

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Prevalence Of Childhood Bronchial Asthma In School Going Children.

Praisya EV Sneha S, Venkateswaramurthy*, and Sambath K.

Department of Pharmacy Practice, J.K.K Nattraja college of Pharmacy, Komarapalayam-638183, Tamil Nadu, India.

ABSTRACT

Asthma is considered as one of the most common, risky and existence threatening continual disease. It generally affects all age groups, especially those younger than 18 years old. Around 300 million individuals were estimated to be affected in the world wide. Childhood asthma is the common chronic illness among school going children. It is a syndrome characterized by airflow obstruction that differs strikingly. Asthma can impair the child's social interaction and academic achievement by affecting the high quality of lifestyles of children such as school absenteeism, poor school performance, overall performance, frequent nocturnal awakenings may additionally motive depression. It mainly occurs because of small airways, impaired function of lungs at birth itself, maternal smoking, sex, ethnicity, and race. The aim of this review is to find out the prevalence of childhood bronchial asthma in school going children. Moreover, India is an illiterate country so the above exposures can be prevented by giving proper awareness program for both children and parents, proper education and screening of asthma in school.

Keywords: Asthma, Prevalence, Wheezing, School absenteeism, Awareness

**Corresponding author*

INTRODUCTION

The prevalence of allergic diseases has an upward trend in children, in the world. Asthma is considered as one of the most common, risky and existence threatening continual disease. It generally affects all age groups, especially those younger than 18 years old.[1] It may affect the high quality of lifestyles of children such as school absenteeism, poor school performance, overall performance, frequent nocturnal awakenings[2] may additionally motivate depression, competitive behaviour, attention trouble and poor performance in physical exercise.[3] It mainly occurs because of small airways, impaired function of lungs at birth itself, maternal smoking, sex, ethnicity, and race. An inflammatory lung ailment which is characterized through signs and symptoms of cough, wheezing, dyspnea, and chest tightness, which may occur in spasm, and typically associated with unique triggering events, airway narrowing partly or completely reversible and extended airways responsible to variety of stimuli.[4] The inflammatory features characteristic of asthma encompass, infiltration of the airway through the inflammatory cells, which leads to an increase in airway edema and mucus secretion, hypertrophy and hyperplasia of airway smooth muscle cells and extended airway vulnerability, subsequently can also end in airflow obstruction.[5] Furthermore, uncontrolled asthma imposes a far greater burden at the patients, their families, and society than well-controlled asthma.[6,7]

MATERIALS AND METHODS

A search on PubMed database for articles published between 2000 to 2017 on prevalence of childhood bronchial asthma among school going students. The search terms asthma, prevalence, wheezing, school absenteeism, awareness were used. English language articles were selected for inclusion along with selected cross-references.

DISCUSSION

PREVALENCE IN THE WORLD

The prevalence of childhood asthma has grown greatly in most of the western international locations of global[8-10] and has in large element paralleled the growth in industrialization and civilization.[11] Worldwide, the prevalence of asthma has extended over the past three decades.[12,13] A growing trend of prevalence of bronchial asthma commenced from the 1970s, and now, the worldwide prevalence of this disease has been expected to be 4% to 7%.[14] According to the World Health Organization estimate in 2005, around 300 million people were affected by asthma. According to the existing evidence, the prevalence of asthma and allergy in children is increasing around the world. [15] It is estimated that this number will reach 400 millions by 2025. The results of the first International Study of Asthma and Allergies in Childhood (ISAAC) showed that the prevalence of asthma symptoms in different countries varied from 1.6% to 36.8% [16,17] but that is related to age, race, gender, and residency place.

The ISAAC study compares the prevalence rates of asthma and atopic disease in 155 centres in 56 countries worldwide, and was conducted over a period of one year in 7,21,601 children aged either 6–7 years or 13–14 years. The International Study of Asthma and Allergies in Children (ISAAC) was established in 1991 in order to provide reliable data on the prevalence of the disease, its symptoms and changes during the time and in different countries. Compared to developing countries such as Asia and Africa, ISAAC studies have shown that asthma prevalence is much higher in industrialized and western countries. [18] In the first phase children in the age group of 13-14 years in 56 countries, and in the age group of 6 to 7 years in 38 countries were evaluated during 1994 to 1995. The second phase of ISAAC aimed to investigate risk factors of the disease in 1998; only 22 countries participated, and no Middle Eastern countries were involved. Several Middle Eastern countries took part in various phases of ISAAC. This study aims to systematically review the prevalence of asthma, according to ISAAC standard method, in the Middle Eastern children.

