ISSN: 0975-3583,0976-2833 VOL15, ISSUE 01, 2024

STUDY OF CLINICAL PROFILE OF ASTHMA AND OTHER COMORBIDITIES AMONG SCHOOL GOING CHILDREN

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Received Date: 18/12/2023 Acceptance Date: 15/01/2024

Abstract

Background: Asthma, being a commonest chronic disease in children, is leading to disability as well as school absence. Present study was aimed to Study of clinical profile of asthma and other comorbidities among school going children. **Material and Methods:** Present study was prospective, observational study, conducted in school going children in urban Bangalore, age group between 6 to 15 years. On the basis of the history, students with suspected asthma were subjected to PEFR & spirometry. **Results:** During present study, total 8 schools were selected randomly, among 1000 subjects were enrolled into the study. Based on questionnaire 85 of subjects were suspected of asthma. 563 subjects were male and the prevalence of asthma in males is 38(6.75%) and 437 subjects were female and the prevalence of asthma in the female is 47 (10.76%). The P-Value is 0.02 statistically significant, indicating that females were more risk than males. The p-value was statistically significant for exposure to cigarette smoke at home, exposure to household smoke & pets at home; indicating that those were significant high risk factor to develop asthma. Among 1000 subjects, 85 subjects were suspected asthma, for them Pulmonary function was performed. Among 85 asthma suspected subjects, 5 (5.88%) subjects have PEFR less than 60 followed by 12 (14.11%) subjects have PEFR between 60-70, 25 (29.41%) subjects have PEFR between 70-80 and 43 (50.58%) subjects have PEFR more than 80. **Conclusion:** In the present study, the overall prevalence of bronchial asthma among children of the school-going age group was found to be 8.5%. The risk factors were exposure to cigarette smoke at home, exposure to household smoke, and pets at home are significantly high-risk factors to develop asthma.

Keyword: bronchial asthma, school-going children, Pulmonary Function Tests, FVC, FEV1, PEFR

ISSN: 0975-3583,0976-2833 VOL15, ISSUE 01, 2024

Introduction

Asthma, being a commonest chronic disease in children, is leading to disability as well as school absence. Due to the chronic nature of the disease, the impact on family and childhood is considerable. Recent evidence has emerged that the increase in asthma prevalence in the past few decades has been slowed or stabilised.[1]

Though there are numerous epidemiological studies available, direct comparisons between studies are often limited by variations in methodologies used. To overcome this limitation, a standardized protocol was developed by the International Study of Asthma and Allergies in Childhood (ISAAC) Committee which comprises a standardized written questionnaire for self-completion by teenage children.[2] This approach is well validated in the epidemiological studies of bronchial asthma.

Jenkins *et al.*,[3] in a population-based study reported that a questionnaire-based survey had higher sensitivity, specificity, positive predictive value, and Youden's index which is the best single measure of validity. This method is cheap[4], widely acceptable, and convenient requiring no special equipment. Present study was aimed to Study of clinical profile of asthma and other comorbidities among school going children.

Material And Methods

Present study was prospective, observational study, conducted in department of paediatrics, at Vydehi Institute of Medical Sciences & Research Centre, Bengaluru, India. Study duration was of 4 years (January 2018 to January 2021). Study approval was obtained from institutional ethical committee.

Inclusion criteria

- School going children in urban Bangalore, age group between 6 to 15 years, parents willing to participate in questionnaire and PFTs if indicated.

Exclusion criteria

- Children who already have asthma based from questionnaire.

Data collection was started after obtaining clearance from ethical committee. Subjects for the study were non-randomly selected from schools in Bangalore. Permission was obtained from the Block Education Officer and respective school authorities after explaining the details of the study. On the basis of the history, students with suspected asthma were subjected to PEFR & spirometry. Children were instructed not to take any medications or caffeine containing food like chocolate, tea, coffee prior to execution of the test. The procedure was explained prior to it. It was performed using spirometer and the parameters evaluated were FEV1, RATIO BETWEEN FEV1/FVC & FVC.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Difference of proportions between qualitative variables were tested using chi-square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

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Results

During present study, total 8 schools were selected randomly, among 1000 subjects were enrolled into the study. The average age of enrolled subjects was 13.51 ± 1.44 years, average weight was 43.52 ± 10.57 kgs, average height was 152.15 ± 11.97.

