Original research article

Prevalence of childhood asthma in tertiary care hospitals: A prospective study

[1]DR.K.SANJEEVI, [2]DR. K.PALANIAPPAN*, [3] DR.M.GEETHANJALI, [4] DR.T.RAVIKUMAR

[1]ASSOCIATE PROFESSOR OF PAEDIATRICS, KARUNA MEDICAL COLLEGE, VILAYODI, CHITTUR, PALAKKAD, KERALA
[2]ASSOCIATE PROFESSOR OF PAEDIATRICS, KARPAGAM FACULTY OF MEDICAL SCIENCES&RESEARCH COIMBATORE
[3]PROFESSOR OF PAEDIATRICS, GOVERNMENT COIMBATORE MEDICAL COLLEGE AND HOSPITAL COIMBATORE
[4]PROFESSOR AND HOD DEPARTMENT OF MEDICINE, GOVERNMENT MEDICAL COLLEGE AND ESI HOSPITAL COIMBATORE.
CORRESPONDING AUTHOR*

ABSTRACT

Background: Asthma is a chronic common disease in paediatrics, it is more prevalent in children than in adults.   It is a chronic inflammatory disease of the airway which leads to reversible airflow obstruction. Wheezing, chest tightness, and repeated attacks of breathlessness are symptoms of asthma. It was reported that the prevalence of asthma is increasing globally and especially more in india.
Aim; to study the prevalence of childhood asthma in this part of country and find out the incidence and triggering factors and   early intervention

Materials and Methods: this prospective   study involving 19,627 children attending various tertiary care medical college hospitals in Tamilnadu and Kerala between Jan2019 to June 2019 were taken for study using A standard questionnaire.

Results: Prevalence of bronchial asthma in paediatric age group was 17.% (*n* = 3336) of which 11.%(n= 2159) more than 3 episodes in the past 1 year. Prevalence was higher among adolescents males compared to females . About 54%(n=10,566) of total asthmatics were newly diagnosed cases. Prevalence was significantly higher among those putting cow dung in the floor and front of the house as rituals(72%n=14,131)   , pets at home and birds (54%n=10,598), belonging to higher socioeconomic status(23%n=4,514) , using smoke-producing fuel at home (firewood/ dry cow dung/kerosene;(43%n=8,439) , and with history of smoking among family members (33%n=6,476). Among current asthmatics, 76%(n=14,916) reported cold/rhinitis (54.6% in winter), 66% (n=12,953)nocturnal and early morning dry cough, and wheeze (42%n=8243) sleep disturbances, and (34%n=6673) speech disturbances during episodes.

 Conclusion: The study shows higher prevalence of bronchial asthma(17%) compared to other parts of India possibly attributable to rapid industrialization, cotton, waste cotton mills, cultural habits, smoke, air pollution   and climate of Coimbatore and Kerala .Awareness and Preventive interventions need to be taken to reduce disease burden at community level.
Keywords: Asthma, seasonal variation, under developing areas, childhood asthma

INTRODUCTION :

Asthma is one of the most common chronic diseases of childhood and a major health problem not only in India but globally. A multi fold increase in incidence of bronchial asthma has been reported in the past decade. This increase is attributed mainly by increasing environmental smoke and air pollution due to rapid industrialization of cities urbanisation of villages and climatic changes in this part of country.

Most children develop asthma in early age. Many studies on asthma in India reported an estimated prevalence rate of 2% up to as high as 21% . Contribution of various risk factors associated with incidence of asthma may vary with geographical locations, local traditions customs, and environmental factors. In addition to, this childhood asthma is often under diagnosed

268

and under treated that may lead to disturbances in quality of life of children. They cannot play, swim or take active part in outdoor games .understanding of associated risk factors such as family history, exposure to smoke (indoor/outdoor),pollen, allergen, and others may help taking suitable and timely preventive measures.

In sharp contrast to the earlier belief of bronchial asthma to be considered a disease of metro cities, a study reported higher prevalence in rural areas compared with urban areas. Prevalence pattern is now changing and more and more cases of childhood asthma are now being diagnosed in developing areas where earlier prevalence was lower. more children were presenting with respiratory difficulties in winter months and crop harvesting months in summers, but this trend was not analyze d in many studies. The current model of study using International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire has been used extensively worldwide with proven efficacy in epidemiological studies on childhood asthma. ISAAC questionnaire includes all aspects to be studied not only asthma but also allergic conditions such as rhinitis and eczema.

