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CLINICAL PROFILE OF PAEDIATRIC ASTHMATIC PATIENTS APPROACHING A RURAL TERTIARY CARE HOSPITAL

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ABSTRACT **Background:** Asthma is the most common chronic disease in children and is often misdiagnosed or poorly managed due to overlapping symptoms, inadequate treatment adherence, and co-existing allergic conditions. Identifying demographic patterns, triggers, and treatment outcomes is essential to improve management strategies, particularly in rural populations. **Methods:** A prospective observational study was conducted in the Department of Paediatrics, Dhiraj Hospital, Sumandeep Vidyapeeth, from January 2018 to October 2019. Seventy-one children diagnosed with asthma were enrolled. Demographic data, clinical presentation, associated allergic conditions, spirometry parameters, and treatment outcomes with inhaled corticosteroids were analyzed. **Results:** Of the 71 participants, 70.43% were male (male-to-female ratio 2.3:1), with a mean age of 11 years and mean BMI of 16 kg/m². Most patients (61.9%) belonged to the 6–12 years age group, predominantly from rural areas (59.15%) and low socioeconomic backgrounds (76.06%). Allergic rhinitis (37.05%) and food allergies (30.69%) were the most frequent co-morbidities. Mild persistent asthma was the most common type (43.7%), with cough being the predominant symptom (42.25%). Exacerbations (n=54) occurred mainly during monsoon (44.45%) and at night (55.55%), with cold weather and dust as major triggers. Pulmonary function improved with therapy, though severity correlated with reduced reversibility. Hospitalization was required in 25 cases. Maximum partial control was achieved by the fourth month, and well-controlled status by the sixth month, though compliance issues necessitated treatment escalation at the second month. **Conclusion:** Childhood asthma remains a significant public health concern in rural India. Early recognition of co-allergies, environmental control, and caregiver education are crucial for reducing exacerbations. Inhaled corticosteroids, combined with strict adherence and follow-up, remain the cornerstone of effective management.

KEYWORDS : Asthma, Inhaled corticosteroids, cough, triggers

INTRODUCTION

Asthma is the most common chronic disease in the paediatric age group, which is often mismanaged due to difficulties in diagnosis and poor treatment adherence. [1, 2] A school-based study published from Rajasthan showed that 7.59% of children in the 5–15 years age group were suffering from asthma.[3] Similarly, another study from South India found the prevalence to be 10.3% in the 6–15 years age group.[4]

Being an allergic disorder, asthma often co-exists with other atopic conditions such as eczema, allergic rhinitis, atopic kerato-conjunctivitis, and food allergies. [5, 6] Identifying these co-existing conditions is very crucial for positive treatment outcomes because uncontrolled asthma is often attributed to untreated atopic conditions.[7,8]

Inhaled corticosteroids are the mainstay of asthma controller therapy [9,10], and adherence to treatment requires repeated reminders to caregivers and meticulous follow-up. [2]

The present study was planned to evaluate the clinical profile of paediatric asthma patients attending the Asthma Clinic in the Paediatric Department of Dhiraj Hospital, Sumandeep Vidyapeeth. It aimed to provide insights into the magnitude of the problem and treatment outcomes. The objectives were to assess the demographic profile of our patients, examine seasonal variations in asthma attacks with possible triggers and associated allergic manifestations, and analyze treatment with special reference to inhaled corticosteroids and follow-up.

METHODOLOGY

Study Design: Prospective observational study.

Setting: Department of Paediatrics, Dhiraj Hospital affiliated to SBKS MIRC, Sumandeep Vidyapeeth- Deemed to be University, Piparia, Gujarat.

Study Period: January, 2018 to October, 2019

Ethical approval was obtained from ethics committee SVIEC (SVIEC/ON/MEDI/BN-PG17/D18019) dated 16.01.2018

Sampling:

Suspected asthma patients meeting criteria were enrolled.

- Inclusion: All patients more than 5 years enrolled in asthma clinic during 1-year period starting from the month of approval of this synopsis.

- Exclusion: Lack of parental consent, cardiac disease, or comorbidities preventing pulmonary function/PEFR testing.