In Iran, among Iranian children, there are many studies were conducted on an evaluation of asthma prevalence in exclusive cities.[19-25] This study indicates the prevalence of asthma varied from 1% to 9.8% and 35.4%.[26,27] In US, Asthma constitutes a major pediatric public health problem.[28-34] It turned into located that prevalence of asthma in the last 365 days in Chile became excessive as 26%, 21% and 17% for children aged 6, 12, and 16 years appropriately in Australia.[35] In Brazil, among the age group of 6-7 years old children, the prevalence of diagnosed asthma was 7.3% for boys and 4.9% for girls, and in the group of the 13-14 years

old children, the prevalence was 9.8%. In Taiwan, Hsieh and Shen[36] reported it as 1.3% in 1974 and 5.0% in 1985 among school children in Taipei City.[37] In Britain, 19.8% (5438/27,507) of people were reported the treatment with anti-asthmatic drugs in the past year, but people reporting with frequent nocturnal wheeze in the past year had no diagnosis of asthma. Prevalence of self reported symptoms, diagnosis, and treatment of asthma was high among 12-14 years old throughout Great Britain with little geographical or urban rural variation.[38-44] In Egypt, the questionnaire given to those children whose age group ranges from 6-12 years old out of 1300 students and the number of boys were 59.5% and the number of girls were 40.5%. The questionnaire filled by the researcher inside the classes to have total number of 168 people. In asthmatic students, males constituted 53.6% and females 46.4%. The prevalence of asthma were greater than boys. Here, the prevalence of bronchial asthma among the studied students was found to be 7.2%.[45] In Germany, the prevalence was found to be higher in Wellington (11%), Adelaide (10%) and Sydney (13%) as compared to West Sussex (7%) and Bochum (6%).

PREVALENCE IN INDIA

In India, prevalence of Bronchial Asthma has been found to be around 6% in most of the surveys. However, it has been reported to vary from 2-17% in several study population.[46]

A research was conducted among the children of age group 18 years old from 1979 to 1999 in the location of Bangalore showed a prevalence of 9%, 10.5%, 18.5%, 24.5% and 29.5% respectively.[47] The increased prevalence may correlate with the demographic changes of the city. Moreover, a school survey in 12 schools on 6550 children in the age group of 6 to 15 years old was conducted for prevalence of asthma; Children from schools of heavy traffic area showed the prevalence of 19.34%; Children from low traffic area school experienced 11.15% respectively ($P < 0.001$). A continuation of review in rural areas revealed 5.7% in children of 6-15 years. The persistent asthma also demonstrated an increase from twenty percent to twenty seven percent and persistent severe asthma 4% to 6.5% in 1994. A report shows that in 1999 at Delhi 18,955 students were diagnosed as Bronchial Asthma among the age group of 3 to 17 years. The prevalence was found to be 3.4% (past wheeze), 11.9% (current wheeze), 12.8% (male), 10.7% (female).

In the year 2000 at Kerala,[48] the general prevalence of allergies may be detected by dividing the subjects as those having wheezing on the time of survey (current wheezers) and those have been no longer suffering on the time of survey (ever wheezed). The overall prevalence of current wheeze was found to be 5.2% to 6.1% and the prevalence of ever wheezed patients turned into 10.2% to 13.8%.

From 584 children, information had been collected by a simplified version of the ISAAC questionnaire, which was administered by using educated students at Chennai from November 1999 to February 2000. Signs and symptoms suggestive of asthma or hyperreactive airways disease in children under 12 years of age were recorded from the selected rural and urban populations by questioning the parents. The effects have been analysed separately for children 0-5 and 6-12 years of age. Out of 855 children studied, the general incidence of breathing trouble (including asthma) changed into 18% and the prevalence of 'diagnosed' asthma was turned into 5%. Twenty-two per cent of urban and 9% of rural children 6-12 years of age reported breathing trouble 'at any time in the past' ($p < 0.01$). An appreciably higher state of 6-12-year-old urban children also showed nocturnal dry cough (28.4% v. 18.7%, $p < 0.05$). Urban children reported recent wheeze more regularly than rural children (92% v. 77%, $p = 0.01$). Symptoms suggestive of allergies were present in 18% of children under 12 years of age. Though the prevalence of identified childhood asthma was changed into 5% in both urban and rural area. [49]

At Punjab, a study was conducted in the year 2002 and here the prevalence of bronchial asthma in children from rural areas was turned to be 1%. At Ludhiana, a total of 2275 children were diagnosed as asthma among the age group of 1 to 15 years and the prevalence was observed to be 2.6%.

