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ORIGINAL ARTICLE

Role of Breastfeeding and Onset of Atopic Dermatitis in Children Patient: A Cross-Sectional Study

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Abstract: Atopic dermatitis (AD) is a multifactorial disease that belongs to the "burden disease" in childhood. It needs to be prevented to reach their optimal growth. Exclusive breastfeeding given during the first six months of life provides nutritional benefits and is thought to protect children from allergic or infectious diseases, such as AD. This study aims to determine the relationship between breastfeeding and the onset of atopic dermatitis. This was an observational analytic study using a cross-sectional method. Samples were taken consecutively at the Dermatovenereology Polyclinic of referral hospital and Puskesmas in Medan. This study included all pediatric patients aged 6 months to <18 years diagnosed with AD and was interviewed with informed consent. Children who didn't get breastmilk were excluded. The result was a significant relationship between breastfeeding (exclusively to partially) and AD onset. There was no relationship between breastfeeding (exclusively to pre-lacteally) and AD onset. Polyunsaturated fatty acids, sIgA, and TGF-β2 in the breast milk of mothers with atopy are lower than mothers without atopy. Breastfeeding exclusively has a protective effect on AD. Further research is needed to analyzes various factors by comparing genetic predisposition.

Keywords: Atopic dermatitis, Atopy onset, Exclusive breastfeeding, Pediatric.

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INTRODUCTION

Atopic dermatitis (AD) is a chronic, recurrent inflammation of the skin with the main symptoms of pruritus being very disturbing, morphologically distinctive, and having a specific pattern based on age. Usually associated with a history of atopy in the patient or family (allergic rhinitis, asthma, AD), xerosis or skin barrier disorders, reactive IgE, genetic factors, changes in T-cell response, antigens, inflammatory cytokines, host defense proteins, sensitivity to allergens and infections.[1-3] Atopic dermatitis is a disease that is classified as a "burden disease" with an unknown etiology, complex pathogenesis and involves many factors that describe a multifactorial disease.[4]

The International Study of Asthma and Allergies in Childhood (ISAAC) suggests that AD prevalence varies between 0.3% to 20.5% in 56 countries, but there is a tendency for disease prevalence to increase and be consistent over time.[5] Based on research data from 7 hospitals in Indonesia, AD is ranked first of the 10 most common skin diseases found in toddlers and children (611 cases). AD disease usually appears in childhood, especially in infants, and must be prevented early on, because children need optimal growth. Exclusive breastfeeding given during the first 6 months, provides nutritional benefits and protects children from allergic diseases or infections so that the incidence rate can be reduced and does not cause disturbances such as the occurrence of AD in infants and children.[6]

A large-scale cohort study by Grulee reported a seven times greater risk of AD in infants who received formula milk compared to infants who received breast milk. Since then, a lot of research has been done to prove this hypothesis, but the results are still controversial.[7] Not many studies have examined the relationship between exclusive breastfeeding and the incidence of AD in Indonesia. Another study showed breastfeeding during the first 4 months had a significant protective factor against the risk of AD in children in the initial 3 years, compared to children who received formula milk.[8] Munasir and his colleagues conducted a 6-month cohort study of newborns in Jakarta that failed to conclude the role of hyper allergenic food exposure, breastfeeding, exposure to cigarette smoke, and dust in the environment as risk factors for AD in infants aged 0-6 months.[9] Research on the relationship of breastfeeding patterns with AD onset has not been done much.

METHODS

This cross-sectional observational analytic study was conducted in the Pediatric Dermatology Division, Department of Dermatovenereology in General Hospital Haji Adam Malik, Puskesmas Bestari, Puskesmas Helvetia, Puskesmas Glugur Kota, Puskesmas Teladan and Puskesmas Padang Bulan in Medan. Sampling was conducted consecutively from April 2019 until the minimum number of samples was met i.e. 35 (categorical comparative analytics, not in pairs). The inclusion criteria were pediatric patients aged 6 months to <18 years who had been diagnosed with AD according to the Hanifin-Rajka criteria. Children who are not breastfed and their parents are not willing to be excluded. All samples signed an informed consent form and research permission was obtained from the Research Ethics Commission of the Faculty of Medicine, University of North Sumatra.