Eligible cases were screened, provided information sheets, and consent/assent obtained. Data recorded in pre-structured proforma.

Sample Size:

68, calculated using prevalence 0.8% and population size 100.

Data Analysis:

Data entered in Excel; descriptive analysis performed on demographics, treatment response, and compliance.

RESULTS

Demographic And Clinical Characteristics

Table 1. Demographic Profile Of Participants (N=71)

Variable	Male (n=50)	Female (n=21)	Total (%)
Mean age (years)	11.08	11.52	–
Mean BMI (kg/m²)	16.11	16.91	–
Age 6–12 years	32 (64.0%)	12 (57.1%)	44 (61.9%)
Age >12–18 years	18 (36.0%)	9 (42.9%)	27 (38.1%)
Rural residence	–	–	42 (59.2%)
Urban residence	–	–	29 (40.8%)
Joint family	–	–	41 (57.8%)
Nuclear family	–	–	30 (42.3%)

The cohort was predominantly male (70.4%), with comparable mean age and BMI across sexes. Most participants were aged 6–12 years, from rural areas, and belonged to joint families.

Atopy, Comorbidities, and Asthma Severity

Table 2. Atopy, Comorbidities, And Asthma Severity

Variable	n (%)

Family history of atopy	37 (52.1)
Family history of asthma	15 (21.1)
Allergic rhinitis	30 (42.9)
Food allergy	25 (35.1)
Atopic dermatitis	8 (11.7)
Keratoconjunctivitis	5 (6.5)
Urticaria	3 (3.9)
GERD	11 (15.5)
Intermittent asthma	10 (14.1)
Mild persistent asthma	31 (43.7)
Moderate persistent asthma	24 (33.8)
Severe persistent asthma	6 (8.5)

Allergic rhinitis was the most common atopic condition, followed by food allergy. GERD was present in 15.5% of patients. Mild persistent asthma was the most frequent severity category.

Exacerbations, Triggers, and Treatment Outcomes

Panel A shows distribution of asthma severity (intermittent 14.1%, mild persistent 43.7%, moderate persistent 33.8%, severe persistent 8.5%).

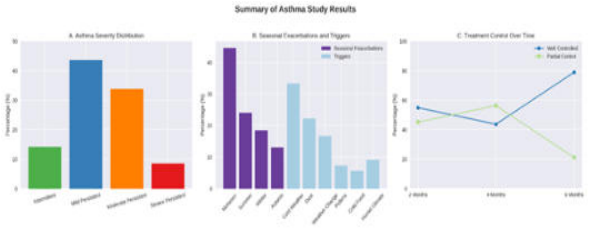

Figure 1. Exacerbations And Treatment Outcomes

Panel B illustrates seasonal exacerbations (monsoon 44.5%, summer 24.1%, winter 18.5%, autumn 13.0%) and common triggers (cold weather, dust, weather change, pollens, cold food, humid climate).

Panel C depicts treatment control over time, with well-controlled asthma in 54.9% at 2 months, 43.7% at 4 months, and 78.9% at 6 months.

Pulmonary Function Tests

Table 4. Pulmonary Function Test Results At Baseline And 6 Months, Stratified By Asthma Severity And Age Group

Asthma Severity	Age Group	FVC% Baseline	FEV1% Baseline	FEV1/FVC Baseline	FVC% 6 Months	FEV1% 6 Months	FEV1/FVC 6 Months	p-value (FEV1/FVC)
Intermittent	6–12 years	92.0	90.0	0.88	96.0	94.0	0.91	0.04
Intermittent	13–18 years	90.0	88.0	0.87	94.0	92.0	0.90	0.05
Mild persistent	6–12 years	85.0	82.0	0.83	90.0	88.0	0.86	0.03
Mild persistent	13–18 years	84.0	80.0	0.82	89.0	86.0	0.85	0.04
Moderate persistent	6–12 years	78.0	74.0	0.78	84.0	81.0	0.82	0.02
Moderate persistent	13–18 years	76.0	72.0	0.76	82.0	79.0	0.80	0.01
Severe persistent	6–12 years	70.0	66.0	0.72	76.0	72.0	0.76	0.01
Severe persistent	13–18 years	68.0	64.0	0.70	74.0	70.0	0.74	0.01

At diagnosis, FVC% and FEV1% declined with increasing severity, with a significant reduction in FEV1/FVC ratio (p=0.0001). At 6 months, improvement was observed across all severity groups, though FEV1/FVC ratio differences were not statistically significant. Children aged 6–12 years showed significant improvement in FEV1/FVC% (p=0.006), while adolescents improved across all parameters.