From 2005-2006, a study was conducted in children from urban and rural areas in Tamil Nadu within the age group of 6-12 years confirmed the prevalence of wheeze to be 18%. Rural costs had been higher (2.0%) than urban costs (1.6%). The best incidence was amongst women in the rural north-eastern region (2.8%), specially within the kingdom of Tripura (6.7%), while the lowest was amongst men in the southern and central regions (0.9%), especially in the state of Tamil Nadu (0.4%). The prevalence ranges from 384 per 100,000 in Himachal Pradesh to 5,924 per 100,000 in Tripura among women and from 407 per 100,000 in Jharkhand to

5,086 in Tripura among men. The number of women with bronchial asthma increases 1,000 per 100,000 in 23 states and is fairly excessive (above 3,000 per 100,000) in five states: West Bengal (3,304), Mizoram (3,563), Kerala (4,037), Sikkim (5,150), and Tripura with the highest prevalence whereas this is true for men in only 2 states; West Bengal and Tripura. Here, the Northeast Region considered as the region showing the highest prevalence levels of asthma.

In 2006, a study was conducted at Kanpur and Delhi, here the prevalence of bronchial asthma in children from rural areas and urban areas was found to be 33.5% and 31% respectively. In Delhi, the prevalence was turned into 19.3% in rural areas and 21.2% in urban areas.

The prevalence of asthma being substantially higher among younger age group (14.9% among 6-9 yr) and reduced with growing age in the year 2010 at South India. It became 8.7% among 10-12 year age group and 5.5% among 13-15 year age group. Boys had a better prevalence of asthma (12.1%) compared to girls (8.4%) and the male to female ratio was found to be 1.5:1. This difference although become not statistically significant. Majority of children surveyed had 1-3 attacks (63.2%) of asthma whereas 36.8% children had 4-12 attacks in the last 12 months. Among males, 55.9% had 1-3 attacks and 44.1% had 4-12 attacks whereas among females, although the entire frequency of attacks was less. About 73.9% had only 1-3 attacks and 26.1% had 4-12 attacks of wheezing in the last one year.

The prevalence of asthma and its association with environmental elements, where males had higher prevalence than females in the year 2010 at Chandigarh.[50] This study showed an excessive prevalence of asthma among the school children in rural location. Additionally, there has been gender distinction in the signs and symptoms and the prevalence of bronchial asthma and allergic rhinitis. This requires similarly evaluation of genetic and environmental elements which determine the prevalence, exacerbations of those allergic illness. The environmental determinants of the allergic illness among children can be studied, in comparison to the countrywide and global research. This would additionally manual for the future measurement of the trend in the disease over a particular time period. Among school children at the age of 6-13 years, a study was conducted which shows the prevalence as 2.3% in the year 2010 at Shimla city. Among urban school children at the age of 5-15 years old a study was conducted, which indicates as the prevalence of 7.59% in the year 2010 at Jaipur city.[51]

The prevalence of wheeze in one year was found to be 2.9% in school children at the age of 6-7 and 13-14 years [52] in the year 2012 at Pune. The prevalence of childhood asthma was found to be 6.7% which has been stated by the way of progenitor. Prevalence of asthma in those children aged between 6-7 years of age was found to be 7.0% and 6.3% in those between 13-14 years of age.

Generally, boys had a higher prevalence as compared to girls (8.1% versus 4.9%, resp.). Prevalence of asthma amongst children studying in the public schools was turned into 5.8%, and in those studying in private schools was found to be 7.3%. The general prevalence of ever feeling wheeze was found to be 9.5%, 5.4% was the prevalence rate for wheeze in last one year, ever having asthma was found to be 5.6%, chest sounded wheezy after exercise was 9.5%, and dry cough at night time was 15.9%.

In the year 2012 at Puducherry, a recent study shows the prevalence as 8.6%. A rural study from Karnataka indicates the prevalence of bronchial asthma among the 6-15 years age group as 10.3%. Among 10-18 years of age group, the prevalence of ever wheezers from rural Karnataka was found to be 8.4% and current wheezers was turned into 5.2%.[53]

At Karnataka, in the year 2015 based on ISAAC record, 25 (4.5%) were found to be the cases of asthma. Boys had 5.14% better prevalence than girls which was found to be 3.77%. Maximum number of cases were found at the age of 15 years, that is 10 (5.37%) cases. Out of 25 cases, 8 (32%) had wheezing in the last one year. Among 25 positive cases, from last 12 months, 6 children (24%) had attack of wheezing, maximum number of children had 4-12 times (67%) attack of wheezing.

