



ASSOCIATION BETWEEN EXCLUSIVE BREASTFEEDING AND MANIFESTATION OF ALLERGY IN TODDLERS IN PEDIATRIC CLINIC OF RST WIRASAKTI KUPANG, INDONESIA

Pediatrics

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ABSTRACT

Allergies may induce serious health complications and can interfere with the child's growth and development process. Allergy in children is also influenced by the mother's breastfeeding behavior.

Objective: To investigate the association between history of receiving exclusive breastfeeding and manifestation of allergy in toddlers.

Method: Observational descriptive-analytical study with cross-sectional design. Analyzed using chi square test.

Results: There was a significant association between history of being exclusively breastfed and manifestation of allergy in toddlers ($P = 0.012$). There was also a significant association between history of allergy in parents and manifestations of allergy in toddlers ($P = 0.05$). Exposure to cigarette smoke, pets, history of antibiotic use, and history of caesarean section delivery were not associated with manifestation of allergy in toddlers.

Conclusion: There was a significant association between history of being exclusively breastfed and history of allergy in parents with manifestation of allergy in toddlers.

KEYWORDS

Exclusive Breastfeeding, Manifestation of Allergy

INTRODUCTION

According to data from International Study of Asthma and Allergies in Childhood, the prevalence of allergy in children is getting higher, including in Indonesia.¹ Data from health profile of Kupang City in 2016 and 2017 shows that allergy is one of the top 10 most prevalent disease, which has 12,971 cases or 7.9% in 2016 and 12,356 cases or 5.5% in 2017.^{2,3}

Allergy is the body's defense mechanism against antigens entering the body. This defense or body reaction is a result of type I hypersensitivity reaction mediated by IgE which is released by Mast cells and basophils. The symptoms of type I hypersensitivity vary widely from feeling of discomfort to death. If the IgE antibody tied to those cells face against an antigen (in this case called an allergen), the cells will be stimulated to release chemical mediators that may disrupt or harm the surrounding tissue. Allergens can be a dust particle, plant pollen, or food which act as an antigen that triggers immune response.⁴

Allergy in children is also affected by the mother's behavior in breastfeeding and in giving complementary food.⁵ Breast milk is the best nutrition for infants. Other than fulfill nutritional requirements, breast milk also play important role in developing the immune system and preventing allergic diseases.⁶ Breast milk improves infant's immune system, because mothers pass their antibodies to the infant through breast milk, therefore infants can develop stronger immune system to fight viruses and other infections.⁷ Breast milk contains various substances which function as non-specific immunity, macrophages and neutrophils and their products which function as specific immunity, and other protective factors. T Lymphocyte cells composed 80% of lymphocytes in breast milk. T Lymphocytes can destroy *E. coli*'s bacterial cell wall and transfer cellular immunity from the mother to the infant.⁸ Cytokines contained in breast milk also increase the level of IgA antibody in it.⁹ Breast milk also contains mucin that function to coat the milk fatty membrane and has antimicrobial properties that work by binding to bacteria and viruses then eliminate them from the body.⁹

Exclusive breastfeeding/BF is defined as giving breast milk without any food or fluid supplementation, including water, juice, or other kind of milk. Administration of vitamins and minerals supplementation, or medicine is allowed during exclusive breastfeeding.¹⁰ Exclusive breastfeeding is essential for infant's well-being, however exclusive breastfeeding practice in Kupang is still low, which is only in 44-55% of population.¹¹ Other risk factors for allergy are lifestyle (cigarette smoking, pollution and toxin exposure in the environment, pets, medication, and history of caesarean section/C-section delivery.⁸

METHODS

This was an observational descriptive-analytical study with cross-sectional design, conducted from August to September 2019 in Pediatric Clinic of *Rumah Sakit Tentara Tk IV* (Army Hospital Level IV) Wirasakti Kupang. The sample was 98 children under 5 years old. The study used questionnaire and interview as instruments to collect

data of history of exclusive breastfeeding and manifestations of allergy and other factors affecting the development of allergy in toddlers. Data obtained was analyzed with SPSS version 20 using chi square test.

RESULTS

From our respondents of 98 toddlers, 51 were exclusively breastfed (52%) and 47 were not exclusively breastfed (48%).

Table 1. History of Exclusive Breastfeeding

Factors	Frequency (n)	Percentage (%)
Toddlers > 6 months old		
Exclusively Breastfed		
Yes	51	52
No	47	48

Of all 98 toddlers, 56 of them show signs and symptoms of allergy. The most common manifestation was found on the skin at 45.2%, followed by the respiratory tract at 23.6%, and the digestive tract at 10.7%. More than one manifestation that appear on the same individual was also found, those involving the skin and respiratory tract at 16.2% and those involving the skin and digestive tract at 6.7%. It was found that the sources of those allergies were food at 30.2%, dust at 26.7%, cold temperature at 24%, and powder at 19.1%.

