Original Research Article

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

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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, socioeconomic 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                            | 51.0              |
| MMPS          | 402                        | 195                            | 48.5              |
| Vidhya Niketan| 100                        | 94                             | 94.0              |
| CPS           | 490                        | 356                            | 72.6              |
| Total         | 1500                       | 904                            | 60.2              |

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

| Age (Years) | Boys N | Asthma N | % | Girls N | Asthma N | % | Total N | Asthma 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) (%) |
|--------------------------------------------------|-------------------|-------------------------------|
| Child ever had wheezing in past                   | N                 | N                             | 41.74                          |
| No. of wheezing attacks                           |                   |                               |                                |
| Less than 3                                      | 103               | 43                            | 50.74                          |
| More than 3                                      | 9                 | 9                             | 100                            |
| Disturbance of sleep due to wheezing in last 12 months (night per week) | 33                | 29                            | 87.8                           |
| <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 last 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 have reported prevalence ranging from 2.3% to 18.2%.<sup>8,9</sup> 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.<sup>10,11</sup> 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.<sup>7,12</sup> 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.<sup>13</sup>

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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