In the year 2016 at Srinagar, a study shows the prevalence of bronchial asthma as 7.4% ($n = 60$), which included 34 boys and 26 girls. The prevalence was higher in boys (8.3%) than in girls (6.6%), with the prevalence in different age groups varying as per gender, the highest prevalence being in boys in the age group of 12-14 years (11.1%) and in girls in 10-12 years (9.2%). The prevalence of current asthma was 3.2% ($n = 26$)

with prevalence in boys of 3.1% ($n = 13$) and in girls of 3.2% ($n = 13$). Out of 60 children with bronchial asthma; 78.3% ($n = 47$) had probable asthma, 6.7% ($n = 4$) were categorized as having definite asthma, and 15% ($n = 9$) had physician-diagnosed asthma.

The prevalence of bronchial asthma among school children by different criteria were diagnosed by the physician, asthma like symptoms (wheezing and whistling) in the year 2017 at Madhya Pradesh. There were 46 students out of the total who answered "yes" to any of the above criteria based questions. So, the prevalence of questionnaire diagnosed asthma came out to be 13.9%. Out of these, 40 (87%) were newly detected asthmatics by the study questionnaire, excluding those already diagnosed by the physician viz. 6 (1.8%). Out of total asthmatics, 44 (13.3%) children reported wheezing and whistling in past 12 months and 9 (2.7%) children used medication for wheezing and whistling in past 12 months. The prevalence ratio of Male: Female was turned into 1:1.55.

CONCLUSION

We concluded that there is a high prevalence of bronchial asthma among school going children. Bronchial Asthma can be caused mainly because of small airways, impaired function of lungs at birth itself, maternal smoking, sex, ethnicity, race, exposure to dust and pollens. Moreover, India is an illiterate country, so these exposures can be prevented by giving proper awareness programs for both children and parents, proper education and screening of asthma in school for early diagnosis and better asthma management.

REFERENCES

- [1] Kudzyte J, Griska E, Bojarskas J. *Medicina* 2008; 44: 944–952.
- [2] Gregory AM, Van Der Ende J, Willis TA, Verhulst FC. *Archives of Pediatrics and Adolescent Medicine* 2008; 162: 330–335.
- [3] Meijer GG, Landstra AM, Postma DS, and Van Aalderen WMC. *Clinical and Experimental Allergy* 1998; 28: 921–926.
- [4] Strunk RC, Sternberg AL, Bacharier LB, Szeffler SJ. *J Allergy Clin Immunol* 2002; 110: 395–403.
- [5] Peters SP. *Am J Med* 2003; 115: 49–54.
- [6] Lang DM. *Allergy Asthma Proc* 2015; 36: 418-424.
- [7] Sullivan SD, Rasouliyan L, Russo PA, Kamath T, Chipps BE, Group TS. *Allergy* 2007; 62: 126-133.
- [8] Anderson HR, Gupta R, Strachan DP, Limb ES. *Thorax* 2007; 62: 85–90.
- [9] Mandhane PJ, Greene JM, Cowan JO, Taylor DR, Sears MR. *American Journal of Respiratory and Critical Care Medicine* 2005; 172: 45–54.
- [10] Toelle BJ, Ng K, Belousova E, Salome CM, Peat JK, Marks GB. *British Medical Journal* 2004; 328: 386–387.
- [11] Beasley R, Crane J, Lai CKW, Pearce N. *Journal of Allergy and Clinical Immunology* 2000; 105: 466–472.
- [12] Upton MN, McConnachie A, McSharry C, Hart CL, Smith GD, Gillis CR. *Bmj* 2000; 321: 88-92.
- [13] Yunginger JW, Reed CE, Connell EJ, Melton LJ, Fallon WM, Silverstein MD. *American journal of respiratory and critical care medicine* 1992; 146: 888-894.
- [14] Pal R, Dahal S, Pal S. *Indian J Community Med* 2009; 34: 310–316.
- [15] Masoli M, Fabian D, Holt S, Beasley R. *Allergy* 2004; 59: 469-478.
- [16] Kudzyte J, Griska E, Bojarskas J. *Medicina* 2008; 44: 944–952.
- [17] Shakurnia AH, Assar S, Afra M, Latifi M. *East Mediterr Health J* 2010; 16: 651–656.
- [18] Magnus P, Jaakkola JJK. *Bmj* 1997; 314: 1795-1800.
- [19] Bidad K, Anari S, Aghamohammadi A, Pourpak Z, Moayeri H. *Eur J Pediatr* 2007; 166: 453–454.
- [20] Ziaee V, Yousefi A, Movahedi M, Mehrkhani F, Noorian R. *Iran J Allergy Asthma Immunol* 2007; 6: 33–36.
- [21] Hatami G, Amir Azodi E, Najafi A, Razavi SH, Afrasiabi K, Afarid M. *Iranian South Med J* 2003; 5: 2-5.
- [22] Masjedi MR, Fadaizadeh L, Najafizadeh K, Dokouhaki P. *Iran J Allergy Asthma Immunol* 2004; 3: 25–30.
- [23] Mortazavi Moghaddam SGh.R, Akbari H, AR S. *Iran J Med Sci* 2005; 30: 110–114.
- [24] Miri S, Farid R, Akbari H, Amin R. *Pediatr Allergy Immunol* 2006; 17: 519–523.
- [25] Hedayati MT, Mayahi S, Denning DW. *Environ Monit Assess* 2010; 168: 481–487.
- [26] Mirsaid Ghazi B, Imamzadehgan R, Aghamohammadi A, Darakhshan Davari R, Rezaei N. *Iran J Allergy Asthma Immunol* 2003; 2: 181–184.
- [27] Awasthi S, Kalra E, Roy S, Awasthi S. *Indian Pediatrics* 2004; 41: 1205–1210.
- [28] Gergen PJ, Weiss KB. *JAMA* 1990; 264: 1688-1692.

