|| Print ISSN: 2589-7837 || Online ISSN: 2581-3935 ||
International Journal of Medical Science and Diagnosis Research (IJMSDR)
Available Online at www.ijmsdr.com
PubMed (National Library of Medicine ID: 101738824)
Volume 3, Issue 12; December: 2019; Page No. 20-24
Original Research Article
crossref DOI: https://dx.doi.org/10.32553/IJMSDR/v3i12.5

PREVALENCE OF BRONCHIAL ASTHMA AMONG SCHOOL-GOING CHILDREN IN UJJAIN CITY

Nipun Agrawal[1], Lokendra Dave[2], Arti Julka[3], Parag Sharma[4]
[1]Senior Resident, Department of Pulmonary Medicine, Gandhi Medical College, Bhopal
[2]Professor, Department of Pulmonary Medicine, Gandhi Medical College, Bhopal
[3]Professor, Department of Pulmonary Medicine, RD Gardi Medical College, Ujjain
[4]Assistant Professor, Department of Pulmonary Medicine, Gandhi Medical College, Bhopal
Conflicts of Interest: Nil
Corresponding author: Nipun Agarwal

Abstract:
Background: Asthma is chronic diseases widely prevalent among children. The paucity of data on bronchial asthma among Indian children especially from smaller cities make it difficult for policy makers to draft a programme for its control. The objectives of this study were to estimate the prevalence of bronchial asthma and identify its determinants among school going children.
Material and Method: A cross-sectional study was conducted involving 925 children studying in grade VI-X in six schools of Ujjain city using International Study of Asthma and Allergies in Childhood questionnaire.
Results: The prevalence of bronchial asthma among study subjects was 8.0 % (74) of which 2.4 % were newly diagnosed as asthma. Prevalence was higher among boys in comparison to girls. The prevalence was significantly higher among those having pets at home, belonging to higher socioeconomic status, using smoke-producing fuel at home, and with history of smoking among family members.
Conclusion: The study shows higher prevalence of bronchial asthma in school-going population. Preventive interventions need to be taken to reduce disease burden at community level.
Keywords: Asthma, Children, India

Introduction

Asthma is one of the most common chronic diseases of respiratory system among children.[1] During the past few decades the prevalence of asthma has increased several folds among children due to increase in air pollution secondary to rapid industrialization and ever-increasing number of automobiles.[2] Some studies on asthma in India reported an estimated prevalence rate of around 2% and up to as high as 23%.[3,4] In recent times, burning of crops at large scale has further increased the pollution in medium and small cities. Most studies assessing the prevalence of asthma were conducted among children residing in large metro cities, thus there is paucity of data from lower tier cities of India.[3,4] In sharp contrast to the earlier belief, which considered asthma as a disease limited to metro cities, few studies have reported a higher prevalence in rural areas compared with urban areas.[5] In addition, childhood asthma is often underdiagnosed and undertreated that may lead to disturbances in (quality) life of children due to frequent exacerbations.[6]

Risk factors associated with asthma vary with geographical locations, local traditions customs, and environmental factors.[7,8] Understanding of risk factors such as family history, exposure to smoke (indoor/outdoor), allergen, and others may help design programme undertaking preventive measures.[9] Thus, this study was conducted with the aim of estimating the prevalence of bronchial asthma among school going children studying in grades 6th to 10th and identifying its various determinants.

Materials and Method:

This was a cross-sectional, questionnaire-based study which was further supplemented by detailed history and clinical examination of suspected children shortlisted based on total score of the questionnaire. The study was conducted in the months of October 2017 to March 2018 in a total of six schools: three each of private and government schools selected randomly from the list of all secondary schools of the Ujjain city. Study subjects were school-going children studying in the grade VI-X in the selected schools. All students of a randomly selected class from the shortlisted school (studying in class VI to X) present at

the time of visit for data collection were asked to take part in the study. Minimum sample size was calculated based on assumption of a prevalence rate of 10% and maximum allowable error of 20% was calculated to be 900.[10] Prior approval from Institute Ethical Committee on human subjects was obtained before commencing the work. The head(s) of the school were approached and a written permission was obtained after briefing them about study objectives, procedures, and safety of students. Students participating in the study were provided a written "Parent Information Sheet" describing the disease and study procedure for parents along with parent information sheet and informed consent form were made available in local language. Students were included in the study only after receiving consent form fully filled and signed by parents.

