

## **Comparison of Atopic Dermatitis Events Between Breastfed and Breastfed Plus Formula In Children**

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**Abstract : Background :** Food allergy is a common trigger factor for the occurrence of atopic dermatitis in infants. The introduction of an early feeding e.g. infants' formula in early life is one hypothesis for the occurrence of atopic dermatitis.

**Objective :** To compare the incidence of atopic dermatitis in infants who are breastfeeding only with the infants who are breastfeeding plus formula combined.

**Methods :** The study was observational analytic with cross sectional study design, carried out in PuskesmasPuloBrayan in July-December 2016. Infants aged 12-60 months amounted to 114 then divided into two groups: a group with breastfeeding only and the group of breastfeeding plus formula combined; taken by consecutive sampling. Atopic dermatitis is made by ISAAC questioner through the interviews.

**Results :** Of the 57 breastfed only infants, there were 10 infants (17.5%) who suffered from atopic dermatitis, while on the other group; only 8 out of 57 (14.0%) had the similar problem. Atopic dermatitis most often found on the neck, ears, and eyes (44.4%). There were no significant differences of the incidence of atopic dermatitis based on the eating history as a baby, between breastfed only infants and breastfed plus formulas combined ( $p = 0.067$ ). There were also no relationship between maternal educational status and family history of atopic with the incidence of atopic dermatitis ( $p$ -value 0.075 and 0.059 respectively).

**Conclusions :** There were no significant differences between the incidence of atopic dermatitis in breastfeeding only infants and breastfeeding plus formula.

**Keywords :** Atopic dermatitis, breastfed, formula

### **Introduction**

Atopic dermatitis is a pruritic, chronic-remitting inflammatory skin disease that usually happen in people with a history of atopy within his or her family.<sup>1</sup> Atopic dermatitis may occur in a population across any age groups with an incidence around 10-20% among children and 1-3% among adults in developing countries. Most cases of atopic dermatitis happened during childhood, around 45% cases among 6-month old infants, 60%

cases among infants within their first year of life, and 85% cases before 5 years-old age.<sup>2</sup> According to a study conducted by the Indonesian Pediatric Dermatology Study Group, atopic dermatitis ranked first among the 10 most prevalent pediatric skin diseases in Indonesia.<sup>3</sup>

The precise etiopathophysiological process of atopic dermatitis was still debatable but it was believed to be multifactorial. Trigger factors for atopic dermatitis include intrinsic factors such as hereditary status, immune status, and skin protective-defensive function and also extrinsic factors such as irritants, climate change, and food allergens<sup>1</sup>. Food allergy was known to be the most common trigger factor of atopic dermatitis in childhood<sup>4</sup>. Early feeding was hypothesized to trigger atopic dermatitis in childhood.<sup>5</sup> A study by Oranje et al found that an adverse reaction caused by bovine proteins found within milk may trigger an atopic dermatitis<sup>6</sup>. Previous studies reported that more than 33% cases of atopic dermatitis in childhood were triggered by cows' milk. A study done by Pourpak et al among children of 1 to 12 years-old age found that cows' milk allergy affected the severity of atopic dermatitis symptoms.<sup>7</sup> Breastmilk as a preventive factor for allergic diseases was still subject to considerable debate,<sup>5,8,9</sup> several studies reported that breastmilk consumption may prevent allergic diseases<sup>10</sup> while other studies reported otherwise.<sup>11,12</sup> Fatty acid contents within breastmilk was found to be an immunomodulator that may trigger an atopic dermatitis. Hoppu et al reported that breastmilk with high content of saturated fatty acid and low content of n-3 fatty acid may precipitate atopic dermatitis in infants.<sup>12</sup> Yang et al concluded in their study that there was no significant protective effect given by exclusive 3-month breastfeeding to prevent atopic dermatitis even among children with family history of atopic dermatitis.<sup>13</sup> Miyake et al and Pohlabein et al found in their study that breastfeeding may induce acute dermatitis among children without family history of atopic dermatitis.<sup>9,14</sup> Similar results were also found by Halim et al. Their study found no significant effect of exclusive breastfeeding as a preventive measure against atopic dermatitis in children.<sup>14</sup>

Atopic dermatitis has a broad clinical spectrum and varies among different age groups. Acute signs include pruritic excoriated erythematous papules with serous exudate while chronic signs include lichenification, papules and excoriation.<sup>15</sup>

Several diagnostic criterias for atopic dermatitis had been formulated such as Hanifinn-Rajka Criteria, William et al. Criteria and also the commonly used ISAAC Questionnaire.<sup>16</sup> Hanifin-Rajka formulated 3 major signs and 3 minor signs as means to diagnose atopic dermatitis.<sup>17</sup> The major signs formulated by Hanifin-Rajka were further expanded to formulate the ISAAC Questionnaire.<sup>18</sup> ISAAC Questionnaire was chiefly used to assess prevalence. Atopic dermatitis diagnosis can be made when the clinical findings fulfilled  $\geq 3$  out of 7 questions of ISAAC Questionnaire.<sup>16</sup>

## Methods

The study was observational analytic with cross sectional study design, carried out in PuskesmasPuloBrayan in July-December 2016. Infants aged 12-60 months amounted to 114 then divided into two groups: a group with breastfeeding only and the group of breastfeeding plus formula combined; taken by consecutive sampling. Atopic dermatitis is made by ISAAC questionnaire through the interviews.

## Results

### Subjects Characteristics

114 children aged 12-60 months who came to PuskesmasPuloBrayan were included within this study. The subjects were divided into two groups : (1) breastfeeding-only group ; and (2) breastfeeding and infant formula group. Each groups consisted of 57 subjects.