Table 1- General characteristics

Parameter	**Mean ± SD**
Age (Years)	13.51 ± 1.44
Weight (Kgs)	43.52 ± 10.57
Height (cms)	152.15 ± 11.97

Among 1000 subjects, based on questioner's 85 (8.5%) of subjects were suspected of asthma and 915 (91.50%) were non-asthma. Among 1000 subjects, 563 subjects were male and the prevalence of asthma in males is 38(6.75%) and 437 subjects were female and the prevalence of asthma in the female is 47 (10.76%). The P-Value is 0.02 statistically significant, indicating that females were more risk than males.

Table 2: Prevalence of Asthma in Sex

Sex/Asthma	**Yes**	**No**	**P-Value**
Male	38 (6.75%)	525 (93.25%)	0.02
Female	47 (10.76%)	390 (89.24%)	
Total	85 (8.5%)	915 (91.50%)	

Among 1000 subjects, 16 subjects have a family history of allergy and the prevalence of asthma in a family history of allergy subjects was 2 (12.50%), 44 subjects have a family history of asthma and the prevalence of asthma in a family history of asthma subjects is 3 (6.82%), 49 subjects were exposure to cigarette smoke at home and the prevalence of asthma in a exposure to cigarette smoke at home subjects is 16 (32.65%), 30 subjects were exposure to household smoke and the prevalence of asthma in a exposure to household smoke subjects is 12 (40.00%) and 87 subjects have pets at home and the prevalence of asthma in a pets at home subjects is 16 (18.39%). The p-value was statistically significant for exposure to cigarette smoke at home, exposure to household smoke & pets at home; indicating that those were significant high risk factor to develop asthma.

Table 3: Prevalence of risk factors for Asthma in Family

	Yes	**No**	**P-Value**
Family history of allergy	2 (12.50%)	14 (87.50%)	0.56
Family history of asthma	3 (6.82%)	41 (93.18%)	0.68
Exposure to cigarette smoke at home	16 (32.65%)	33 (67.35%)	0.0001
Exposure to household smoke	12 (40.00%)	18 (60.00%)	0.0001
Pets at home /Asthma	16 (18.39%)	71 (81.61%)	0.0005

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Among 85 subjects, 31 (36.47%) subjects have wheezing symptoms, 10 (11.76%) subjects have snoring and sleep disturbances, 35 (41.17%) subjects have Itchy rash, 28 (32.94%) subjects have Allergic rhinitis and 4 (32.94%) subjects had obesity.

Table 4: Subjects were distributed based on wheezing Sounds

Characteristics	No. of Subjects	Percentage
wheezing Sounds Sometimes	31	36.47
sleep disturbances and snoring Sometimes	10	11.76
Itchy rash Sometimes	35	41.17
Allergic rhinitis Sometimes	28	32.94
Obesity Sometimes	4	4.7

Among 1000 subjects, 85 subjects were suspected asthma, for them Pulmonary function was performed. Among 85 asthma suspected subjects, 5 (5.88%) subjects have PEFR less than 60 followed by 12 (14.11%) subjects have PEFR between 60-70, 25 (29.41%) subjects have PEFR between 70-80 and 43 (50.58%) subjects have PEFR more than 80.

Table 5: PEFR levels

PEFR	No. of Subjects	Percentage
<60	5	5.88
60-70	12	14.11
70-80	25	29.41
>80	43	50.58

Among 85 asthma suspected subjects, 1 (1.17%) subjects have FVC less than 60 followed by 2 (2.35%) subjects have FVC between 60-70, 8 (9.41%) subjects have FVC between 70-80 and 74 (87.05%) subjects have FVC more than 80.

