

Effect of Breast-Feeding on the Development of Atopic Dermatitis

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ABSTRACT

Atopy can be defined as the genetically determined risk to develop allergic disease. Avoidance of one specific allergen may decrease the risk for sensitization against this allergen, but it will not affect atopy. Our aim was to investigate if exclusive breast-feeding is associated with atopic dermatitis during the first 5 years of life.

Data on 200 children were taken from parental-administered questionnaires from a case control study in Birjand - Iran (recruited 2003) comprised of a case (100 children with atopic dermatitis) and a control (100 normal children) subgroup. Outcomes were physician-diagnosed atopic dermatitis (AD) and itchy rash. Data were analyzed by using SPSS package, Chi square and Exact Fisher tests.

Thirty-four of the case and 50 of control group were exclusively breast-fed, whereas 6 of the case and 2 of control group were exclusively cow milk-fed. These differences were statistically significant. ($P < 0.05$)

Duration of breast-feeding in case and control group was different. These differences were statistically significant ($P < 0.001$).

Duration of cow's milk formula feeding in case and control group was different, but these differences were not statistically significant. ($P = 0.6$) Positive family history of allergy in case and control group was 63% and 23% respectively and this difference was statistically significant ($P < 0.001$).

These findings support the hypothesis that exclusive breast-feeding is a protective factor for development of atopic dermatitis if compared with conventional cow's milk formula.

Keywords: Atopy; Atopic dermatitis; Breast feeding

INTRODUCTION

Atopy can be defined as the genetically determined risk to develop allergic disease. Avoidance of one specific allergen may decrease the risk for sensitization against this allergen, but it will not affect atopy. In the 1936, a large nine-month follow-up study in the United Kingdom found that breast-feeding had an impressive protective effect on the development of eczema.¹ Since then, the environment, living conditions and prevalence of

allergic diseases have changed considerably. The impact of breast-feeding on the development of allergies has been investigated continuously ever since. However, the large body of evidence has not succeeded in convincingly proving the protective effect of breast-feeding; the issue remains controversial today.²⁻¹¹ Nevertheless, the overall beneficial effect of breast-feeding on a child's health was never questioned, but the lingering discussion on the topic recently had a fresh revival by a reported increased risk of asthma and atopy in breast-fed New Zealanders born in the 1970s.² Most previous reports on this issue have focused on finding protective effects of breast-feeding,^{11,12} but Sears et al were not the first to report a possible increased risk^{8,13-18} of

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asthma^{19,20} and allergies.^{10,21} Just recently, two studies also found breast-feeding to be a risk factor for atopic eczema.^{22,23} The general public in developed countries is well aware of the problem of increasing prevalence of allergies, so these recent adverse reports could have negative public health implications on infant feeding practices. This debate prompted us to further investigate the issue using data from our case control study to investigate the risk factors of atopic dermatitis in Birjand, Iran. Our aim was to investigate whether breast-feeding is associated with the development of atopic dermatitis during the first five years of life.

MATERIALS AND METHODS

Study Design and Subjects

We used questionnaire data from a case control study in Birjand - Iran (recruited 2003) comprised of a case (100 children with atopic dermatitis) and a control (100 normal children) subgroup with age of 2-5 years. We had matched case and control groups (age and sex).

Written informed consent was obtained from all the participating families.

Questionnaires

Definition of Feeding Regimen

The child's parents were asked: "What kind of milk did your child drink during (each of) the first 6 months of life?" The child was defined as "exclusively breast-fed" if parents selected "exclusively human milk" for all of months 1 to 6. Otherwise the child was labeled "partly breast-fed". A child was further defined to be "conventional cow's-milk formula fed" if he/she had been fed conventional cow's-milk formula during the first year of life.

Definition of Atopic Dermatitis (AD)

Parents were asked: "Did a physician diagnose any of the following diseases during the 1st/2nd/3rd/4th/5th year of life: allergic or atopic eczema/dermatitis?" If the parents selected yes, the child was defined to have "physician-diagnosed atopic dermatitis", which was the primary outcome. The symptom "itchy rash" was defined by ISAAC (International Study of Asthma and Allergies in Childhood) core questions²⁴ as intermittent itchy rash affecting the skin creases for at least 6 months.

Risk Factors for Allergic Diseases

Additional questionnaire information included solid food feeding, family history of allergy (AD, asthma, hay fever, urticaria, and food allergy).

Statistical Analysis

Data were analyzed by using SPSS package, Chi square and Exact Fisher tests. Statistical significance was defined at the two-sided $P = 0.05$ level.

RESULTS

Mean age of case group was 3.7 ± 0.25 and mean age of control group was 3.6 ± 0.20 ($P > 0.5$). Half of the children were female and 50% of the children were male. Thirty-four (34%) of the cases and 50 (50%) of the control group were exclusively breast-fed, whereas 6 (6%) of the case and 2 (2%) of the control group were exclusively cow's milk formula-fed. These differences were statistically significant. ($X = 3.59$, $p < 0.05$) (Table 1).

