



## ASSESSMENT OF RISK FACTORS FOR ASTHMA/ALLERGY IN SCHOOL GOING CHILDREN

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## KEYWORDS :

## INTRODUCTION

Nowadays there is great concern about outdoor air pollution among child health professionals, public health workers, epidemiologists, environmental officials and families. The level of outdoor air pollutants in our country has been increased but awareness has to be enhanced among the population about increasing air pollution, so that measures to control it can be adopted.

However, progress of this awareness and controlling measures of this pollution has slowed in recent years, and air quality in some areas has actually worsened.<sup>1</sup> A growing body of research supports the role of these air pollutants in acutely aggravating chronic diseases, such as asthma, and suggests that they might be contributing to the development of these diseases, including as a result of exposure to developing fetuses and children. Policy makers must now confront evidence that current safety thresholds might not be sufficiently protective, especially for susceptible populations, such as children. Physicians and specialists alike are, with increasing frequency, facing management dilemmas in the care of children with asthma whose exacerbations are the product of inflammation mediated by respiratory irritants. Parents frequently request information about the environmental origins of asthma and ask for evidence-based guidance to prevent hospitalizations, especially in urban areas, where studies have consistently documented unusually prevalent and severe asthma.<sup>3</sup> This study is done to assess risk factors of asthma/allergy in school going children, thereby increasing awareness among population about increasing pollution and air pollutants degrading quality of life of children.

## MATERIAL AND METHODS

All schools in Shahdol urban area were listed and 10 were selected randomly for this study. The schools selected were from different places in city. Consent was taken from school authorities. Those students suffering from asthma or any other allergic conditions were listed from the data available in the records of the school authorities. These students were from all grades in the school, who were suffering from asthma or any other allergy. All the students participating in the study were informed about it and consent was taken from their parents for their participation. There were questions to find out the presence of asthma or any other allergy and to collect information on potential risk factors associated with it. The risk factors included in the study were food habits, exposure to the environment i.e traffic pollution, presence of smoking in the family, fuels used for cooking purpose, presence of pets and lifestyle. The questionnaire was distributed to children in the school after explaining each question. They completed the questionnaire themselves in school and returned it on the same day. General examination and measurement of weight, height etc was done prior to the study. A fixed sample size of 990 was taken. This sample size was sufficient to detect a minimum prevalence of asthma or any other allergy within schools. Data analysis was done by SPSS version 20 software.

## RESULTS

The present study was carried out from listed schools in Shahdol urban area, 10 were randomly selected for inclusion. There were 7 private and 3 government schools. Students were selected from all grades and classes randomly from school.

Number of children in schools with 5-10 years age was 847 (85.6%) and in 10-15 years was 143(14.4%). A total of 990 children were enrolled each in age groups 5 to 10 and 10-15 years. 387(39.1%) were female and 603(60.9%) were males. Significant association was found between asthma or allergy present with age group of students (P value 0.019).

Mean weight of 5 to 10 year students was 22.17±2.9 kg. Mean weight of 11 to 15 year students was 38.69±2.9 kg. Mean age of students of 5 to 10 years was 7.13±1.4 years while mean age of 11 to 15 year students was 12.73±1.5 years.

437(44.1%) were from lower socio economic status, 164(16.6%) from middle and 389(39.3%) were from upper socioeconomic status. Significant association was found between socioeconomic status and asthma or allergy present.

Prevalence of asthma or any other allergy among school going children was 17.6%. Known cases of asthma were 2% (20 students), No significant association was found between gender and asthma or allergy in students.

Most common factors responsible for allergy were smoking by family members or friends (4.7%) followed by vehicular traffic (3.9%), residential cooking and heating (3.2%), biomass fuels (2.8%) and industrial emissions (2.8%). Significant association was found between factors responsible and asthma / allergy in school students. (P value<0.05)

**Tables I- Association of age, gender, socio economic status, various risk factors with asthma or any other allergy in children.**

|                  | Asthma or Any other allergy |                |
|------------------|-----------------------------|----------------|
|                  | Absent                      | Present        |
| Age group(years) |                             |                |
| 5 to 10 years    | 708                         | 139            |
| 11 to 15 years   | 108                         | 35             |
| Chi-square       | 5.493                       | P value= 0.019 |
| Gender           | Absent                      | Present        |
| Female           | 313                         | 74             |
| Male             | 503                         | 100            |
| Chi-square       | 1.048                       | P value= 0.306 |
| SES              | Absent                      | Present        |
| Lower            | 367                         | 70             |
| Middle           | 124                         | 40             |
| Upper            | 325                         | 64             |
| Chi-square       | 6.328                       | P value=0.042  |