DISCUSSION

In this prospective study of 71 children (6–18 years), asthma was more common in males (70.4%) with a male-to-female ratio of 2.3:1. Similar male predominance has been reported by Ratageri et al (2:1), Jain A et al (1.5:1), Srinivasa K et al (1.77:1), Satish et al (60.4% males), Bhalla K et al (69.4% males), and Gosai D et al (2.1:1). This consistency highlights the gender difference in childhood asthma prevalence. [11,4,12,13,14,15]

Most participants were in the younger age group (6–12 years), aligning with Jain et al who found higher prevalence in younger children. [4] Yao TC et al also described age-dependent gender differences, peaking at 10–11 years. [16] The mean age in our study (~11 years) was similar to Brand P et al (median 11 years) and Cabral et al (mean 9–10 years). [17,18] Mean BMI was ~16 kg/m², slightly lower than Sharma S et al (17.2 kg/m²) and Von Mutius et al (18.5 kg/m²), likely reflecting dietary and regional variations. [19,20] Most patients were from rural areas (59.1%), consistent with Satish et al and Boneberger et al, though some studies (Chakravarthy et al) reported higher prevalence in urban children. [13,21]

Low socioeconomic status predominated (76%), supporting findings by Padmaja Subbarao et al and H Parmesh et al that SES influences asthma risk. [22,23] Interestingly, Jain A et al reported higher prevalence in high SES groups, suggesting regional differences. [4]

Family history of atopy was positive in 52.1%, similar to Tomac et al (40%) confirming genetic predisposition as a major risk factor. [24] Allergic rhinitis was the most common associated condition (42.9%), consistent with Elmoniem et al. [25]

Cough was the most frequent presenting symptom (42.3%), comparable to Green R et al and Elmoniem et al. [26, 25] Mild persistent asthma was the most common type (43.7%), similar to Leonard B et al and Cabral et al. [27, 18] Eosinophil counts were elevated, consistent with Koshak EA and Leckie et al linking eosinophilia to severity. [28,29]

Pulmonary function tests showed reduced FEV1/FVC ratios with increasing severity, in line with Leonard B et al. [27] Improvement after treatment was noted, especially in younger children. Seasonal variation was evident, with monsoon exacerbations most frequent (44.5%). Other studies reported peaks in winter (Bhalla K et al, Elmoniem et al) or fall (Julia A et al), highlighting geographic differences. [14, 25, 30] Cold air, dust, and pollen were major triggers, consistent with Ratageri et al, Srinivasa K et al, and Satish et al. [11,12,13]

Nocturnal symptoms predominated (55.6%), similar to Weiss and Cabral et al. [31, 18] Exercise-induced exacerbations were seen in 46.6%, aligning with Sharma S et al and Grimfeld & Just. [3, 32] Hospital admissions were more frequent in moderate and severe asthma, consistent with Guilbert TW et al and Van Essen-Zandvliet et al, who emphasized the role of corticosteroids. Montelukast has also shown benefit in milder asthma. [33,34]

At 6 months, 78.9% achieved good control with preventive therapy, with many able to step down treatment. This supports the effectiveness of standard controller medications in pediatric asthma.

Limitations

The study had fewer participants as only those willing for bi-monthly follow-up over 6 months were enrolled. With a one-year duration including follow-up, complete seasonal variation could not be assessed.

CONCLUSIONS

Our study confirms male predominance, younger age presentation, and strong association with family history and atopy. Rural and low SES children are increasingly affected. Cough is the most common symptom, mild persistent asthma the most frequent type, and monsoon season the peak for exacerbations. Pulmonary function improves with treatment, though severity correlates with reduced FEV1/FVC. Preventive therapy ensures good control in most patients, consistent with previous literature.

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