Table 2. Manifestation of Allergy

Manifestation of Allergy	Frequency (n)	Percentage (%)
Yes	56	57.1
No	42	42.9
Total	98	100.0

Table 3. Crosstabs Analysis between Exclusive BF and Manifestation of Allergy

Exclusive Breastfeeding	Manifestation of Allergy		P = 0.012
	Yes	No	
Yes	23	28	
No	33	14	
Total	56	42	

Contingency Coefficient 0.246

Prevalence Ratio (PR) 2.870 CI 95 (1.247 – 6.605)

Table 4. Crosstabs Analysis between Parental History of Allergy and Manifestation of Allergy in Toddlers

Parental History of Allergy	Manifestation of Allergy in Toddlers		0.00<0.05
	Yes	No	
Yes	25	2	
No	33	38	
Total	58	40	

Contingency Coefficient 0.437

Prevalence Ratio (PR) 20.00 CI 95% (4.402 – 90.860)

Table 5. Crosstabs Analysis between Cigarette Smoke Exposure and Manifestation of Allergy in Toddlers

Exposure to Cigarette Smoke	Manifestation of Allergy		
	Yes	No	
Yes	27	17	P < 0.446
No	29	25	
Total	56	42	

Contingency Coefficient 0.077

Prevalence Ratio (PR) 1.369 CI 95% (0.060 – 3.074)

Table 6. Crosstabs Analysis between Pets and Manifestation of Allergy in Toddlers

Exposure to Pets	Manifestation of Allergy		
	Yes	No	
Yes	36	13	P < 0.622
No	20	29	
Total	56	42	

Contingency Coefficient 0.050

Prevalence Ratio (PR) 1.239 CI 95% (0.582 – 2.907)

Table 7. Crosstabs Analysis between History of C-section Delivery and Manifestation of Allergy in Toddlers

History of C-section Delivery	Manifestation of Allergy		
	Yes	No	
Yes	14	10	P < 0.892
No	42	32	
Total	56	42	

Contingency Coefficient 0.014

Prevalence Ratio (PR) 1.067 CI 95% (0.420 – 2.711)

DISCUSSION

a. Association between Exclusive Breastfeeding and Manifestation of Allergy in Toddlers

There was a significant association between exclusive breastfeeding and manifestation of allergy in toddlers (P 0.012). Although the strength of this association was relatively low (with Contingency Coefficient of 0.246). Result of the prevalence ratio (PR) was 2.870 CI 95% (1.246 – 6.605); a PR value of >1 indicated that exclusive breastfeeding was related to the increase of prevalence of allergy in toddlers. This result was contradictory to previous studies that suggested exclusive breastfeeding as a protective factor towards the development of allergy in toddlers.¹² Infants receiving non-exclusive breastfeeding are relatively more susceptible to the development of early symptoms of allergy.¹³ It is known that exclusive breastfeeding promote improvement of infants' immunity, due to the immunomodulators contained in breast milk, which are IgA and lactoferrin that play a role in prevention of allergy.¹⁵ Breast milk is very rich in immune cells that are believed to compensate for the infant immature immune system; breast milk is also rich in tolerogenic cytokines such as IL-10 and TGFβ.¹⁴

However, one study reported that exclusive breastfeeding does not affect the risk of developing Atopic Dermatitis.¹⁵ Exclusive breastfeeding in children with family history of atopy tend to be a protective factor towards the development of Atopic Dermatitis, but may become a risk factor otherwise in children without family history of atopy¹⁶, it was supported by another study that reported exclusive breastfeeding as a risk factor for Atopic Dermatitis in children without family history of atopy.^{17,18}

Therefore, according to the result of this study and earlier studies, it can be concluded that we still haven't been able to prove that exclusive breastfeeding prevents the development of allergy in toddlers. Since there are many other factors that predispose the development of allergy in children. Nevertheless, exclusive breastfeeding is still strongly recommended for its other benefits and superiority to formula milk.

In this study, 57% of the toddlers showed signs and symptoms of allergy and the most common cause was food (30.2%). This was in accordance to previous study¹⁹, sensitization of the most common allergen before the age of 2 is food allergen, while at age 2-5 years the most common allergens are food and inhaled allergen. Early symptoms of allergy can be in the form of atopic dermatitis and wheezing which is more frequent in male infants than their female counterparts.¹³

b. Association between History of Allergy in Parents and Manifestation of Allergy in Toddlers

There was a significant association between the two variables (chi square test $0.00 < 0.05$) based on the contingency coefficient of 0.437 which means they have moderate association. The prevalence ratio (PR) was 20.00 (95% CI 4.402 – 90.866) which means toddlers with parental history of allergy will be at 20 times more risk to develop an allergy compared to those without parental history of allergy.