Duration of breast-feeding in case and control groups was different. Forty-two (42%) of the cases and 18 (18%) of the control group were partly breast-fed during only the first one-year of life, whereas 51% of case and 79% of control group were partly breast-fed during the first two years of life. These differences were statistically significant. ($X = 15.85$, $p < 0.001$) (Table 2).

Duration of cow's milk formula feeding in case and control group was different. Fifty (15%) of case and 10 (10%) of control group were partly cow's milk formula-fed during only the first one-year of life, whereas 36% of case and 18% of control group were partly cow's milk formula fed during the first two years of life, but these differences were not statistically significant. ($X = 0.329$, $p = 0.6$) (Table 3).

Table 1. The assessment of relationship between exclusively cow's milk formula and exclusively Breast-feeding with development of atopic dermatitis in case and control groups.

Groups		Exclusively Breast-feeding	exclusively milk- formula feeding	Total
Case	No.	34	6	40
Control	No.	50	2	52
Total		84	8	92

Exact fisher test analysis showed a significance relationship between exclusively cow's milk formula and Breast-feeding with development of atopic dermatitis. $X = 3.59$, $P < 0.05$

Table 2. The assessment of relationship between duration of Breast-feeding and development of atopic dermatitis in case and control groups.

Groups		< 1 year	< 2 years	Total
Case	No.	42	51	93
Control	No.	18	79	97
Total		60	130	190

Exact fisher test analysis showed a significance relationship between duration of Breast-feeding and development of atopic dermatitis. $X = 15.86$, $P < 0.001$

Table 3. The assessment of relationship between duration of cow's milk formula feeding and development of atopic dermatitis in case and control groups.

Groups		< 1 year	< 2 years	Total
Case	No.	15	36	51
Control	No.	10	18	28
Total		25	54	79

Exact fisher test analysis showed no significance relationship between duration of cow's milk- formula feeding and development of atopic dermatitis. $X = 0.329$, $P = 0.618$

Family history of allergy (AD, asthma, hay fever, urticaria, food allergy) in case and control group was different. Positive family history of allergy in case and control group was 63% and 23% respectively. ($P < 0.001$, Odds Ratio = 2.78)

DISCUSSION

In this case control study to investigate determinants and the natural course of atopic dermatitis (AD), we found a protective effect of exclusive breast-feeding compared with conventional cow's-milk and milk formula in the AD.

Breast-feeding is the preferred method of infant nutrition for numerous reasons. However, its role in the prevention of allergic disease remains controversial.^{2-11,25} Reasons for this controversy include methodological differences and flaws in the studies performed to date, the immunologic complexity of breast milk itself and, possibly, genetic differences among patients that would affect whether breast-feeding was protective against the development of allergies or is in fact sensitizing. The preponderance of evidence suggests, however, that there would be much to lose by not recommending breast-feeding. In general, studies reveal that infants fed on formulas of intact cow's milk or soya protein compared with breast milk have a higher incidence of atopic dermatitis and wheezing illnesses in early

childhood. Consistent with these findings, exclusive breast-feeding should be encouraged for at least 4 to 6 months in infants at both high and low risk of atopy and irrespective of a history of maternal asthma.²⁶

Our results agree with the findings in two studies.^{12,15} Contrary to our findings, recently findings have been reported that breast-feeding is associated with an increased risk of atopic eczema in a German observational cohort study,²² in a New Zealand cohort study²⁷ and in a Japanese cross-sectional study on adolescents.²³ Miyake et al found that breast-feeding was associated with AD in 12- to 15-year-old children, but not with wheezing or rhino-conjunctivitis.²³

It is possible that AD in these adolescents developed in early infancy during the period of breast-feeding, whereas wheezing and rhino-conjunctivitis had a later onset and thus could not influence the choice of feeding regimen. In a study by Kramer¹¹ to help shed some light on the 60-year-old controversy concerning the possible protective effect of breast feeding on subsequent atopic disease, he developed 12 standards pertaining to both biologic and methodologic aspects of exposure (infant feeding), outcome (atopic conditions), and statistical analysis for studies of atopic eczema, asthma, allergic rhinitis, cow milk allergy, and other food allergy. Among the published studies on atopic eczema, the nine studies claiming a protective benefit of breast-feeding performed less well than the 12 studies not making such a claim on "methodologic" standards relating to strict diagnostic criteria and blind ascertainment of outcome.¹¹ The positive studies were somewhat stronger, however, on the "biologic" standards bearing on sufficient duration and exclusivity of breast-feeding and on separate analysis of children at high risk. For the other atopic conditions, there were no important differences between positive and negative studies. In few negative or positive studies there was adequate control for confounding variables or examination of potential benefits relating to the severity or age at the onset of atopic disease. To avoid another 60 years of unresolved controversy, future studies should improve both the biologic and methodologic aspects of their design and analysis.

These findings support the hypothesis that exclusive breast-feeding is a protective factor for development of atopic dermatitis if compared with conventional cow's milk formula.

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