Exclusion criteria included any other comorbid respiratory or systemic illness. Participants were briefed about exclusion criteria which were further scrutinized while taking detailed history taking of selected subjects. ISSAC questionnaires are validated tools for epidemiological studies on childhood asthma and allergic respiratory conditions.[11] The questionnaires were translated both in English and Hindi languages.

After completing questionnaire, a video prepared by Wellington School of Medicine and Health Sciences, University of Otago, showing five different symptoms of asthma such as wheezing/whistling sound from chest in resting conditions, after exercise/running/physical activity, nocturnal dry cough disturbing sleep, and respiratory difficulty disturbing sleep was shown to all study subjects.[12] Based on the video, study subjects were asked to fill a Video Questionnaire prepared by ISAAC.[12] Subjects having a threshold score to questions of ISAAC questionnaire asthma/rhinitis/skin allergies were labelled as suspected asthmatics and were selected for detailed history taking and clinical examination. Detailed history of such subjects was taken, and clinical examination was performed on the basis of active wheeze/whistling to confirm the diagnosis. Asthma cases were followed up in outpatient department of hospital and their parents were also informed about the condition. Symptom severity of asthma based on the number of attacks of wheezing/whistling in the past 6 months, nocturnal dry cough, sleep, and speech disturbances was also recorded.

Statistical analysis:

Data were recorded in Microsoft Office Excel 2013. Statistical analysis was performed using Statistical Package for Social Sciences version 20.1 Statistical significance was checked by *P* value (two-tailed) considering value <0.05 as significant.

Results:

A total of 978 students studying in the class VI-X were initially interviewed, 53 children were excluded using the selection criteria. Prevalence of bronchial asthma was found to be 8.0% (74/925); 52 (5.6%) were previously diagnosed with asthma and rest 22 (2.4%) were newly diagnosed during our study. We observed that student studying in lower grade (64.8%) and boys (58.1%) were more affected. Prevalence of asthma was significantly higher among children with history of exposure to second-hand smoke, having pet at home, using smoke-producing fuel at home, and experiencing two or more episodes of fever ($P < 0.03$) [Table 1].

In the past 6 months, 55.4% of current asthmatics had sleep disturbances, 25.7% had speech disturbances, 56.0% had nocturnal dry cough, and 66.2% had cold/rhinitis. [Table 2].

Table 1: Socio-demographic characteristics of study participants (n=925)

Study Variables	Subjects screened	Diagnosed as Asthma	P value
Grade			
6-8th	500	48	0.061
9-10th	425	26	
Gender			
Boys	485	43	0.058
Girls	440	31	
Cooking fuel			
Smoke producing	234	28	0.021
Smoke free	691	46	

Exposure to second-hand smoke			
Yes	293	48	
No	632	26	0.001
Birth order			
1st	354	26	0.091
2nd	376	28	
3rd or higher	195	20	
Total siblings			
0-2	689	54	0.12
3-4	222	16	
5 or more	14	4	
Pets at home			
Yes	386	43	0.02
No	539	31	
Type of school			
Private	489	49	0.012
Government	436	25	

Table 2: Symptoms and its severity among study subjects during past 6 months (n=74)

Symptoms	n	%
Previously diagnosed		
Yes	52	70.3
No	22	29.7
Sleep disturbances		
Yes	41	55.4
No	33	44.6
Speech disturbances		
Yes	19	25.7
No	55	74.3
Number of attacks of wheezing (at rest) in last month		
0	21	28.4
1-2	39	52.7
3 or more	14	18.9
Wheezing on exercise		
Yes	39	52.7
No	35	47.3
Nocturnal dry cough		
Yes	42	56.8
No	32	43.2
Cold/rhinitis		
Yes	49	66.2
No	25	33.8
Itching/rashes		
Yes	31	41.9
No	43	58.1

Discussion:

Asthma is becoming increasingly common with each passing year indicating increasing prevalence among children, however, reasons for the same are still are not clearly understood.

