

Original Research Article

A study of bronchial asthma in school going children in Southern part of Rajasthan

Shubham Jain*, Atul Luhadia, Shanti K. Luhadia, Gaurav Chhabra, Rishi Kumar Sharma, Amit S. Gupta, Monica Bansal, Sujit Gupta, Mohammed Hamza Hanfe, Vishal Yadav, Viren Patel, Adit Zota, Trishi Nagda, Divax Oza, Ronak Kankrecha, Vidit Saxena, Deepak Shukla

Department of Respiratory Medicine, Geetanjali Medical college and Hospital, Udaipur City, Rajasthan, India

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*Correspondence:

Dr. Shubham Jain,

E-mail: gurushubham@gmail.com

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ABSTRACT

Background: Asthma is a chronic and common inflammatory disease involving mainly large airways of lungs. Childhood asthma is common chronic illness among school going children and is usually underdiagnosed and undertreated. The aim of the present study was to find out of the prevalence of Bronchial asthma in school going children of age group 6-12 years in southern part of Rajasthan (India), and its relation with gender, socio-economic status and heredity.

Methods: A questionnaire-based study has been carried out in 1500 children of 6 to 12 years age group in four schools of Udaipur city (Rajasthan, India) with a response rate of 60.23% (904/1500).

Results: The overall prevalence of asthma observed is 4.75% (43/904). The prevalence is higher among boys (5.55%) as compared to girls (3.75%). Further the prevalence is higher in upper (7.18%) and upper middle class (7.14%) children as compared to lower middle (4.84%) and upper lower class (2.01%) socioeconomic status. The children with positive family history of asthma also have higher prevalence (26.31%) of asthma.

Conclusions: The prevalence of childhood asthma in Udaipur city is relatively lower and supports the already reported relation with gender, socioeconomic status and heredity.

Keywords: Childhood asthma, Prevalence, Questionnaire, Socioeconomic status

INTRODUCTION

Bronchial asthma is a common chronic inflammatory disease involving mainly large airways. Prevalence of asthma varies from region to region and it was estimated that more than 339 million people had asthma globally in 2016, various studies from India reported prevalence of asthma varying from 4 to 32%.^{1,2} Rise in prevalence of childhood asthma is a matter of concern in India and globally as in about 50% cases, the disease starts in childhood. It is also the most common cause of absenteeism from school.³

The diagnosis of asthma is based on identifying a characteristic pattern of respiratory symptoms such as wheezing, dyspnoea, chest tightness or cough and variable expiratory airflow limitation through spirometry. The availability and reliability of spirometry in field conditions is less useful in children than adults. Further many children even with uncontrolled asthma have normal lung functions between flare ups (exacerbations).⁴ Therefore, few larger studies like international study of asthma and allergies in childhood (ISAAC) and European community respiratory health survey (ECRHS) have used questionnaires for assessing prevalence of asthma.^{5,6}

The prevalence of asthma is rising globally as well as in India and varies from place to place, so local studies should be done to assess the prevalence particularly in school going children, thus we planned to conduct a questionnaire-based study to find out the prevalence of asthma in school going children from 6-12 years of age with different socioeconomic background at Udaipur city in Southern part of Rajasthan (India).

METHODS

This cross-sectional study was conducted in four schools of various categories in Udaipur city between 1st Jan 2019 to 31st Dec 2019. After clearance from institutional ethical committee and permission from school authorities, the questionnaires were distributed to all children in the school in age group 6 to 12 years whose parents had given consent to participate in the study.

Exclusion criteria

Children with other chronic respiratory diseases than asthma and those who refused to give consent to participate were excluded from the study.

The modified ISAAC questionnaire was filled by parents and returned to class teacher. In age group of 6-9 years, a global cut-off score of more than 5 and for age group 10-12 years, the cut-off score was 6 or more used as criteria

for diagnosis of asthma as suggested by Naik et al.⁷

The data obtained was recorded and entered into Microsoft excel sheet. The categorical data was expressed and comparison done by using ANNOVA test.

