Original article:

Influence of breastfeeding on quality of life and serum IgE level in allergic rhinitis children

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Abstract

Background: Allergic rhinitis is a known health problem worldwide. ***Objective:*** The aim of the study was to determine the association between breastfeeding and serum IgE level as well as its impact on quality of life in children with allergic rhinitis. ***Methodology:*** A cross sectional comparative study was done among pediatric patients aged 6-12 who have allergic rhinitis with evidence of positive skin prick test (SPT), for 30 specifically selected patients each for breastfed and non-breast-fed. For each patient, serum IgE was taken and interviewed using the modified allergy questionnaire by validated Sher Allergy Specialists questionnaire (Florida) and Rhinoconjuntivitis Quality of Life Questionnaires (RQLQ) by Juniper. Statistical analysis was performed using SPSS 13.0. The significant association was analyzed using Pearson's chi-square and Mann-Whitney U tests. ***Results:*** There was no significant difference (p = 0.688) with regards to serum IgE level between breastfed and non-breast-fed children. However, children who were breastfed have a better mean of quality of life (mean=1.1679) than non-breast-fed (mean=1.5274). ***Conclusion****:* Our study showed that there is no association between breastfeeding and serum IgE level. Nevertheless, the quality of life is better in breast-fed children. A larger sample and longer duration of study are required to substantiate these findings.

Keywords: allergic rhinitis; children; breastfeeding; serum IgE; quality of life

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Introduction

Allergic rhinitis is one of the common forms of atopic diseases in the community. It affects 20% of the population, especially the pediatric age group. Allergic rhinitis is not a life-threatening disorder but moderate to severe cases may have a great impact on the patients' quality of life[1,2]. Study showed that the financial burden of allergic rhinitis was estimated to be $5.3 billion per annum[3].

Allergic rhinitis is an inflammation disease of mucous membranes of the nose, sinuses, eyes, eustachian tubes, middle ear, and pharynx. This condition is a type I hypersensitivity reaction triggered by an immunoglobulin E (IgE)-mediated response[4].

Allergic rhinitis affects approximately 40% of children, which subsequently decreasing with age[5]. It may be influenced by genetic differences, geographic factors, environmental differences or other population-based factors. In childhood, it has a male preponderance. However, the prevalence is equal between men and women in adulthood. The mean age of onset is 8-11 years.

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Many preventive strategies have been attempted to minimize the development of allergic disease. However, the protective effects of breastfeeding on allergic rhinitis remains controversial despite studies had been carried out to prove its significant role for development of allergic diseases in infancy. During the past 50 years, numerous studies have been published on the relationship between infant feeding and allergy. Evidence showed that breastfeeding during the first few months of life influences the risk of allergic disease in subsequent years[6-8].

A meta-analysis study on 3303 patients by Mimouni et al[6] revealed that exclusive breastfeeding had a protective role against allergic rhinitis in children with or without a family history of atopy. The result is supported by Saarinen et al [9] in a prospective follow-up study discovered that respiratory allergy was most prevalent in children who were not or breastfed for less than one month. Exclusive breastfeeding in high-risk infants with a family history of atopy had a lower incidence of atopic diseases and food allergy [10]. Furthermore, a cohort study of 4089 infants, Kull[11] proved that exclusive breastfeeding seemed to have preventive effects on the early development of allergic rhinitis up to 3 years old. In addition, a review of 56 conclusive studies by Odijk et al[12] further confirmed these findings and concluded that breastfeeding does protect the children from atopic diseases.

However, a cross-sectional study of 24,077 children in Okinawa, Japan [7] showed that the breastfeeding has no significant protective role of on allergic rhinitis. In addition to that, a large prospective birth cohort study also failed to find any evidence of harmful or protective effect of breastfeeding on allergic disease [13]. Study by Anne et al[14] found that breastfeeding has paradoxical relationship with IgE depending on maternal IgE level. The breastfeeding was associated with diminished IgE level in children of mothers with lower IgE levels whereas among children of mothers with high IgE level, breastfeeding was associated with elevated IgE level. These findings may explain the non-protective effect of breastfeeding on allergic symptoms and markers.