MATERIAL AND METHODS :

Environmental questionnaire – a part of ISAAC questionnaires – covers almost all the risk factors associated with bronchial asthma in children. Not only the epidemiological studies are possible using this questionnaire but also symptom severity when child has most suffered from conditions such as rhinitis.

This is a questionnaire-based study followed by detailed history and clinical examination of suspected individuals selected on the basis of response to questionnaire. The study was conducted in the months of JAN 2019–JUNE 2019 operational feasibility of study and in an attempt of covering almost all socioeconomic strata of the community uniformly.

Subjects giving positive response to any question of ISAAC questionnaire asthma/rhinitis/skin allergies were labeled as suspected asthmatics and were selected for *detailed history taking and clinical examination*. Detailed history of total 3336 subjects was taken and examined clinically on this basis for active wheeze/whistling and confirm the diagnosis. Clinical examination not only confirmed previously diagnosed cases but also strengthened diagnosis. Asthma cases were followed up in outpatient department of hospital and asked to start treatment which patients complied with. Their parents were also informed about the condition and stressed importance of early treatment. 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.

RESULTS:

Prevalence of bronchial asthma in paediatric age group was 17.% (*n* = 3336) of which 11.%(n= 2159) had episodes in the past 1 year. Prevalence was higher among adolescents males compared to females . About 57% of total asthmatics were newly diagnosed cases. Prevalence was significantly higher among those putting cow dung in front of the house as rituals , pets animals cat, dog, birds at home, belonging to higher socioeconomic status have perfume,induced , using smoke-producing fuel at home (firewood/cow dung/kerosene) smoke of mosquito repellent coils dhoop, incence sticks agarbathies sticks, camphor, benzoic resin (samprani),thasankam etc, , and with history of smoking among family members .dust and dust mites, fumes from chemicals, room sprays acids for cleaning toilets, fog, smoke from vehicles,power plants, industries which burn fuels , coal, lignite, etc. Among current asthmatics, 72.3% reported cold/rhinitis (54.6% in winter), 66% nocturnal and early morning dry cough, and wheeze 42% sleep disturbances, and 34% speech disturbances in the past 1 year.

The number of bronchial asthma patients in many countries has increased, the WHO estimated the number as 235 million people suffering asthma

Asthma is being increasingly diagnosed nowadays indicating increasing prevalence, but reasons for the same are still poorly understood. A study by Taylor *et al.* depicts burden of childhood asthma on US society in terms of 2.7 million children affected annually comprising 7.3 million days of restriction to bed, 10.1 million days of absence from school, 12.9 million

contacts with doctors, and 2 lakh hospitalization resulting in 1.9 million days of hospital admissions

Higher prevalence can be explained by difference in geographical, climate differences, agriculture dominant region, and post harvesting season when the study was carried out. As shown by some domestic and international studies, there is seasonal variation in symptom severity of asthma; it is relevantly observed in our study as well (highest number of episodes of rhinitis observed in months of December–January in winter season and April–May when crop harvesting season is going on/partially completed in this agricultural dominant region).

Prevalence was higher in male gender compared with female with M:F of 2.27:1. Pet presence at home proved to be a significant risk factor for bronchial asthma in our study As asthmatics reported pet presence in the past 1 year. Statistical analysis proves it a significant risk factor ($P < 0.05$). This is in contrast to some previous studies. History of smoking among family members was present in 6.7% Indoor air pollution in terms of smoke produced due to fuel used at home for cooking/water heating emerged as an important risk factor. also using of mosquito repellent coils, sprays, and smokes from doop sticks . Prevalence was higher among those using smoke-producing fuel at home. . Being younger in birth order was found to be a significant risk factor in this study. About half of asthmatics were younger in birth order . However, in our study no significant correlation of bronchial asthma could be established with younger age as was observed by Arora *et al*. in their study. This could be explained on the basis of a study by Martin *et al.* suggesting a prevalence of asthma decreased by up to three-fourth with age.