**Table II- Distribution according to weight and age group**

| Weight (kg)   | N   | Mean  | Std. Deviation |
|---------------|-----|-------|----------------|
| 5 to 10 year  | 847 | 22.17 | 2.924          |
| 11 to 15 year | 143 | 38.69 | 2.917          |
| Total         | 990 | 24.55 | 6.505          |
| Age (years)   | N   | Mean  | Std. Deviation |
| 5 to 10 year  | 847 | 7.13  | 1.456          |
| 11 to 15 year | 143 | 12.73 | 1.588          |
| Total         | 990 | 7.94  | 2.461          |

### Distribution according to factors responsible for allergy and known case of asthma/ diagnosed asthmatic students

| Factors responsible for allergy | Number | Percent |
|---------------------------------|--------|---------|
| Biomass fuel                    | 28     | 2.8%    |
| Industrial emissions            | 28     | 2.8%    |
| Residential cooking and heating | 32     | 3%      |
| Smoking                         | 47     | 5%      |
| Vehicular traffic               | 39     | 4%      |
| None                            | 816    | 82.4%   |
| Total                           | 990    | 100%    |
| Asthma Present or Absent        | Number | Percent |
| Known Case of asthma            | 20     | 2%      |
| Asthma absent                   | 970    | 98%     |

### DISCUSSION

Prevalence of asthma was 2% while there was a high prevalence of other allergies (17.6%) in the children surveyed in Shahdol in this study. Reported prevalence of asthma in rural children from Ludhiana<sup>(4)</sup> and Punjab<sup>(5)</sup> was 2.6% and 1% respectively, which are very similar to our study (2%). As we are considering other allergies also in our study the prevalence of asthma with other allergies is high (17.6%). Our findings differ from that reported from Bangalore<sup>(6)</sup> which showed 9% and 29.5% prevalence of asthma in 1979 and 1999 respectively, and urban Delhi<sup>(7)</sup> which showed prevalence of asthma 11.6%. Rise in prevalence over time in Bangalore has been associated with environmental pollution, urbanisation and change in demography of the city<sup>(6)</sup>. These factors may be responsible for inter-city variation in the prevalence of asthma and our study is not designed to depict inter-city differences.

Various risk factors for allergic condition and asthma have been identified. One of them is smoking and vehicular pollution. Since there is association of factors with allergy or asthma, this can be concluded that air pollution imparts significant role in causing allergy and asthma. Prevalence of asthma has increased during the last decades in the countries worldwide. Vehicle exhausts have been implicated for an increased prevalence of wheeze, rhinitis, asthma and other respiratory symptoms in children.<sup>(8)</sup> These results are similar to our study. Few studies<sup>(9,10)</sup> have reported air pollution as a causative factor for asthma. In a 6-yr follow-up study<sup>(9)</sup> among Japanese children a significant association was found between the annual average concentration of nitrogen dioxide and the incidence of asthma. Similarly in our study asthma or allergy is found to be associated with air pollution factors as smoking and vehicular pollution. The major sources of air pollution in any city are industrial emissions, residential heating and cooking, vehicular traffic and natural sources etc. Indoor coal combustion is the major source of indoor particulate matter. The suspended particle concentration levels found in the kitchens are very high. Indoor sources of NO<sub>2</sub> include cigarette smoke, gas and oil heaters and cookers which often result in high indoor concentrations<sup>(11)</sup>. In India, in Garhwal<sup>(12)</sup> the mean level of indoor total suspended particulate (TSP) during cooking by wood and shrubs were found to be 4500 µg/m<sup>3</sup>. In another place in India i.e. Pune<sup>(13)</sup>, the 12–24 hours mean level of indoor PM<sub>10</sub> during cooking by wood was 2000 µg/m<sup>3</sup>. In Tamil Nadu (India)<sup>(14)</sup> the mean level of indoor TSP during cooking by biomass was 500–2000 µg/m<sup>3</sup>. In the present study, the indoor pollutants have also significant association with allergy or asthma in school going children which was similar to above studies. In India, Mishra<sup>(15)</sup> also studied the effect of indoor air pollution from biomass combustion on prevalence of asthma in the elderly and found the prevalence of asthma in was around 8–10% in elderly.

### CONCLUSION

From this study it can be concluded that indoor air pollutants level and outdoor pollution leads to asthma and allergy in school going children. There is significant association found. So measures should be taken to prohibit use smoking and restrict industrial areas exposure. Children should be more exposed to residential and urban areas for outdoor activities and plays. Further, the houses with asthmatic children in all these areas should adopt appropriate measures to prohibit child exposure from allergens and other risk factors. Students of lower age group are more affected by these allergies and asthmas on exposure to risk factors as compared to older children.

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