Table 6: FVC levels

FVC	No. of Subjects	Percentage
<60	1	1.17
60-70	2	2.35
70-80	8	9.41
>80	74	87.05

Among 85 asthma suspected subjects, 2 (2.35%) subjects have FEV1 less than 60 followed by 2 (2.35%) subjects have FEV1 between 60-70, 5 (5.88%) subjects have FEV1 between 70-80 and 76(89.41%) subjects have FEV1 more than 80.

Table 7: FEV1 levels

FEV1	No. of Subjects	Percentage
<60	2	2.35
60-70	2	2.35
70-80	5	5.88
>80	76	89.41

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Among 85 asthma suspected subjects, 5 (5.88%) subjects have FEV1/FVC was less than 80 and 80 (94.11%) subjects have FEV1/FVC more than 80.

Table 8: FEV1/FVC levels

FVC/FEV1	No. of Subjects	Percentage
<80	5	5.88
>80	80	94.11

Discussion

There is inadequate data on Asthma epidemiology from the developing world, including India. Asthma rates are legitimately low in India, although there is some contemporary evidence that the factual prevalence is higher than previously thought.[5] The total appraised burden of Asthma is an overall prevalence of 3%.[6]

In the present study, the overall prevalence of bronchial asthma among children of the school-going age group was found to be 8.5%. The conclusions of the study were consistent with Chhabra *et al.*,[7] Paramesh [8], Singh *et al.*,[9] and Jain *et al.*,[10] who reported a prevalence of 11.9%, 11.2%, 11.9%, and 10.3% respectively. Global warming has also got an important role to play in the upsurge of allergic disorders worldwide over the last three decades. Increase temperature and carbon dioxide (CO2) production due to climatic change will result in increased production of pollens and fungal spores that could exacerbate symptoms of allergic disease. There is also some evidence of significantly stronger allergenicity in pollen at increased temperatures.[11]

The current study reported a high prevalence of bronchial asthma in females (10.76%) compared to males (6.75%) that are inverse with the existing literature. Behl *et al.*,[12] noted that the overall prevalence of asthma was 2.3%. Boys had a higher prevalence of 3.1% than girls at 1.4%. There was a significant association between asthma prevalence and family history of asthma and other atopic manifestations.

In the present study, no correlation between the presence of the family history of asthma, the presence of a family history of allergy, and the prevalence of asthma. But a study conducted by Sibbald *et al.*,[13] showed that when both parents had asthma, 80% of children developed the disease, compared to 40% of children when one parent had asthma and when no parent had asthma, only 10% of children developed asthma. Maternal influence is probably more than paternal influence, particularly in children less than five years of age possibly due to trans-placental transfer of allergens or cytokines to the fetus.[14]

Previous epidemiological studies have shown that children with asthma exposed to environmental tobacco smoke have more severe respiratory symptoms, higher frequency of acute exacerbations, more pronounced airway responsiveness, and a lower level of lung function than asthmatic children, not exposed.[13] From a study of 200 children with asthma, Chilmonczyk *et al.*,[15] reported that the frequency of acute exacerbations increased with tobacco exposure, whether the exposure was reported by a parent or identified based on urine cotinine level; the relative risk for the highest compared with the lowest exposure category was 1.8 (95% confidence interval 1.4 to 2.2).

Limitation of Study were bronchodilators and bronchial Challenge Tests were not performed in this study. Also, as Asthma is a periodic flare event, a normal PFT during

ISSN: 0975-3583,0976-2833 VOL15, ISSUE 01, 2024

symptom free period does not rule out Asthma. A large number of school children to be assessed for a conclusive strategy.

Conclusion

In the present study, the overall prevalence of bronchial asthma among children of the school-going age group was found to be 8.5%. The current study reported a high prevalence of bronchial asthma in females compared to males that are inverse with the existing literature. The risk factors are exposure to cigarette smoke at home, exposure to household smoke, and pets at home are significantly high-risk factors to develop asthma.

Conflict of Interest: None to declare
Source of funding: Nil

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