

ORIGINAL RESEARCH

A Prospective Analysis of Early Eczema and the Risk of Childhood Asthma at a Tertiary Care Hospital

¹E. ShivanandaMurgod, ²Narayan Murthy D, ³Pendyala Pradeep, ⁴Raj Kirit E P

¹Assistant Professor, Department of General Medicine, Ayaan Institute of Medical Sciences, Teaching Hospital and Research Centre, Kanakamamidi, Moinabad, Telangana, India

²Assistant Professor, Department of General Medicine, Kalinga Institute of Medical Sciences (KIMS), Bhubaneswar, Odisha, India

³Associate Professor, Department of Dermatology, Dhanalakshmi Srinivasan Medical College and Hospital, Siruvachur, Perambalur, Tamil Nadu, India

⁴Associate Professor, Department of Dermatology, Shri. B. M. Patil Medical College, Hospital & Research Centre, Vijayapura, Karnataka, India

Corresponding Author

Raj Kirit E P

Associate Professor, Department of Dermatology, Shri. B. M. Patil Medical College, Hospital & Research Centre, Vijayapura, Karnataka, India

Received: 17 March, 2021

Accepted: 28 April, 2021

ABSTRACT

Background: Childhood eczema carries a heavy burden for the affected child and the family. It is a disease with a high and variable prevalence, and there is evidence that the prevalence has increased in recent decades. Hence; the present study was conducted for assessing early eczema and the risk of childhood asthma. **Materials & Methods:** A total of 100 parents of children at age 2 (baseline) were given questionnaires concerning environmental exposures and the family history of different allergy-related diseases in the parents and siblings were enrolled. A detailed questionnaire concerning the child's health, with an emphasis on allergy-related diseases, was also administered. The standard prick test (SPT) and specific IgE (sIgE) readings were used to assess sensitization, and the Scoring of Atopic Dermatitis (SCORAD) index was used to quantify the severity of the disease. Positive sensitization was indicated by a child's positive sIgE or positive SPT. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Univariate analysis was done for evaluation of level of significance. **Results:** One hundred people in all were examined. The estimate of the substantial correlation between present asthma at 6 years and eczema at 2 years was found. About 40% of children who had eczema at age 6 had it start after age 2. However, those who had it start before age 2 were more likely to have several allergy-related conditions coexisting with their eczema at age 6. **Conclusion:** The results of this study lend credence to the theory of an atopic march in the general population, even if the majority of eczema cases seen in primary care are mild to moderate.

Key words: Childhood, Eczema, Asthma.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

INTRODUCTION

Childhood eczema carries a heavy burden for the affected child and the family. It is a disease with a high and variable prevalence, and there is evidence that the prevalence has increased in recent decades. An association between childhood atopic eczema and asthma has been shown in at least 1 cross-sectional study and in several longitudinal studies. A recent systematic review indicated that about 1/3 of children with atopic eczema before age 4 years will develop asthma by age 6 years or older. There is a paucity of clinical studies of the development of eczema in

infancy.¹⁻³ Available reports have classified eczema from symptom questionnaires, a history of community doctors' diagnoses, or cross-sectional observations. However, the clinical course is capricious, and morphology is instrumental to the diagnosis of eczema, which is based on a syndrome of clinical criteria. Particularly in early age, there is a large interobserver variation and corresponding risk of misclassification.³⁻⁶ Reported risks of asthma in children with AE vary greatly, from 25% in some sources to 80% in others.³⁻⁵ Most of the evidence on which the concept of the atopic march is based comes

from cross-sectional population studies at different ages. A recent population-based prospective birth cohort study suggested a more complicated relationship between early AE and asthma later in childhood, with wheezing preceding or coinciding with AE in the majority of children.⁶ As a result, it is unclear whether the concept of the atopic march, with simple progression of AE at early age into asthma at school age, is still valid. This encouraged us to seek an evidence-based answer to the question, "What is the risk of developing asthma at school age in children with AE during the first 4 years of life?"⁶⁻⁸ Hence; the present study was conducted for assessing early eczema and the risk of childhood asthma.

