



A CASE CONTROL STUDY OF HEREDITARY PROPENSITY ENVIRONMENTAL FACTORS IN BRONCHIAL ASTHMA

Paediatric Medicine

Dr. Veeda Sree J	Paediatric Junior Resident, Narayana Medical College And Hospital, Nellore-524003. Andhra Pradesh.
Dr. Gokul Krishnan R	Neonatology, NICU Incharge, Narayana Medical College And Hospital, Nellore-524003. Andhra Pradesh.
Dr. Manisha	Paediatrics, Narayana Medical College And Hospital, Nellore-524003. Andhra Pradesh.
Dr. Bharath Vyas	Paediatric Junior Resident, Narayana Medical College And Hospital, Nellore-524003. Andhra Pradesh.

ABSTRACT

Asthma is described as reversible hyper responsive chronic inflammatory airway disease. Inflammation of the airways in the lungs, cause the airways to narrow and constrict. The obstruction leads to the increase in work of breathing as the outflow of the air during expiration becomes difficult. It is a disease characterized by shortness of breath and wheezing, which vary in severity and frequency from person to person. Asthma attacks often starts in childhood mostly affecting children of age group 3-6 years and it is chronic condition affecting daily life and activities of the children. Asthma varies in severity within different countries, population. The climate, genetic, social, environmental factors are significantly connected with the inclination of asthma attacks.

KEYWORDS

Asthma, Environmental Exposure, Genetic Factor

INTRODUCTION

Asthma has arisen as the commonest ongoing clinical issue treated by pediatricians everywhere. It was initially thought to be a influencing just the adults, but now it has arisen as an extremely critical issue influencing child's life and daily activities. The family's substantial social, economic, and psychological effects are significant. The incidence of asthma is increasing alarmingly in the past few decades. The prevalence is estimated to be 10%.⁵

The environmental and hereditary factors has the maximum significance among all the another factors for development of asthma. The allergens, pollens, dust, cold air, pets, wall moulds, cockroaches, passive smoking, outdoor pollution, road traffic, residence near factories, cooking with firewood etc trigger the asthma attack. When the asthmatic child get exposed to the trigger TH-2 mediated reactions takes place causing inflammation, bronchospasm, mucosal edema.

Broncho constriction is caused by the smooth muscle because of the IgE- dependent release of tryptase, histamine leukotrienes, and prostaglandins from mast cells. Airway swelling and remodeling which causes hyper responsiveness of the airway. Symptoms like Recurrent wheeze, Recurrent dry cough, Recurrent breathlessness, Nocturnal-cough, chest tightness indicates recurrent airway obstruction. In spite of the sincere medical efforts, the aetiology of asthma and the rise in prevalence pattern presently can't seem to be laid out. The specific etiology of asthma isn't unequivocally known. The reason might be multifactorial.

AIMS AND OBJECTIVES

To study the role of hereditary propensity and environmental factors in asthma.

MATERIALS AND METHODS

Type Of Study:

Case Control study.

Study Setting:

This study was conducted in the department of paediatrics, Narayana Medical College and Hospital.

Study Population:

Study population includes children between the age group of 4-12 years admitted in Narayana Medical College and Hospital.

Sample Size: 200

Sampling Method:

judgemental sampling method

Study Period:

14 months (September 2021 - November 2022)

Ethical Considerations:

Informed consent was obtained from the parents, and guardians of children before including them in the study. Privacy and confidentiality was maintained. No conflicts of interest.

Inclusion Criteria -

Cases - All children diagnosed with asthma aged 4 - 12 years admitted to Narayana Medical College's pediatrics ward.

Controls - children in same age group admitted in paediatrics ward of Narayana Medical College

Exclusion Criteria

Cases: Children with other causes of wheezing, such as airway abnormalities, foreign body aspiration Children who are less than 4 years and more than 12 years

Controls: The children with Asthma and other associated upper airway tract obstruction disease.

Methodology:

Cases and controls were enlisted in light of consideration and rejection measures subsequent to getting parental assent.

Using the patient data entry form, information was abstracted regarding details and risk factors considered for this study from all cases and controls. Data on environmental, perinatal, inherited, and epidemiological factors, as well as patient and control hereditary factors, were collected using a standardized questionnaire. Every inquiry was made in a subjective manner.

Statistical Analysis:

To examine the proportion of associated factors between cases and controls, the Pearson chi-square test was used.

Odds ratio with a 95% Confidence Interval was calculated to compare the risk factors between cases and controls.

RESULTS:

The majority of the children were found in the age of 4-8 yrs. The male: female proportion is 1.08:1 with no significance. Around 68.5% of the asthmatic children began having their exacerbation at 0-3 years old, 28.5% of them had symptoms at 4-8 years, whereas 3% of them had after 9yrs. Some type of individual atopy is noted in 44% of asthmatic children compared with (4.5%) non-asthmatics. Asthmatic

children were bound to have different atopic signs when compared with those without asthma [OR (95%CI) =9.7(4.6-20.5)]. Allergic rhinitis in asthmatic children was multiple times more than non-asthmatic children with significant importance [OR(95% CI)= 6.86(2.6-17.6)]. Food sensitivity was seen in 27(13.5%) asthmatics compared to 1(0.5%) non-asthmatics with significance [OR (95% CI) =27(3.42212.5)].