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The subject's parents will be implanted by the researcher by the status of the study and recorded patterns of breastfeeding and AD onset of the subject. The breastfeeding pattern is divided into three categories namely exclusive, predominant, and partial patterns. Exclusive breastfeeding is a baby only given breast milk, including breast milk from birth until the age of 6 months, without the addition of other liquids and artificial food additives except for drugs with medical indications. Predominant breast milk is a baby given breast milk but has been given a small number of other liquids or water-based drinks, such as tea or formula milk, as prelacteal food/drink before the mother's milk comes out. Partial breast milk is a baby given breast milk and given artificial fluids or food additives, both formula milk, porridge, orange juice, tea water, water, bananas, papaya, biscuits, rice porridge, team, and so on before the baby is 6 months old. AD onset is divided into 2 categories, namely: the infantile phase from 6 months to <2 years old and the children phase from 2 years to <18 years.[10]

The collected data were analyzed statistically using the SPSS application to determine the relationship of the pattern of breastfeeding with the onset of AD. The test used was Fisher's alternative test.

RESULTS

In this study, 35 pediatric patients with AD who were eligible had undergone history taking, dermatological examination, and recording the status of the study. The characteristics of the subjects in this study were based on the distribution of gender, age group, and atopy history of patients and families in all study subjects (Table 1). Obtained the ratio of male to female 1.3: 1 with the most age groups in the range 2-4 years. History of atopy in both parents was most often found, namely 42.9% although 4.3% of parents did not have a history of atopy.

The results of this study indicate that there is a relationship between the pattern of breastfeeding (exclusive of partial) with the onset of AD (p = 0.03) and there is no relationship between the pattern of breastfeeding (exclusive of predominant / prelacteal) with the onset of AD (p = 0.16) (table 2).

Table 1. Subject Characteristics

Characteristics	Atopic Dermatitis	
	n	%
Gender		
Male	20	57.1
Female	15	42.9
Age group (years)		
<2	11	31.4
2 – 4	12	34.3
5 – 12	11	31.4
13 – 17	1	2.9
History of Atopy		
Present	28	80.0
Absent	7	20.0
Familial History of Atopy		
Father and mother	15	42.9
Mother	11	31.4
Father	4	11.4
Absent	5	14.3

Table 2. Relationship of Breastfeeding Patterns with AD Onset

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Breastfeeding patterns	Atopic Dermatitis					
	Infantile onset		Children onset		p-value	OR (IK95%)
	n	%	n	%		
Partial	16	88.9	2	11.1	0.03	0.13 (0.02-0.85)
Predominant/prelacteal	6	85.7	1	14.3	0.16	0.17 (0.01-1.94)
Exclusive	5	50.0	5	50.0		Comparison
Total	27	77.1	8	22.9		

DISCUSSION

Higher IgE levels have been reported in male infants and infants at birth and ages 6 months and 6 years. This data may be parallel with reports that asthma is more common in boys than girls during infancy and children but this pattern is reversed at puberty.[11] Exposure to prenatal hormones can regulate the immune system of the fetus, but biological or cultural factors involved in shifting gender differences in atopic disease are not fully known.[12]

The results of this study are supported by the results of Halkjaer's study in which the cumulative incidence of AD at 1 year of age is 31%, 2 years of age is 41% and at 3 years of age is 44% with a peak incidence of 2 years in boys and 2.5 years in girls.[13] According to Bieber, more than 50% of children affected by AD in the first 2 years have no signs of IgE sensitization, but they become much more sensitive during AD.[14] Among these, 75% will experience remission spontaneously before adolescence and the remaining 25% are persistent to adulthood or recur after several years free of symptoms.[15] According to the researchers' assumptions, the increase in cases in childhood at the age of 3 years is due to children at the age of activities outside the home that are increasing and can scratch themselves.

