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Family History of Asthma and Atopy as Risk Factors of Childhood Asthma: A Tertiary Hospital Based Study

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Abstract:
Introduction: *Genetic and environmental factors play important roles in prevalence rates for allergy and asthma. Family history of asthma and other atopic diseases has a strong association with development of asthma in children.*
Methods: *Patients of 3-12 years of age presented to our institute, were tested for reversibility (PEFR) and/ or variability wherever feasible, were given anti-asthma drug trial and were followed up to observe the improvement and thus were diagnosed as childhood asthma excluding other differential diagnoses. In the present study, a total of 94 children with childhood asthma were studied. After matching ninety four children were included in the control group. Family history of asthma and atopy among parents and siblings was taken in both asthma and control groups. Presence of family history of asthma and atopy among cases and controls was compared by using chi-square test.*
Results: *Family history of asthma was present in 20.2% asthmatic children whereas in control group it was 7.4%. The association of family history and asthma was statistically significant ($p < 0.05$). The risk of having asthma among children with family history of asthma was found to be 3.15 times greater than that of children without family history of asthma ($\chi^2 = 6.427$, OR = 3.15, 95% CI = 1.17 – 8.78, P =0.011). Family history of atopy was present in 37.2% of asthmatic children whereas it was present in 18.1% children in control group. The association was found to be significant statistically ($\chi^2 = 8.613$, $p = 0.0033$). The risk of having asthma among the children with family history of atopy was found to be 2.69 times greater than that of the children without family history of atopy (OR = 2.69, 95% CI= 1.31 – 5.56).*
Conclusion: *The children having family history of asthma and atopy have an increased risk of having asthma. Genetic predisposition and gene-environment interaction may play important role for increased prevalence of asthma among children. This demands long term multicenter further study on large sample.*
Keywords: *Asthma, Childhood asthma, Family history of asthma, Family history of atopy, Risk factor*

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I. Introduction

Asthma is one of the leading serious chronic illnesses of children in India and abroad.[1] This is an inflammatory condition of the bronchial airways.[2] Genetic and environmental factors play important roles in prevalence rates for allergy and asthma.[3] Family history of asthma among parents has a strong association with development of asthma in children.[4,5] Family history of other atopic diseases like atopic dermatitis, allergic rhinitis, allergic conjunctivitis,etc among parents and siblings have increased risk of having asthma in their childhood and later period as well.[5]

Asthma is also a prevalent disease in Sub-Himalayan Terai Region of North Bengal. But there are not much data on family history of asthma and other atopic diseases as risk factors of childhood asthma. Therefore a tertiary hospital based case control study has been proposed.

II. Materials And Medtods

Proper permission from the ethical committee was taken before doing this study and proper history and clinical examination findings were written in typed proforma in OPD and inpatient department also after getting proper written consent from the guardians of the children. Normal healthy children who are the neighbours of the patients were taken as control only after getting written consent from the guardians. This tertiary hospital based case control study was crried out over one year (from 1st February, 2009 to 31st January, 2010) in the Department of Pediatrics, North Bengal Medical College & Hospital and the drainage area of the study population is North Bengal Terai Region which includes Cooch behar, Jalpaiguri & Terai area of Darjeeling district.

Selection of cases: Patients of 3-12 years of age presented to OPD or inpatient department with clinical signs and symptoms of asthma were tested for reversibility (PEFR) and/ or variability wherever feasible, given anti-asthma drug trial and were followed up to observe the improvement and history of allergens and triggers were taken and thus diagnosed as asthma after excluding other important differential diagnoses. The Children belonging to North Bengal Terai region in the age group of 3 years to 12 years presented with pulmonary symptoms which are due to any acute or chronic illness other than asthma were excluded from the study group. Patients having both asthma as well as any acute or chronic illness other than asthma were excluded from the study group.

Selection of Control: The healthy children (3 years to 12 years) of the above mentioned drainage area, who are neighbours of the patients visiting the OPD or inpatient department and who did not have any infections of respiratory tract or any pulmonary diseases or any known diseases which might impair pulmonary function and alter other parameters of the study, were included in this study after getting written consent. Any children having any kind of respiratory illness or any other illnesses which might affect the clinical and laboratory criteria of asthma were exclude from the study.

Matching: Matching of Age: One healthy child who was within 3 -12 year age group and nearest to a patient by age was taken as his / her control.