MATERIALS & METHODS

The present study was conducted for assessing early eczema and the risk of childhood asthma. A total of 100 parents of children at age 2 (baseline) were given questionnaires concerning environmental exposures and the family history of different allergy-related diseases in the parents and siblings were enrolled. A detailed questionnaire concerning the child's health, with an emphasis on allergy-related diseases, was also administered. An identical health questionnaire was administered when the child was 6 years of age. "Has your child ever had eczema?" is the query on both. and "Has your child ever experienced a recurrent, itchy rash that lasted at least six months?" required to be responded in the affirmative in order to be given the title of "history of eczema" at the age of two. The two earlier inquiries were paired with the question,

"Has your child during the last 12 months used any kind of medication, ointment, cream, tablets, or herbal medicines against eczema?" in order to identify children who had eczema at the age of six. A yes response to the query, "Has your child ever been diagnosed as having asthma by a doctor?" indicated a history of asthma. The first question was paired with a yes response to the follow-up inquiry, "Has the child during the last 12 months used tablets, inhalation medications, or other treatments for wheezing, tightness in the chest, or asthma?" in order to determine the child's current asthma status. The standard prick test (SPT) and specific IgE (sIgE) readings were used to assess sensitization, and the Scoring of Atopic Dermatitis (SCORAD) index was used to quantify the severity of the disease. Positive sensitization was indicated by a child's positive sIgE or positive SPT. All the results were recorded in Microsoft excel sheet and was subjected to statistical analysis using SPSS software. Univariate analysis was done for evaluation of level of significance.

RESULTS

One hundred people in all were examined. The estimate of the substantial correlation between present asthma at 6 years and eczema at 2 years was found. About 40% of children who had eczema at age 6 had it start after age 2. However, those who had it start before age 2 were more likely to have several allergy-related conditions coexisting with their eczema at age 6.

Table 1: Variables

Variable	Number /Percentage	95% CI
Male gender	53	49.2- 53.2
Dog at home	9.2	6.2- 10.5
Smoking parents	20.3	15.3- 20.8
Eczema	19.2	15.2- 21.3
Doctor diagnosed asthma	7.3	4.3- 8.9
Allergy test performed	22.3	18.2- 23.9

Table 2: Prevalence of allergy-related diseases and sensitization in children

Variable	Number /Percentage	95% CI
Eczema (ever)	19.3	17.2- 20.3
Asthma (ever)	8.3	7.2- 10.9
Wheezing (ever)	27.3	26.1- 29.2

Table 3: Prevalence of allergy-related diseases in children at 6 years of age

Variable	Number /Percentage	95% CI
Eczema (current)	14.1	13.2- 16.9
Asthma (current)	6.2	4.2- 7.1
Wheezing (current)	12.3	10.1- 14.3

DISCUSSION

Children with an atopic constitution are at risk of developing allergic symptoms, such as atopic eczema, food allergy, allergic rhinoconjunctivitis (ARC) and asthma, with multiple factors influencing these

immune responses. Especially in countries with a western life style the prevalence of allergy in childhood has increased remarkably in recent decades. The "atopic march" is a term that has been used to describe the progression from atopic eczema and food

allergy during infancy to ARC and subsequently to asthma later in childhood. Previous studies have shown that children with atopic eczema or those sensitized to allergens in early childhood more often develop ARC and asthma. However, the concept of “atopic march” has been questioned. The relations between the allergic disorders seem to be much more complicated than that of one condition progressing into another.⁹⁻¹²Hence; the present study was conducted for assessing early eczema and the risk of childhood asthma.

One hundred people in all were examined. The estimate of the substantial correlation between present asthma at 6 years and eczema at 2 years was found. About 40% of children who had eczema at age 6 had it start after age 2. However, those who had it start before age 2 were more likely to have several allergy-related conditions coexisting with their eczema at age 6. van der Hulst E et al assessed the risk of developing asthma in children with atopic eczema during the first 4 years of life. A sensitive search was performed to identify all prospective cohort studies on the topic. By pooling the eligible reports, we calculated the risk of developing asthma at 6 years of age or older in children with atopic eczema in the first 4 years of life. Thirteen prospective cohort studies were included, with 4 representing birth cohort studies and 9 representing eczema cohort studies. The pooled odds ratio for the risk of asthma after eczema, compared with children without eczema, in birth cohort studies was 2.14. The prevalence of asthma at the age of 6 years in eczema cohort studies was 35.8% for inpatients and 29.5% for a combined group of inpatients and outpatients. Although there is an increased risk of developing asthma after eczema in early childhood, only 1 in every 3 children with eczema develops asthma during later childhood.¹¹

