



A CROSS SECTIONAL STUDY OF PREVALENCE AND RISK FACTORS OF BRONCHIAL ASTHMA IN SCHOOL CHILDREN IN A TERTIARY CARE HOSPITAL

Paediatrics

Likitha. N*

Assistant Professor, Dept Of Paediatrics Adichunchanagiri Institute Of Medical Sciences And Research Centre B.G. Nagara, Nagamangala Taluk, Mandya District.
*Corresponding Author

**Dr. Channa
Basavanna. N**

Associate Professor, Dept Of Paediatrics, Adichunchanagiri Institute Of Medical Sciences And Research Centre B.G. Nagara, Nagamangala Taluk, Mandya District.

ABSTRACT

Background- One of the most prevalent childhood chronic diseases and a significant global health issue is asthma. Despite multi-fold increase in prevalence, there is paucity of data on bronchial asthma from non-metro cities. **Objectives-** To find prevalence of bronchial asthma and various risk factors that are associated in school going children. **Methods-** It was a cross-sectional study followed by detailed history and clinical examination of suspected individuals selected on the basis of response to questionnaire. The study was conducted for a period of 5 months August 2019- Jan 2020 in a tertiary care hospital in which three private sector and two government sector schools selected randomly from all parts of the city based on operational feasibility of study. School-going children of 10–16 years age group of five schools (from class VI to XI) were study subjects considering they would be able to answer the questionnaire on their own. Student's selection from one school was kept limited so as to include all variability. Estimated sample size was found to be 450 students including 10% loss to follow up. **Results-** Prevalence of bronchial asthma was found to be 18.8% (85/450). The study found that age group 14–16 (59%; 50/85) which was statistically significant ($p < 0.05$) and male subjects (72%; 61/85) were more affected and it was statistically significant. Prevalence was significantly higher among those with history of smoking among family members, using smoke-producing fuel at home, and experiencing two or more episodes of fever ($P < 0.05$). Around 47% more than 4 episodes of wheezing and 61% had sleep disturbances, 45% had speech disturbances, 58% had nocturnal dry cough, and 72% had cold/rhinitis. **Conclusion-** The study shows higher prevalence of bronchial asthma in school-going population (10–16 years) possibly attributable to rapid industrialization. Preventive interventions need to be taken to reduce disease burden at community level.

KEYWORDS

asthma, prevalence, rhinitis, risk factors, adolescents

INTRODUCTION

One of the most prevalent childhood chronic diseases and a significant global health issue is asthma. an exponential rise in the prevalence of bronchial asthma has been documented throughout the last ten years.[1] The increased industrialisation of cities is mostly to blame for this growth in environmental smoke and air pollution.[2,3] Most kids who develop asthma do so at a young age.[4] Numerous earlier research on asthma in India estimated the prevalence rate to range from 2% to 23%.[4] Such a large disparity is caused by a variety of study methodologies as well as significant regional and environmental differences to India. The contribution of different risk factors to the occurrence of asthma may differ depending on geographic location, regional customs, and environmental factors. In addition, it is common for paediatric asthma to be undiagnosed and untreated, which can affect children's quality of life.[5] By being aware of risk factors such family history, indoor and outdoor smoking exposure, allergy exposure, and others, appropriate and prompt preventative steps may be taken.

The current research paradigm, which makes considerable use of the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire, has been shown to be effective in epidemiological researches on asthma in children.[6] The ISAAC questionnaire covers all study-relevant topics, including not only asthma but also allergic diseases including rhinitis and eczema. The ISAAC questionnaires' environmental section covers practically all of the risk variables for childhood bronchial asthma. This questionnaire allows for not only epidemiological studies but also symptom intensity when a child has most frequently experienced illnesses like rhinitis.

Despite many studies, there has largely been paucity of data. There may be undiagnosed childhood asthma cases in this region as well. The study aims to find the prevalence of bronchial asthma among 10- to 16-year school-going children and to find association with various risk factors and determine the extent of under-diagnosis.

MATERIAL AND METHODS

It was a cross-sectional study followed by detailed history and clinical examination of suspected individuals selected on the basis of response to questionnaire. The study was conducted for a period of 5 months August 2019- Jan 2020 in a tertiary care hospital in which students of total of 5 schools: three private sector and two government sector schools selected randomly from all parts of the city based on

operational feasibility of study. School-going children of 10–16 years age group of five schools (from class VI to XI) were study subjects considering they would be able to answer the questionnaire on their own and were invited as per consent to hospital. Special bus arrangement was done from school to hospital. Student's selection from one school was kept limited so as to include all variability. Estimated sample size was found to be 450 students including 10% loss to follow up. Students were included in the study only after receiving consent form fully filled and signed by parents. Exclusion criteria included age < 10 years and > 16 years and any other comorbid respiratory or systemic illness.

The study was approved by Institutional Ethics Committee. After selecting schools for study concerned, school principals were approached and a written permission was obtained after briefing them about study objectives, procedures, and safety. A written Consent Sheet for Participation in Study to be signed by Parents/Guardians" was sent to the participating students after they had been informed about the study and invited to participate. Forms for informed consent were made available in both the local language and English. When conducting epidemiological research on allergic respiratory diseases and childhood asthma, ISAAC questionnaires [6] are useful instruments. Subjects who provided a positive response to any ISAAC questionnaire question regarding asthma, rhinitis, or skin allergies were classified as suspected asthmatics and chosen for a thorough medical history and physical examination. Patients who had asthma were monitored in the hospital's outpatient department and asked to begin medication; they cooperated. Symptom severity of asthma based on the number of attacks of wheezing/whistling in the past 1-year, nocturnal dry cough, sleep, and speech disturbances were also recorded.