The study by Amir *et al.* observed higher prevalence of asthma in those having non vegetarian dietary habit compared with vegetarian diet. 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. Also, vehicle movement near home and vigorous physical activity in terms of vigorous physical activity twice or more times per week and rural versus urban residence were not found to be statistically significant risk factors. Of 3336 asthma cases, only (22%) were previously labeled cases, and the remaining were diagnosed for the first time, showing high degree of under diagnosis in the region – for every diagnosed child with asthma, there are three undiagnosed as well. Several studies have shown some degree of under diagnosis of bronchial asthma among children in India and abroad with range varying from 36.9% in the study by Sharma BS *et al.*, 55.4% in the study by Sharma *et al*., and 82.2% in a study by Kaur *et al*. and Brozek *et al*.

Hence, this finding is consistent with previous studies as well. Certain risk factors as observed by Kaur *et al.* in their study such as female sex, lower socioeconomic status, and younger age may be responsible for underdiagnosis. The consequences include loss of work, absence from school, hospitalizations, and low quality of life . Asthma is a non-curable chronic disorder, however, it has lower mortality rate than other similar chronic disorders . History and interpretation of asthma symptoms are considered as important criteria in asthma diagnosis, it also depends on the reversibility and variability of pulmonary function tests, wheeze within 12 months is considered a marker for the diagnosis of asthma . One of the pitfalls in the asthma management is under- diagnosis of asthma in children.

CONCLUSIONS :

incidence of bronchial asthma could be significantly associated with risk factors such as gender (male at higher risk than females), type of fuel used at home for cooking and water heating, presence of pet (cat/dog) in the home, history of smoking among family members, and socioeconomic status (more in upper socioeconomic status). Bronchial asthma in this age group is largely underdiagnosed in the region ; only 23% were previously diagnosed by physician. Public awareness about asthma needs to be done so that disease may be diagnosed earlier and some timely preventable measures may be taken.

Table 1. Answers of participants about six questions.

Questions N (%)

Did your children were disturbed during sleep as a result of breathing problems?

Yes n=17,075 (87%)

No n=2552 (13%)

Do the breathing problems of your children affect their daily and school activities?

Yes n= 9225 (47%)

No n=10,402 (53%)

Do your children speak only one or two words between breathing?

Yes   n=6281(32%)

No n=13345 (68%)

Do you need quick relief drugs to solve the breathing problems of your children?

Yes n=10,794 (55%)

No n=8852 (45%)

Do your children need cortisone administration via mouth to treat breathing problems which other drugs can't do?

Yes n=5103(26%)

No n=14,523(74%)

Did your child diagnosed of having bronchial asthma?

Yes n=7,066 (36%)

No n=12,561 (64%)

Table 2. Answers of participants whose children had bronchial asthma.

Question N (%)

Does the chest of your children make a sound during or after exercise?

No n=901(27%)

Yes n=2435 (73%)

During last 4 weeks, what was the number of days your children experienced

asthma symptoms during daytime?

None n=1101 (33%)

1–3 days n= 1401 (42%)

4–10 days n=834 (25%)

During last 4 weeks, how many days your children awaked from sleeping due to

asthma?

None n=1268 (38%)

1–3 days n=1667(50%)

4–10 days n=401 (12%)

271

REFERENCES :

1. Pal R, Dahal S, Pal S. Prevalence of bronchial asthma in Indian children. Indian J Community Med 2009;34:3106.

2. Lai CK---m, Beasley R, Crane J, Foliaki S, Shah J, Weiland S, International Study of Asthma and Allergies in Childhood Phase Three Study Group. Global variation in the prevalence and severity of asthma symptoms: Phase Three of the International Study of Asthma and Allergies in Childhood (ISAAC). Thorax 2009;64:476-83.

3. Paramesh H. Asthma in children: Seasonal variations. Int J Environ Health 2008;2:3-4.

4. Arora K, Das RR, Pooni PA, Rustagi R, Singh D. A study of the prevalence and risk factors of asthma in urban schools of Ludhiana, Punjab. Indian J Health Sci 2015;8:104-8.

5. Sharma BS, Gupta MK, Chandel R. Indian Pediatr 2012;49:835.

6. Kumar GS, Roy G, Subitha L, Sahu SK. Prevalence of bronchial asthma and its associated factors among school children in urban Puducherry, India. J Nat Sci Biol Med 2014;5:59-62.