Bisgaard H et al analyzed the effect of environmental exposures in early life and genetic predisposition on the development of eczema before age 3 years. The Copenhagen Study on Asthma in Childhood is a prospective clinical study of a birth cohort of 411 children born of mothers with asthma. Eczema was diagnosed, treated, and monitored at the clinical research unit, and complete follow-up for the first 3 years of life was available for 356 children. Risk assessments included filaggrin loss-of-function mutation; parent's atopic disease; sex; social status; previous deliveries; third trimester complications and exposures; anthropometrics at birth; month of birth; duration solely breast-fed; introduction of egg, cow's milk, and fish; time spent in day care; cat and dog at home; feather pillow; nicotine in infant's hair; and temperature and humidity in bedroom. Eczema developed in 43.5% of the infants. Filaggrin mutation (odds ratio [OR], 3.20; 95% CI, 1.46-7.02; $P = .004$), mother's eczema (OR, 2.80; 95% CI, 1.70-4.63; $P < .0001$), and father's allergic rhinitis (OR, 1.91; 95% CI, 1.09-3.33; $P = .02$) were directly associated with risk of eczema. Risk of eczema was significantly

reduced by birth length (OR per cm increase, 0.87; 95% CI, 0.78-0.97; $P = .02$), increased bedroom temperature (probably inverse causality; OR, 0.80; 95% CI, 0.66-0.97; $P = .02$), and dog living in the home (OR, 0.44; 95% CI, 0.23-0.87; $P = .02$). Dog exposure reduced the risk of eczema, whereas short length at birth, filaggrin mutation, and parental atopy increased the risk of eczema by age 3 years.¹²

CONCLUSION

The results of this study lend credence to the theory of an atopic march in the general population, even if the majority of eczema cases seen in primary care are mild to moderate.

REFERENCES

- Oien T, Storro O, Johnsen R. Intestinal microbiota and its effect on the immune system—a nested case-cohort study on prevention of atopy among small children in Trondheim: the IMPACT study. *Contemp Clin Trials*. 2006;27:389–95.
- Illi S, von Mutius E, Lau S, Nickel R, Niggemann B, Sommerfeld C, Wahn U. The pattern of atopic sensitization is associated with the development of asthma in childhood. *J Allergy Clin Immunol*. 2001;108:709–14.
- Oien T, Storro O, Johnsen R. Assessing atopic disease in children two to six years old: reliability of a revised questionnaire. *Prim Care Respir J*. 2008;17:164–8.
- Weidinger S, O'Sullivan M, Illig T. Filaggrin mutations, atopic eczema, hay fever, and asthma in children. *J Allergy Clin Immunol* 2008; 121: 1203–9.
- Hederos C-A, Hasselgren M, Hedlin G, Bornehag C-G: Comparison of clinically diagnosed asthma with parental assessment of children's asthma in a questionnaire. *Pediatr Allergy Immunol* 2007; 18: 135–41.
- Bisgaard H, Hermansen MN, Buchvald F, Loland L, Halkjaer LB, Bonnelykke K, et al. Childhood asthma after bacterial colonization of the airway in neonates. *N Engl J Med* 2007;357:1487-95.
- Bisgaard H, Loland L, Holst KK, Phipps CB. Prenatal determinants of neonatal lung function in high-risk newborns. *J Allergy Clin Immunol* 2009;123:651-7.
- von ME. Gene-environment interactions in asthma. *J Allergy Clin Immunol* 2009; 123:3-11.
- Lack G, Fox D, Northstone K, Golding J: Factors associated with the development of peanut allergy in childhood. *N Engl J Med* 2003, 348: 977–85.
- Peroni DG, Piacentini GL, Alfonsi L, Zerman L, Di Blasi P, Visona G, et al.: Rhinitis in pre-school children: prevalence, association with allergic diseases and risk factors. *Clin Exp Allergy* 2003, 33: 1349–54.
- van der Hulst E et al. Risk of developing asthma in young children with atopic eczema: A systematic review. *Asthma diagnosis and treatment*. 2007; 120(3): 565-9.
- Bisgaard H et al. Risk analysis of early childhood eczema. *J Allergy Clin Immunol*. 2009; 123(6): 1355-60.