**Table 1. Study Subjects Characteristics Stratified by Sex**

Sex	Breastfeeding-only		Breastfeeding and Infant Formula	
	n	%	n	%
Male	31	54,4	28	49,1
Female	26	45,6	29	50,9
Total	57	100	57	100

More male were found in the breastfeeding-only group (31 subjects, 54.4%) while more female were found in the breastfeeding and infant formula group (29 subjects, 50.9%).

**Table 2. Study Subjects Characteristics Stratified by Age Groups**

Age group	Breastfeeding-only		Breastfeeding and Infant Formula	
	n	%	n	%
12 – 24 month	13	22,8	19	33,3
25 – 36 month	21	36,8	11	19,3
37 – 48 month	15	26,3	12	21,1
49 – 60 month	8	14,0	15	26,3
Total	57	100	57	100

Most of the subjects in the breastfeeding-only group were under the 25-36 months old age group (21 subjects, 36.8%) while most of the subjects in the breastfeeding and infant formula group were under the 12-24 months old age group (19 subjects, 33.3%)

**Table 3. Study Subjects Characteristics Stratified by the Mothers' level of Education**

Mother's Level of Education	Breastfeeding-only		Breastfeeding and Infant Formula	
	n	%	n	%
Primary	19	33,3	7	12,3
Middle	30	52,6	37	64,9
High	8	14,0	13	22,8
Total	57	100	57	100

Most of the subjects within both groups are within the middle-level of education group (30 subjects; 52.6% within the breastfeeding-only group and 37 subjects; 64.9% within the breastfeeding and infant formula group).

**Table 4. Study Subject Characteristics Stratified by Economical Status**

Economical status	Breastfeeding-only		Breastfeeding and Infant Formula	
	n	%	n	%
Low	25	43,9	7	12,3
Middle	21	36,8	38	66,7
High	11	19,3	12	21,1
Very High	0	0	0	0
Total	57	100	57	100

Most of the subjects in the breastfeeding-only group are within the low-income economical status group (25 subjects; 43.9%) while most of the subjects in the breastfeeding and infant formula group are within the middle economical status group (38 subjects, 66.7%). 11 subjects (19.3%) within the breastfeeding-only group were found to have high income while 12 subjects (21.3%) within the breastfeeding and infant formula group were found to have high income.

**Table 5. Study Subject Characteristics Stratified by Family History of Atopy**

Family History of Atopy	Breastfeeding-only		Breastfeeding and Infant Formula	
	n	%	n	%
Mother	11	19,3	7	12,3
Father	7	12,3	8	14,0
Both Parents	2	3,5	1	1,8
Siblings	5	8,8	0	0
None	32	56,1	41	71,9
Total	57	100	57	100

There are 11 subjects (19.3%) within the breastfeeding-only group had a mother with a history of atopy while 7 subjects (12.3%) within the breastfeeding and infant formula group had a father with a history of atopy. Most of the subjects of both groups had no history of atopy within their families (32 subjects; 56.1% within the breastfeeding-only group and 41 subjects; 71.9% within the breastfeeding and infant formula group).

**Table 6. Atopic Dermatitis Characteristics in Children**

Location	Total (subjects)	Percentage (%)
Elbow pit	4	22,2%
Kneepit	2	11,1%
Ankle	2	11,1%
Below buttocks	2	11,1%
Neck, ears, eye	8	44,4%
Total	18	100

Most of the atopic dermatitis in this study was found on the neck-ears-eye region (8 subjects; 44.4%) followed by the elbow pit region (4 subjects; 22.2%).

**Table 7. Atopic Dermatitis Occurrence Stratified by Mothers' Education Level**

Mother's Education Level	Atopic Dermatitis		No Atopic Dermatitis		p value
	n	%	n	%	
Low	1	5,6	25	26,0	0,068
Middle	11	61,1	56	58,3	
High	6	33,3	15	15,6	
Total	18	100	96	100	

No relationship was found between mothers' education level with the occurrence of atopic dermatitis (p-value = 0.068).

**Table 8. Atopic Dermatitis Occurrence Stratified by Family History of Atopy**

Atopy History	Atopic Dermatitis		No Atopic Dermatitis		p value
	n	%	n	%	
With history of atopy	10	55,6	31	32,3	0,059
Without history of atopy	8	44,4	65	67,7	
Total	41	100	73	100	

No relationship was found between the occurrence of atopic dermatitis with the family history of atopy (p value 0.059). This may reflected the multifactorial trait of atopic dermatitis.

**Table 9. Atopic Dermatitis Occurrence Stratified by Feeding History**

Feeding History During Infancy	Atopic Dermatitis n (%)	No Atopic Dermatitis n (%)				
Breastfeeding-only	10 (17,5%)	47 (82,5%)	57 (100%)	0,607	1,303	0,474 - 3,586
Breastfeeding and Infant Formula	8 (14,0%)	49 (86,0%)	57 (100%)			
Total	18 (15,8%)	96 (84,2%)	114 (100%)			

No statistical significance was found between the occurrence of atopic dermatitis and the feeding history during infancy (p value 0.607; prevalence ratio = 1.303; CI 95% 0.474 – 5.586).

## Conclusion

Several conclusion could be drawn from this study :

1. No significant relationship was found between atopic dermatitis occurrence and feeding history during infancy (p>0,05). No conclusion could be drawn between the family history of atopy and the mothers' education level.

2. 17.5% of breastfed children in this study had atopic dermatitis while 14% of breastfed children with infant formula had atopic dermatitis.
3. In this study, most atopic dermatitis were found on the neck, ears, and eyes region (44,4%).
4. The prevalence ratio of atopic dermatitis between children who were breastfed and children who were both breastfed and given infant formula was 1,303.

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