Toddlers with parental history of allergy were 41.1% of sample and toddlers without parental history of allergy were 58.9% of sample; there was a significant association between parental history of allergy and manifestation of allergy in toddlers, it was supported by results of previous studies that indicated a relation between manifestation of allergy and family history of allergy passed on to the children.²⁰

The prevalence ratio of this study was 20.00, which means toddlers with parental history of allergy will be at 20 times more risk to develop an allergy compared to those without parental history of allergy. This result was in accordance to previous study which stated that toddlers with history of atopy from their parents have 2.407 times more risk to show manifestation of allergy compared to those without history of atopy from their parents¹²; other study stated that the prevalence ratio of allergic rhinitis was 5.550 times higher on patients with family history of atopy compared to patients without family history of atopy.²¹

c. Association between Exposure to Cigarette Smoke and Manifestation of Allergy in Toddlers

There was no significant association between manifestation of allergy in toddlers and exposure to cigarette smoke (P = 0.446). This result was similar to previous study which stated that there was no significant association between manifestation of allergy and exposure to cigarette smoke¹², supposedly because the exposure to cigarette smoke was not direct nor continuous.¹² This result was supported by study from Zulkarnain et al., which reported that there was no significant relation between cigarette smoke exposure and asthma, as well as the number of cigarette consumption in a household.²² Whereas other study stated cigarette smoke exposure in a household as a risk factor for developing asthma in children with allergic rhinitis.²³ This data was also supported by the next study which reported that exposure to cigarette smoke in a household increase the prevalence and incidence of wheezing and asthma in children.²⁴ According to theory, the exposure of cigarette smoke may increase incidence of allergy in children; the chemical substances in cigarette smoke may trigger response from Th2 and mainly increase IL-4, disrupt the mucociliary system, and may affect morphogenesis of lung and the child's immune system.²⁵ Both passive and active smoking in children and adolescents are related to the increased risk of developing allergic diseases and food allergy.²⁶

d. Association between Pets and Manifestation of Allergy in Toddlers

There was no association between having pets and manifestation of allergy in toddlers (P = 0.622). One of the triggering factor of atopic dermatitis is animal hair/fur, other than infection, food, cold temperature, and irritants.²⁷ However this result corresponded to previous study which showed no significant association between pets and manifestation of allergy in toddlers.¹² This was in accordance to IDAI recommendation which stated that there is not enough evidence to avoiding having pets at home as a primary prevention of allergy.⁴

e. Association between History of Antibiotic Use and Manifestation of Allergy in Toddlers

There was no significant association between history of antibiotic use and manifestation of allergy in toddlers (P = 0.371), this result was also similar to previous study.¹² Another study found that the use of antibiotic in the first 3 months of life may provoke the development of asthma and atopic dermatitis.²⁷ Children who use antibiotics in the first

6 months of life not only show higher risk of allergy but also show higher incidence of atopic dermatitis according to skin prick test and specific IgE test.²⁷ In a good healthy condition, the normal intestinal flora has a balanced ratio of Th1/Th2.²⁷ With the use of antibiotics the condition will shift to imbalance or cause disruption of the immune system which will induce an allergic response.²⁷

f. Association between History of Caesarean Section Delivery and Manifestation of Allergy in Toddlers

There was no association between manifestation of allergy and history of caesarean section (C-section) delivery ($P = 0.892$). In this study there were 14 sample subjects who were born by C-section delivery. The result of this study corresponded with previous study that showed no association between method of delivery to incidence of allergy in infants.²⁸ Infants who are born by C-section delivery have a different intestinal flora than those born by vaginal delivery.²⁹ The alteration of intestinal flora in infants born by C-section delivery will affect maturation of the immune system which may increase the incidence of atopy.²⁹

CONCLUSION

1. The number of toddlers older than 6 months old with history of being exclusively breastfed were 51 respondents (52%) and those without were 47 respondents (48%)
2. The incidence of manifestation of allergy in toddlers in pediatric clinic of Army Hospital Level IV Wirasakti was 56 respondents (57.1%)
3. There was a significant association between history of exclusive breastfeeding and manifestation of allergy in toddlers
4. History of allergy in parents is also related to manifestation of allergy in toddlers
5. Exposure to cigarette smoke, pets, history of antibiotic use, and history of C-section delivery were not related to manifestation of allergy in toddlers.

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