In our study, the prevalence of asthma among school going children of grades VI-X was 8.0%. The prevalence of asthma in our study was higher than the national average prevalence and other recent studies on asthma among children.[14-16] Higher prevalence as observed in our study can in part be explained by difference in geographical, climate differences, agriculture dominant region, and post harvesting season when the study was carried out. Some domestic and international studies have noted that there is seasonal variation in the severity of asthma symptoms. We also noted that, the prevalence of asthma was higher among boys in comparison to girls. Similar results were also observed by Pal *et al in their study*.[1] Presence of pets at home was also a significant risk factor for bronchial asthma in our study. Further, exposure to second-hand smoke seen in more than half of the all asthmatics included in the study. Similar results were also reported by a study conducted by Taylor & Newacheck and Jindal.[17,18] Children belonging to upper socioeconomic status (studying in private schools) had higher prevalence in comparison to those studying in government owned schools. Similar observations were made by Amir *et al.* in their study.[18]

Subjects experiencing two or more episodes of fever were at higher risk of developing bronchial asthma. This finding is consistent with a study by Mutius *et al*.[19] 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.[20] 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. Of the total 74 children identified in our study, only 22 (22.30%) were newly diagnosed as having asthma, and the remaining 52 (77.70%) were diagnosed previously indicating high degree of awareness among parents. Several studies have shown some degree of underdiagnosis of bronchial asthma among children in India and abroad.

Few limitations of this study include shorter duration of study, unable to establish confirmatory relationship with seasonal variation, not using laboratory test such as pulmonary function test, or spirometry that could have further strengthened the diagnosis. Keeping all risk factors in mind, suitable timely measures must be taken by government authorities for prevention, early diagnosis, and prompt treatment.

Conclusion

Prevalence of bronchial asthma among school going children studying in class VI-X was 8.0% in our study which was higher than noted by most other recent studies from other Indian cities. In this study, after statistical analysis 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, presence of pet 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. Public awareness about asthma needs to be done so that disease may be diagnosed earlier, and some timely preventable measures may be taken.

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, 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.
7. Jindal SK. Indian study on epidemiology of asthma, respiratory symptoms and chronic bronchitis in (INSEARCH), Chandigarh, India 2010. Available from: http://icmr.nic.in/final/INSEARCH. [Last accessed on 2018 Apr 20].

8. Sharma BS, Gupta MK, Chandel R. Prevalence of asthma in urban school children in Jaipur, Rajasthan. Ind Pediatrics 2012;49:835-6.
9. Verma R, Khanna P, Chawla S, Singh R. To study incidence of asthma among children in a rural block of Haryana (India). Sci Rep 2013;2:604.
10. Von Mutius E. The burden of childhood asthma. Arch Dis Child 2000;82.
11. Kaur J, Chugh K, Sachdeva A, Satyanarayana L. Under diagnosis of asthma in school children and its related factors. J Indian Pediatrics 2007; 44:425-8.
12. Sharma CM, Bhatia SS, Sharma D, Agrawal RP, Meghwani MK, Kumar B. Prevalence of asthma in school children of rural areas of Kanpur, Uttar Pradesh. J Evol Med Dent Sci 2013;2:5298-301.
13. Asher MI, Keil U, Anderson HR, Beasley R, Crane J, Martinez F, *et al*. International Study of Asthma and Allergies in Childhood (ISAAC): Rationale and methods. Eur Respir J 1995;8:483-91.
14. Brozek GM, Farnik M, Lawson J, Zejda JE. Underdiagnosis of childhood asthma: A comparison of survey estimates to clinical evaluation. Int J Occup Med Environ Health 2013;26:900-9.
15. Taylor WR, Newacheck PW. Impact of childhood asthma on health. Pediatrics 1992;90:657-62.
16. Jindal SK. Effect of smoking on asthma. J Assoc Phys India 2014;62:32-7.
17. Amir M, Kumar S, Gupta RK, Singh GV, Kumar R, Anand S, *et al*. An observational study of bronchial asthma in 612 years school going children of Agra District. Indian J Allergy Asthma Immunol 2015;29:62-6.
18. Von Mutius E, Illi S, Hirsch T, Leupold W, Keil U, Weiland SK. Frequency of infections and risk of asthma, atopy and airway hyperresponsiveness in children. Eur Respir J 1999;14:4-11.
19. Martin AJ, McLennan LA, Landau LI, Phelan PD. The natural history of childhood asthma to adult life. BMJ 1980;280:1397-400.
20. Dales RE, Schweitzer I, Toogood JH, Drouin M, Yang W, Dolovich J, *et al*. Respiratory infections and the autumn increase in asthma morbidity. Eur Respir J 1996;9:72-7.