Although several studies have examined the effect of breastfeeding on allergic diseases, none of them had measured its effect based on quality of life and its influence on serum IgE level. The aim of our study was to investigate the association of breastfeeding and allergic rhinitis in terms of quality of life. Furthermore, we would like to identify the relationship between breastfeeding and total serum IgE level.

Methods

The respondents were chosen based on their age, which were from 6 to 12 years old who were diagnosed to have allergic rhinitis that had a positive skin prick test. The sample size was 60 patients, 30 for each group (breastfed and non-breast-fed). The study was approved by The National University Malaysia Medical Research and Ethic Committee.

The respondents were interviewed and the modified allergy questionnaire and Rhinoconjunctivitis Quality of Life questionnaire (RQLQ) were filled. The modified allergy questionnaire consists of atopic, allergic symptoms, the progression of the disease, whether the patient on medications or not, food reaction, family history of atopic diseases and breast fed status. RQLQ have seven domains, which were sleep problems, non hay fever symptoms, practical problems, eye symptoms, nasal symptoms, activity that was influenced by disease and emotions. All questions were scored from 0 up to 6.

Allergic rhinitis patient with positive skin prick test (SPT) were identified in the Otorhinolaryngology clinic, aged 6-12 years during the study period. Their parents were consulted about the study, and consent was taken. After they had filled the questionnaire, the patient's blood was withdrawn for the serum IgE level.

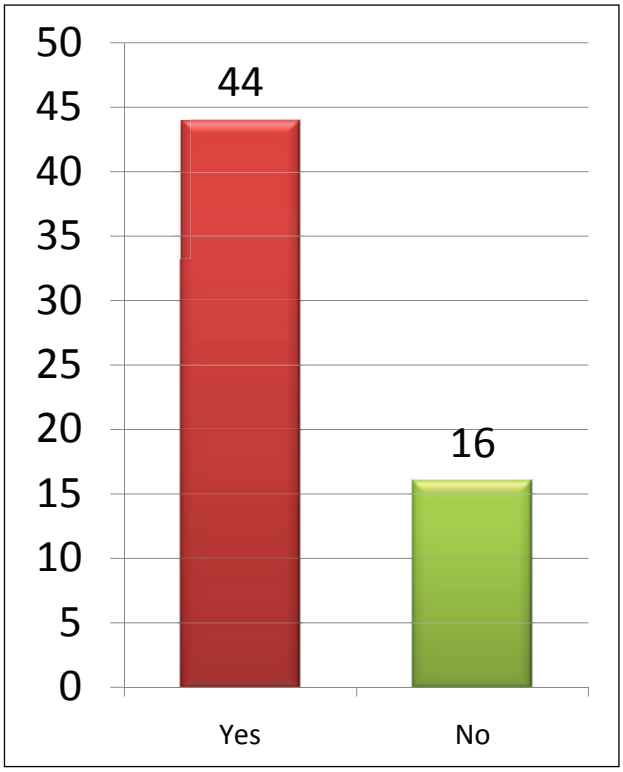
The data was analyzed using Statistical Package Social Sciences (SPSS) version 13.0. For this study, the variables that we analyzed were the serum IgE level, family history of atopic diseases and quality of life for breast-fed and non breast-fed children. Chi-Square was used to determine the association between the serum IgE level and the breast-fed status. The Mann-Whitney U test was to determine the association between quality of life and the breast-fed status. The p value was considered as significant when $p < 0.05$. Besides that, the mean of the quality of life between the breast-fed and non-breast-fed was used to compare which group has a better quality of life.

Results

A total number of 60 children participated in this study. Forty children (66.7%) were male and 20 (33.3%) were female with a mean age of 10 years. Most of the respondents (40%) were aged 12 years old, and this is because most of them were not afraid beings injected for serum IgE level compared to the youngest age. Only 3% of them were 6 years old. Forty-four out of 60 had a positive family history of atopic diseases, which included allergic rhinitis, asthma, eczema, conjunctivitis and ectopic dermatitis.

