%). Ipratropium (28.0%), hydrocortisone (25.9%), and cetirizine (25.9%) were also frequently prescribed.

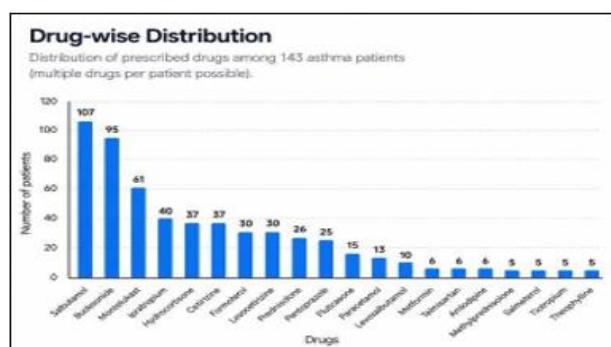


Figure 1: Drug utilization pattern among asthma patients

Cost Analysis Among Asthma Patients

Cost analysis	Price	Percentage (%)
Consultation	75,900	8.1
Laboratory	1,71,500	18.3
Medication	2,50,388	26.72
Hospital stay	3,43,200	36.62
Misc./ Other	96,100	10.26
Total	9,37,088	100

The total expenditure was ₹9,37,088. Hospital stay accounted for the highest proportion of expenditure (36.62%), followed by medication costs (26.72%) and laboratory investigations (18.30%). Consultation and miscellaneous/other costs accounted for 8.10% and 10.26%, respectively.

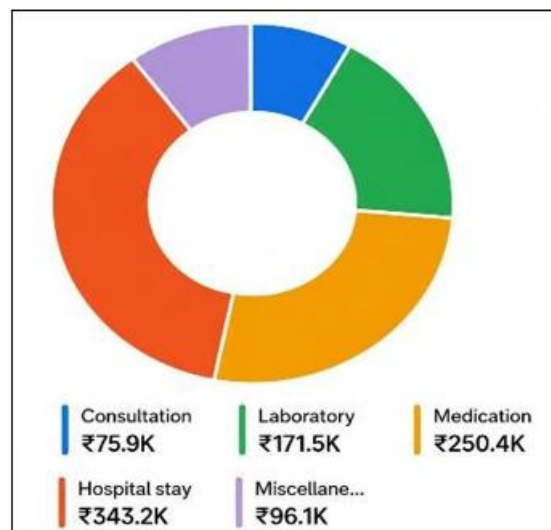


Figure 2: Distribution of healthcare expenditure by cost component among asthma patients

6. Discussion

This retrospective study examined the clinical and economical outcomes of 143 asthma patients treated with pharmaceuticals. Dyspnea was the most common complaint, and the majority of patients had asthma for one to five years (59.44%), with monthly symptoms (47.6%). 67.8% of patients reported increased eosinophils, while 40.6% had an obstructive pattern on spirometry.

The most widely used therapies were salbutamol and inhaled corticosteroid regimens. Overall, 84.6% of patients demonstrated satisfactory symptom control or clinical improvement. Nonetheless, the cost of hospitalization and prescription drugs added greatly to the financial strain. Proper medication use, adherence, frequent monitoring, and exacerbation prevention can improve asthma control and reduce treatment costs. Because this was a retrospective observational study, the findings only indicate observed outcomes and do not establish the causal efficacy of individual drugs.

7. Conclusion

The current study found that asthma medication was associated with mostly positive clinical outcomes among the 143 individuals evaluated, with 84.6% showing clinical improvement or satisfactory symptom management. Salbutamol and inhaled corticosteroid-containing regimens were the most often used treatments. Despite favourable clinical outcomes, asthma therapy placed a significant economic burden, with hospitalization and drug costs accounting for most total documented expenditures. The results emphasize the necessity of rational drug use, suitable controller therapy, adherence, trigger avoidance, and regular monitoring.

Thus, successful asthma care should prioritize not only symptom control but also lowering unnecessary exacerbations and hospitalization expenditures. However, because this was a retrospective observational study without a randomized comparator or standardized pre- and post-treatment measurements, the findings represent observed clinical and economic outcomes rather than causal evidence of the efficacy of individual drug therapies.

References

- [1] Global Initiative for Asthma. Global strategy for asthma management and prevention: 2026 update. Fontana, WI: Global Initiative for Asthma; 2026.
- [2] World Health Organization. Asthma [Internet]. Geneva: World Health Organization; 2026 Apr 28.
- [3] Global Initiative for Asthma. Global strategy for asthma management and prevention: 2025 update. Fontana, WI: Global Initiative for Asthma; 2025.
- [4] Sadatsafavi M, Lynd L, Marra C, Carleton B, Tan WC, Sullivan S, et al. Direct health care costs associated with asthma in British Columbia. *Can Respir J*. 2010;17(2):74-80. doi:10.1155/2010/361071.
- [5] Doz M, Chouaid C, Com-Ruelle L, Calvo E, Brosa M, Robert J, et al. The association between asthma control, health care costs, and quality of life in France and Spain. *BMC Pulm Med*. 2013; 13: 15.
- [6] Bahadori K, Doyle-Waters MM, Marra C, Lynd L, Alasaly K, Swiston J, et al. Economic burden of asthma: a systematic review. *BMC Pulm Med*. 2009; 9: 24.
- [7] Bousquet J, Khaltsev N, editors. Global surveillance, prevention and control of chronic respiratory diseases: a comprehensive approach. Geneva: World Health Organization; 2007.
- [8] Menzies-Gow A, Szefer SJ, Busse WW. The relationship of asthma biologics to exacerbations and healthcare resource utilization. *J Allergy Clin Immunol Pract*. 2021;9(1):1-
- [9] Reddel HK, Bacharier LB, Bateman ED, Brightling CE, Brusselle GG, Buhl R, et al. Global Initiative for Asthma strategy 2021: executive summary and rationale for key changes. *Eur Respir J*. 2022;59(1):2102730.
- [10] Reddel HK, Bacharier LB, Bateman ED, Brightling CE, Brusselle GG, Buhl R, et al. Global Initiative for Asthma strategy 2021: executive summary and rationale for key changes. *Am J Respir Crit Care Med*. 2022;205(1):17-35.