Matching of Sex: Male children were taken for male patients and female children were taken for female patients as controls.

Family History of Asthma and other atopic diseases: Family history of asthma and other atopic diseases like atopic dermatitis, allergic rhinitis, allergic conjunctivitis, urticaria, etc was taken from guardians of patients and control group.

III. Result And Analysis

The collected data edited and entered into excel sheet 2010 Beta and analyzed by using SPSS version 16 software and Epi Info software. Findings were tabulated in frequency distribution tables and the risk factors were analyzed by calculating presence of family history of asthma and atopy in cases and control group. Odds Ratio was also calculated for individual risk factors. Presence of different risk factors of cases and controls was compared by using chi-square test for qualitative data. P value <0.05 was considered as significant statistically.

Table 1: FAMILY HISTORY OF ASTHMA AMONG CASES AND CONTROLS (CROSSTABULATION)

			FAMILY HISTORY OF ASTHMA		TOTAL
			NO	YES	
GROUP	ASTHMA (n=94)	Count	75	19	94
		% within GROUP	79.8%	20.2%	100.0%
	CONTROL (n=94)	Count	87	7	94
		% within GROUP	92.6%	7.4%	100.0%
TOTAL		Count	162	26	188
		% within GROUP	86.2%	13.8%	100.0%

Table no.1 shows that family history of asthma was present in 20.2% asthmatic children whereas in control group it was 7.4%. The association of family history and asthma was statistically significant ($p < 0.05$). The risk of having asthma among children with family history of asthma was found to be 3.15 times greater than that of children without family history of asthma ($\chi^2 = 6.427$, OR = 3.15, 95% CI = 1.17 – 8.78, P =0.011).

Table 2: FAMILY HISTORY OF ATOPY AMONG ASTHMA CASES AND CONTROLS (CROSSTABULATION)

			FAMILY HISTORY OF ATOPY		TOTAL
			NO	YES	
GROUP	ASTHMA (n=94)	Count	59	35	94
		% within GROUP	62.8%	**37.2%**	100.0%
	CONTROL (n=94)	Count	77	17	94
		% within GROUP	81.9%	**18.1%**	100.0%
TOTAL		Count	136	52	188
		% within GROUP	72.3%	27.7%	100.0%

Table no.2 depicts that family history of atopy was present in 37.2% of asthmatic children whereas it was present in 18.1% children in control group. The association was found to be significant statistically ($\chi^2 = 8.613$, $p = 0.0033$). The risk of having asthma among the children with family history of atopy was found to be 2.69 times greater than that of the children without family history of atopy (OR = 2.69, 95% CI= 1.31 – 5.56).

IV. Discussion

In our study 19 patients (20.2%) had family history of asthma (parents and siblings). In a study by Bjerg et al.[5] observed that the prevalence of asthma among fathers and mothers of asthmatic children was 8.7% and 9.2%, respectively. And less than 1% of children had both parents with asthma. Sibling asthma was reported by 10.6% of children. The findings of our study corroborate with the findings of the study by Bjerg et al.[5]

Family history of asthma in our study was present in 19 (20.2%) asthmatic children whereas in control group it was present in 7 (7.4%) children and this difference of family history of asthma among asthma and control groups was found to be statistically significant ($p < 0.05$). The risk of having asthma among children with family history of asthma was 3.15 times greater than that of the children without family history of asthma (Chi-square = 6.427, OR = 3.15, 95% CI = 1.17 – 8.78, P =0.011). These findings of our study match with the findings mentioned in different studies.[6,8]

Family history of atopy was present in 35 (37.2%) asthmatic children whereas it was present in 17 (18.1%) children in control group. The association was found to be significant statistically ($\chi^2 = 8.613$, $p = 0.0033$). This finding is nearly similar with finding of the study conducted by Bjerg et al.[5]

The risk of having asthma among the children with family history of atopy was found to be 2.69 times greater than children without family history of atopy (OR = 2.69, 95% CI= 1.31 – 5.56). This finding is nearly similar with the findings mentioned in other studies.[4,7]

V. Conclusion

It is concluded that children living in this Sub-Himalayan Terai region of North Bengal have an increased risk of having asthma due to increased family history of asthma and atopy. Genetic predisposition and gene-environment interaction may play important role for increased prevalence of asthma among children in this region. This demands long term multicenter further study on large sample.

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