RESULTS

The 1500 students were given the questionnaire proforma consisting of 13 items and out of them 904 questionnaires were returned, thus the response rate is 60.2% (Table 1). There are 504 boys and 400 girls of various age groups ranging from 6 to 12 years with almost similar gender distribution (Table 2). The overall prevalence of asthma observed is 4.75% (43/904) with higher prevalence in boys (5.55%) as compared to girls (3.75%), further the prevalence starts declining at age of 11 years or above.

Table 1: Response rate among different schools.

Schools	No. of questionnaires given	No. of questionnaires received	Response rate (%)
DPS	508	259	51
MMPS	402	195	48.5
Vidhya Niketan	100	94	94
CPS	490	356	72.65
Total	1500	904	60.23

Table 2: Age wise distribution and prevalence of asthma in different genders.

Age (Years)	Boys			Girls			Total		
	N	Asthma		N	Asthma		N	Asthma	
		N	%		N	%		N	%
6	41	2	4.88	36	2	5.55	77	4	5.20
7	57	3	5.2	45	3	6.67	102	6	5.89
8	116	8	6.9	82	3	3.66	198	11	5.55
9	103	6	5.82	81	2	2.47	184	8	4.34
10	101	7	6.9	84	4	4.76	185	11	5.95
11	52	1	1.92	44	1	2.27	96	2	2.08
12	34	1	2.94	28	-	-	62	1	1.61
Total	504	28	5.55	400	15	3.75	904	43	4.75

Family history of asthma was positive in 12.62% (114/904) children and prevalence of asthma was much higher in children with positive history of asthma (26.31%) and prevalence is much higher, if both parents had asthma (45%) while it is much lower in whom there is no family history of asthma (0.51%) (Table 3).

The socioeconomic analysis has shown that family history as well as prevalence of asthma is higher in children belonging to upper and upper middle class as compared to those belong to lower middle and upper lower class and similarly prevalence of asthma is also higher in upper and upper middle-class group (Table 4).

Out of various symptoms analysed more than 3 attacks of wheezing during last 12 months, appearance of wheezing

or cough during or after exercise, sleep disturbance due to nocturnal wheeze, and speech limitation between breaths are usually indicative of asthma (sensitivity 87.8-100%) while occasional wheezing and nocturnal cough are fewer specific symptoms (Table 5).

Table 3: Relation of heredity with bronchial asthma.

History of asthma	Present, (n=904)		Bronchial asthma, (n=43)	
	N	%	N	%
Family history positive	114	12.62	30	26.31
Both parents' asthmatic	20	2.22	9	45
No history	790	85.17	4	0.51

Table 4: Prevalence of asthma with family history among different socioeconomic status.

Socio-economic status	Total no. of children, (n=904)	Presence of family history of asthma, (n=114) (%)	Prevalence of bronchial asthma, n (%)
Upper class	167	35 (20.95)	12 (7.18)
Upper middle class	210	52 (24.76)	15 (7.14)
Lower middle class	248	21 (8.5)	12 (4.84)
Upper lower class	199	6 (3.01)	4 (2.01)
Lower class	56	0	0

Table 5: Relation of clinical symptoms with prevalence of asthma.

Symptoms	Positive, (n=904)	Bronchial asthma, (n=43) (%)	
	N	N	%
Child ever had wheezing in past	103	43	41.74
No. of wheezing attacks			
Less than 3	67	34	50.74
More than 3	9	9	100
Disturbance of sleep due to wheezing in past 12 months (night per week)			
<1	43	34	79.06
>1	9	9	100
Speech limitation severe enough to only 1 or 2 words at a time between breaths	33	29	87.8
Ever had asthma	3	3	100
Child's chest sounded wheezy during or after exercise in past 12 months	43	41	95.34
Nocturnal cough in past 12 months	141	41	29.07