Statistical Analysis

The statistical analysis was performed using SPSS for windows version 22.0 software (Mac, and Linux). The findings were present in number and percentage analyzed by frequency, percent, and Chi-square test. Chi-square test was used to find the association among variables. The critical value of P indicating the probability of significant difference was taken as < 0.05 for comparison.

RESULTS

Table 1- Demographic And Associated Risk Factors With Bronchial Asthma In Children

Factors	Total subjects (450)	Subjects having asthma (85)	p-value
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Age	10-13	235	35	0.11
	14-16	215	50	
Sex	Male	275	61	0.01*
	Females	175	24	
Smoking in family	yes	200	55	0.03*
	No	250	30	
Fuel used	Smoke	175	42	0.01*
	Smokeless	275	43	
Episodes of fever	1/year	150	25	0.01*
	>1/year	300	60	
Diet	Veg	375	72	0.11
	Non-Veg	75	13	
School	Private	215	37	0.01*
	Govt	235	48	
Residence	Urban	270	52	0.22
	Rural	180	33	
Season first 6 months		297	49	0.01*
Last 6 months		153	36	

As per table 1 A total of 450 subjects in age group of 10–16 years were analyzed. Prevalence of bronchial asthma was found to be 18.8% (85/450). The study found that age group 14-16 (59%; 50/85) which was statistically significant ($p < 0.05$) and male subjects (72%; 61/85) were more affected and it was statistically significant. Prevalence was significantly higher among those with history of smoking among family members, using smoke-producing fuel at home, and experiencing two or more episodes of fever ($P < 0.05$). More subjects reported rhinitis episodes in November–January period (winters period; 47.1% (49/85) and March–May (crop harvesting/post harvesting season).

Table 2- Severity Of Symptoms In One Year (n=85)

Symptoms		Number (%)
Episodes of wheezing	1-3	45 (53)
	>4	40 (47)
Sleep disturbances	yes	52 (61)
	No	33 (39)
Speech Disturbances	yes	37 (45)
	No	48 (55)
Dry cough	yes	58 (65)
	No	27 (35)
Cold/ rhinitis	yes	65 (72)
	No	20 (28)
Rashes	yes	31 (36)
	No	54 (64)

As per table 2 in the past 1 year, around 47% more than 4 episodes of wheezing and 61% had sleep disturbances, 45% had speech disturbances, 58% had nocturnal dry cough, and 72% had cold/rhinitis.

DISCUSSION

In our study, the prevalence of bronchial asthma among urban, school-going adolescent's aged 10 to 16 was estimated to be 18.8%. This contrasts with the presence of national pools in adults and numerous recent research on asthma in children in various cities have revealed lower prevalence rates. [3,4,5] The study's post-harvest period and the study's location in an area with a major agricultural industry can all be used to explain the higher occurrence.

According to certain studies, the number of episodes of rhinitis is highest in the months of December and January during the winter and April and May during the spring when the current or nearly-complete crop harvesting season in this agriculturally dominated region. Male gender prevalence was higher than female prevalence. This result is consistent with research done [6,7].

Statistics demonstrate that to be true risk factor that is substantial ($P < 0.05$). This runs counter to some earlier findings [8,9] 6.7% (51% of all asthmatics) had family members who had smoked in the past. [10,11]

Smoke produced within the home as a result of fuel used for cooking and water heating has been identified as a significant risk factor. Higher prevalence was observed in those who used Fuel for smoke production at home. Jindal and colleagues reported making comparable findings [9]. Socioeconomic status as reflected indirectly by school where private sector represents upper socioeconomic and government school

representing lower socioeconomic status. Children belonging to upper socioeconomic status are at more risk of developing asthma as 62.80% of asthmatics belong to private schools. Similar observations were made by Amir et al. in their study [10].

Subjects experiencing two or more episodes of fever were at higher risk of developing bronchial asthma as significance proved by P value < 0.05 . This finding is consistent with a study by Mutius et al [11].

The study observed higher prevalence of asthma in those having nonvegetarian dietary habit compared with vegetarian diet. [12] But no such statistically significant correlation was found in this study. This could be possibly explained by a more number of subjects with vegetarian dietary habits. [13] The highest number of subjects reported rhinitis in the month of January (31/121) when winters are on peak in Northern India. Multiple months were selected by many subjects indicating problem in more than 1 month. Cumulated two peaks were observed one in November–December–January (57 subjects) and the other peak in March–April–May (41 subjects), which is crop harvesting/post harvesting season in this particular region. Similar seasonal variation in incidence of asthma in children was observed in a study that shows seasonal variation as episodes of asthma increased in summer. [14]

CONCLUSION

In comparison to most other recent studies the prevalence of bronchial asthma among 10 to 16-year-old in school-going children in this region is 18.8%, which is higher. In this study, statistical analysis revealed a significant relationship between the incidence of bronchial asthma and risk factors like gender (males are at higher risk than females), the fuel type used at home for cooking and water heating, a family history of smoking, and socioeconomic status. Public awareness about asthma needs to be done so that disease may be diagnosed earlier and some timely preventable measures may be taken.

Conflict of Interest- None declared

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