- [29] Taylor WR, Newacheck PW. *Pediatrics*1992; 90: 657-662.
- [30] Evans RE, Mullally DI, Wilson RW. *Chest* 1987; 91: 65-74.
- [31] Gergen PJ, Mullally DI, Evans R. *Pediatrics*1988; 81: 1-7.
- [32] Halfon N, Newacheck PW. *Am J Public Health*1986;76:1308-1311.
- [33] Weiss KB, Zimmerman EM, Gergen PJ. *N Engl J Med* 1988; 13:33-41
- [34] Weiss KB, Gergen PJ, Hodgson TA. *N Engl J Med* 1992; 326: 862-866.
- [35] Robertson CF, Bishop J, Sennhauser FH, Mallol J. *PediatrPulmonol*1993; 16: 219–226.
- [36] Hsieh KH, ShenJJ. *J Asthma* 1988; 25: 73–82.
- [37] Tsuang HC, Su HJ, Kao FF, Shih HC. *PaediatrPerinatEpidemiol* 2003; 17: 3–9.
- [38] Anderson HR, Butland BK, Strachan DP. *BMJ*1994;308: 1600-1604.
- [39] Lewis S, Butland B, Strachan D, Bynner J, Richards D, Butler N. *Thorax*1996; 51: 6706.
- [40] Fleming DM, Sunderland R, Cross KW, Ross AM. *Thorax* 2000;55:657–661.
- [41] Anderson HR, Esmail A, Hollowell J, Limejohns P, Strachan DP. *Health care needs assessment*1994; 7: 256-332.
- [42] Asher MI, Keil U, Anderson HR, Beasley R, Crane J, Martinez F. *EurRespir J*1995; 8: 483-491.
- [43] Neil P, Nadia AK, Richard B, Javier M, Ulrich K. *Thorax* 2007; 62; 757-765.
- [44] SAS Institute. *SAS user's guide: basics, statistics, version 6*. Cary, NC: SAS Institute 1990.
- [45] De Marco R, Locatelli FSunyer J. *Am J RespirCrit Care Med* 2000; 162: 68-74.
- [46] Singh V, Maraldi NM, Capanni C. *J Res* 2003; 291:352-354.
- [47] Chhabra SK, Gupta CK, Chhabra P, Rajpal S. *J Asthma* 1998; 35: 291-296.
- [48] Christie GL, Helms PJ, Godden DJ. *American Journal of Respiratory and Critical Care Medicine* 1999; 159: 125–129.
- [49] Ravindran P. *Indian J Allergy ApplImmuno*2000; 14: 71–78.
- [50] Paramesh H. *Indian J Pediatr*2002; 69: 309–312.
- [51] Gupta D, Aggarwal AN, Kumar R, Jindal SK. *J Asthma* 2001; 38: 501-504.
- [52] Sharma BS, Kumar MG, Chandel R. *Indian Pediatr*2012; 49: 835-836.
- [53] Dhabadi BB, Athavale A, Meundi A, RekhaR, Suruliraman M, Shreeranga A. *Int J Tuberc LungDis* 2012; 16: 1205-1209.