DISCUSSION

Out of 1500 children only 904 returned the questionnaires with a response rate of 60.23%. The overall prevalence of asthma observed is 4.75%. The other studies based on ISAAC questionnaire has reported prevalence ranging from 2.3% to 18.2%.^{8,9} The medium range prevalence in our study may be because of moderate pollution in Udaipur city as areas with high pollution have reported

higher prevalence.^{10,11} The prevalence is higher among boys (5.55%) than girls (3.75%) and it is lower at the age of 11 and 12 years. Naik et al and Bhalla et al have also reported similar findings.^{7,12} The prevalence of asthma is higher in upper and upper middle-class children as compared to lower middle and upper lower class, which may be explained with the help of hygiene hypothesis.¹³

This study has also supported the well-known fact that heredity plays an important role in etiopathogenesis of asthma as prevalence of asthma is much higher in children who had positive family history of asthma. Out of various symptoms- more than 3 attacks of wheezing in last 12 months, wheezing or cough during or after exercise, nocturnal wheezing is more common in children with asthma. Only 3 children out of 43 asthmatics were diagnosed before study. So, 40 new cases were diagnosed with a simple questionnaire-based survey, indicates the importance of such surveys.

CONCLUSION

The present study was carried out in the school going children of 4 different schools located in the different areas of Udaipur city with different socioeconomic background. The overall prevalence of bronchial asthma in school going children of Udaipur city (Southern part of Rajasthan) is 4.75%. The prevalence of asthma starts declining at the age of 11 years and above. The prevalence of asthma is higher among boys, upper and upper middle socioeconomic class, and with positive family or parenteral history of bronchial asthma.

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REFERENCES

1. GBD 2016 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study. 2016 Lancet. 2017;390:1211-59.
2. Pal R, Dahal S, Pal S. Prevalence of bronchial asthma in Indian children. Indian j community med. 2009;34(4):310.
3. Wang LY, Zhong Y, Wheeler L. Peer reviewed: Direct and indirect costs of asthma in school-age children. Preventing chronic dis. 2005;2(1).
4. National institutes of health. Global initiative for Asthma. Global strategy for asthma management and

- prevention updated 2020. web: <http://www.ginasthma.org>. Accessed on 10 Jan 2020.
5. Asher MI, Weiland SK. The International Study of Asthma and Allergies in Childhood (ISAAC). ISAAC Steering Committee. *J Bri Society Allergy Clin Immunol.* 1998;28:52-66.
 6. Variations in the prevalence of respiratory symptoms, self-reported asthma attacks, and use of asthma medication in the European Community Respiratory Health Survey. *Eur Respir J.* 1996;9(4):687-95.
 7. Naik PB, Ravikumar P. Study of prevalence of bronchial asthma in school children of 6-12 years of age in rural schools of Tumakuru district. *Indian J Allergy Asthma Immunol.* 2017;31:56-60.
 8. Jain A, Vinod Bhat H, Acharya D. Prevalence of bronchial asthma in rural Indian children: a cross sectional study from South India. *Indian J Pediatr.* 2010;77(1):31-5.
 9. Gupta MK, Patodia J, Chaudhary P, Kakkar M. The rising trend of asthma prevalence in urban school children of Jaipur: A questionnaire-based study. *Indian J Allergy Asthma Immunol.* 2018;32:10-4.
 10. Zhao Y, Wang S, Lang L, Huang C, Ma W, Lin H. Ambient fine and coarse particulate matter pollution and respiratory morbidity in Dongguan, China. *Environ Pollut.* 2017;222:126-31.
 11. Peng RD, Chang HH, Bell ML, McDermott A, Zeger SL, Samet JM et al. Coarse particulate matter air pollution and hospital admissions for cardiovascular and respiratory diseases among Medicare patients. *JAMA.* 2008;299:2172-9.
 12. Bhalla K, Nehra D, Nanda S, Verma R, Gupta A, Mehra S. Prevalence of bronchial asthma and its associated risk factors in school-going adolescents in Tier-III North Indian City. *J Family Med Prim Care* 2018;7:1452-7.
 13. Haahtela T, Holgate S, Pawankar R, Akdis CA, Benjaponpitak S, Caraballo L et al. The biodiversity hypothesis and allergic disease: world allergy organization position statement. *World Allergy Organization J.* 2013;6(1):1-8.

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