Atopy can be inherited specifically through the maternal line, or the mother can carry relatively more predisposing genes. Transplacental antigen transfer, maternal antibodies, and maternal cytokines can form early atopy and share postnatal environmental factors through breastfeeding and the shared home environment may also play a role.[12] A history of atopy in first-degree relatives is one of the diagnostic criteria for atopic dermatitis in infancy, so researchers do not exclude patients who have a family history. Besides, because the mother interviewed for a history of paternal atopy, it may contain misinformation. Other studies have found that mothers are more likely to classify fathers with AD if a child suffers from AD than none of their children with AD.[16]

The results of this study support previous studies with a follow-up period of up to 17 years, that breastfeeding has a protective effect on the development of the atopic disease. Where the prevalence of groups with breastfeeding <6 months is greater (65%) compared to those who breastfeed longer (> 6 months) 42% (p = 0.02). Besides, AD is the least common occurrence in groups that are breastfed for longer.[7] A cohort study data in Sweden, shows exclusive breastfeeding for at least 4 months is associated with a reduced risk of suffering from AD and asthma until the age of 2 years.[16] A meta-analysis study in 2001 showed a protective effect on the AD during childhood from breastfeeding in the group who were exclusively breastfed for the first 3 months (p=0.049, OR 0.77). This

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association is stronger in subgroups with a family history of atopy (OR 0.58).[17]

Not all studies support this research because the role of breastfeeding is still controversial about the incidence of AD. A study in Finland with a 20-year follow-up of 200 newborns, 42% with a family history of atopy, showed the longer breastfeeding (9 months or more) was associated with AD (p= 0.002).[18] Other studies found the prevalence of AD increased annually (OR 1.05) for every additional 1 month of breastfeeding in the first 7 years in the group with a history of atopy and concluded that breastfeeding did not prevent AD in children with genetic risk.[19]

Breastfeeding can have a protective effect on AD but several other countries do not apply the same thing. The risk of developing atopy is significantly different in various countries and the highest risk is in industrialized countries and Indonesia is not one of them. This unsupportive result might be due to the reverse-causality effect. Mothers with a history of atopy and good knowledge will realize that babies have a high risk of developing AD so they will give exclusive breastfeeding and with a longer duration. Increased incidence of AD in children with exclusive breastfeeding is associated with a lower incidence of upper respiratory tract infections.

Allergen and immunological components in breast milk also differ between individuals due to genetic factors and maternal diet. The mother's diet of hyper-allergenic food ingredients (such as cow's milk, eggs, nuts, and seafood) was not intervened in this study. The content of sIgA, TGF-β2, and polyunsaturated fatty acids in the breast milk of mothers with atopy is lower than that of mothers without a history of atopy.[18,19] Genetic factors in which the filaggrin null gene mutation occurs is a major factor in the early onset of AD and persists into adulthood.[20]

The allergy prevention effect of exclusive breastfeeding is due to reduced exposure to food antigens and the effect of immunologically active factors contained in breast milk. Likewise, there are antimicrobial agents, various immunomodulating agents, including anti-inflammatory and proinflammatory mediators, and small amounts of allergens, such as food protein antigens in breast milk. On the other hand, exclusive breastfeeding for more than 6 months appears to be beneficial in preventing food allergies with a peak prevalence of 3 years, and respiratory allergies with a peak prevalence of 17 years.[7] Breastfeeding is still better than any formula for infant nutrition because of the nutritional, immunological, and psychological benefits. The controversy between one study and another is also caused by differences in research designs, differences in the diagnosis criteria for AD, randomization, and blinding.

CONCLUSIONS

Breastfeeding for 6 months or more is required for AD prophylaxis during the first 2 years of life. Because AD is a multifactorial disease, further research is needed in the form of prospective studies that analyze multivariate of the various factors that might influence the incidence of AD or AD onset by comparing children who have a genetic predisposition.

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