Dermatitis was noted in 17(8.5%) asthmatic children compared with 1(0.5%) non asthmatics with significant importance [OR (95% CI) =17(2.04-141.63)]. Conjunctivitis had no significance. Asthmatics made up 45.5% of the population, and their likelihood of having family members with the disease is significantly higher than that of nonasthmatics.. [OR (95% CI) =9(4.4-18.4)]. Father with asthma represented 9.5% [OR (95% CI) =19(2.3-155.8)] and has more impact in the asthma propensity compared to maternal asthma, which accounted for 12% of cases, but with [OR (95% CI) = 9(2.4-33.2)]. 8.5% of asthmatics have asthma in a family member, compared to 1% of non-asthmatics with quantifiable consequences. 12.5% of asthmatics have a demonstrable history of asthma in their grandparents, compared to just 1.5% of non-asthmatics. Just 3% of second-degree relatives have asthma, despite this with significant importance. 16.5% of asthmatics had family H/O atopy, compared to (2.5%) of nonasthmatics, [OR (95%CI) = 6.6(2.3-18.7)]. Children born to atopic parents have a significantly increased risk of developing asthma.

Both the father and the mother contributed 4.5% and 5.5%, with maternal atopy having a greater effect on asthma development than that of the father. 4% of asthmatics have an atopy in their family, compared with 1% in nonasthmatics with significant importance [OR(95% CI)= 4(0.6-23.7)]. 62% of the asthmatic children develop symptoms of asthma to motor vehicle exhaust with significant importance. [OR (95% CI) = 41.3 (12.8-133.3)]. 46.5% of asthmatic develop asthma when exposed to cold air with significant importance [OR (95% CI) = 46.5 (11.1-194.17)]. Asthmatic children are threefold in risk to be living close by traffic streets or roads compared with non-asthmatics. Dusty home environment was seen in 58 (29%) of asthmatic children compared with 28 (14%) of non-asthmatic children and was seen two times more usually among asthmatics contrasted with non-asthmatics with significant importance [OR (95%CI) =2.07 (1.2-3.5)]. Passive smoking was seen in 41 (20.5%) asthmatics contrasted with 9(4.5%) non-asthmatics and was multiple times more among asthmatics with measurable significance.[OR (95% CI) = 4.5 (2.63 - 10.35)]. Cooking with wood was noted in 16 (8%) asthmatic compared with 1(0.5%) in non-asthmatic which was seen multiple times more common in asthmatics compared with non-asthmatics [OR(95%CI)= 16 (1.9-134.5)].

Pet exposure was seen in 44 (22%) asthmatic children compared with 12 (6%) in non asthmatics. Utilization of mosquito coils was seen in 66 (33%) asthmatic children compared with 12 (6%) non-asthmatic youngsters with significant importance [OR (95% CI)= 7.64 (4.2-13.7)]. The presence of moulds on the walls [OR (95% CI)=3.1 (1.29-7.93)] viewed as firmly connected with risk for asthma. Presence of cockroaches was essentially connected with asthma. [OR (95% CI)= 4.4(1.4-13.3)]. Among asthmatics, 136 (68%) children were from metropolitan cities compared with non asthmatics who live in rural areas 104 (52%).

CONCLUSION:

Our study supports the complex etiology of asthma. Asthma is due to the interplay of hereditary and environmental variables. The risk of having asthma is independently correlated with the following factors in our study.

- Personal atopy
- Family history asthma
- Family history atopy
- Cold air allergy
- Automobile exhaust dust allergy
- Pets
- Mosquito coils
- Cooking with wood

The measures to reduce exposure to environment irritants and allergens is important to reduce asthma episodes. Asthma is a chronic disease with intermittent treatment, long term follow up is important to control the disease of asthma.

Table-1: Age and sex determination of children(n=200)

Age	sex		Total
	male	female	
4-8 y	57(28.5%)	49(24.5%)	106(53%)
9-12 y	46(23%)	48(24%)	94(47%)
Total	103(51.5%)	97(48.5%)	200(100%)

Table-2: Age onset of asthma (n=200)

Age	No	%
0-3 y	137	68.5%
4-8 y	57	28.5%
9-12 y	6	3%
Total	200	100%

Table-3: Personal atopic manifestation among children with asthma and controls
univariate analysis

Personal Atopy	Cases no(%)	Controls no (%)	OR (95% CI)	Xsquare	P value
Eczema	17(85%)	1(0.5%)	17(2.04-141.63)	14.6	<0.008
Food allergy	27(13.5%)	1(0.5%)	27(3.42-212.5)	22.8	<0.001
Allergic rhinitis	41(20.5%)	6(3%)	6.8(2.6-17.6)	38.28	<0.0001
conjunctivitis	3(1.5%)	1(0.5%)	3(0.2-42.6)	3.26	<0.14
Total	88(44%)	9(4.5%)	9.7(4.6-20.5)	79	<0.0001

Table-4: Family H/O asthma among asthmatics as non-asthmatics univariate analysis

Family h/o Asthma	Cases No(%)	Controls (No%)	OR (95%CI)	X square	P value
father	19(9.5%)	1(0.5%)	19(2.3-155.8)	16.04	<0.005
mother	24(12%)	3(1.5%)	9(2.4-33.2)	21.6	< 0.001
sibling	17(8.5%)	2(1%)	8.5(1.7-41.9)	15.24	<0.008
Grand parents	25(12.5%)	3(1.5%)	8.3(2.25-30.7)	22.46	< 0.001
Relatives (Second degree)	6(3%)	1(0.5%)	6 (0.5-63.6)	5.62	<0.01
total	91(45.5%)	10(5.1%)	9(4.4-18.4)	81.3	<0.001