However, 16 of them had a negative family history of atopic diseases (Fig. 1).

Fig. 1 Number of respondents with family history



of atopic diseases

About, 94.34% of respondents had an elevated IgE level and only 5.66% of them had normal IgE level. Non-breastfeed children have higher mean scores (mean = 31.93), which mean more allergic symptoms manifested in them compared to breastfed children (mean = 29.07). However, based on Mann-Whitney U test 1, the p value (p = 0.524) was more than 0.05. Thus, there is no significant difference concerning the allergic symptoms and method of feeding (Table 1). Breast-fed children have better mean quality of life (mean = 28.43) than non-breastfeed children (mean = 32.57). Despite that, Mann-Whitney U test 2 showed that the p value (p = 0.359) is not statistically significant. There is no association between quality of life and pattern of breastfeeding (Table 2).

Positive family history of atopic disease was further being evaluated on the allergic symptom score and breastfeeding pattern. The mean allergic symptoms score for non-breastfeed is higher (mean = 23.38) than breastfeed (mean = 23.38). There is no association between the allergic symptom and breastfeeding method in children who have a positive family history as the Mann-Whitney U test 3 revealed that the p value is 0.663 (p>0.05) (Table 3).

The influence of breastfeeding on the IgE was evaluated. Total 60 respondents with a 2 missing IgE result were analyzed with Pearson Chi-Square. However, the p value is not significant (p>0.05). From this result, breastfeeding to have no influence on serum IgE level (Table 4).

Discussion

The role of breastfeeding as a protective agent against childhood allergic diseases remains uncertain. Lee et al in 2004 found that allergy has no association with breastfeeding. There is neither protective nor preventive effect of breastfeeding on allergic rhinitis symptoms. There was no significant change in the prevalence of lifetime asthma and lifetime wheeze in this study population[15]. Other study found that breastfeeding has a protective role in infants against early wheezing illness (asthma), eczema, and food allergies. However, it does not appear to protect against the development of asthma, allergic rhinitis, or food allergies in the long term[16]. Our study showed that there was no significant difference between breastfeeding status and severity of the allergic rhinitis.

However, in another study, exclusive breastfeeding has a protective against allergic rhinitis in children with or without a family history of atopy[6]. Kull et al found that exclusive breastfeeding have a preventive effect on the development of asthma, atopic dermatitis, and allergic rhinitis up to two years of age[12]. Our findings showed that non-breastfed children have higher allergic symptoms

Table 1 Mean Allergic Symptom Score versus Breastfeeding Pattern
P value is 0.524 (P > 0.05)

	20	N	Mean Rank	Sum of Ranks
Allergic Symptom Score	Breast-fed	30	29.07	872.00
	Non-breast-fed	30	31.93	958.00
	Total	60		

Table 2 Mean Quality of Life Score versus Breastfeeding Pattern

	20	N	Mean Rank	Sum of Ranks
Mean Quality of Life	Breast-fed	30	28.43	853.00
	Non breast-fed	30	32.57	977.00
	Total	60		

P value is 0.359 (P > 0.05)

Table 3 Breastfeeding Pattern and Allergic Symptoms Score Among Patient with Positive Family History of Atopic Diseases

	Breastfed status	N	Mean Rank	Sum of Ranks
Allergic Symptom Score	Positive family history	23	21.70	499.00
	Negative family history	21	23.38	491.00
	Total	44		

P value is 0.663 (*P* >0.05)

Table 4: B**reastfed status and allergic symptoms score**

	Breaastfed status	N	Mean Rank	Sum of Ranks
allergicsxscore	yes	23	21.70	499.00
	no	21	23.38	491.00
	Total	44		

	Allergicsxscore
Mann-Whitney U	223.000
Wilcoxon W	499.000
Z	-.435
Asymp.Sig.(2-tailed)	.663

(mean = 31.93), compared to breastfed children (mean = 29.07). However, it is not statistically significant (p = 0.359)

Few studies showed that allergic rhinitis patients with positive skin prick test are associated with elevated total serum IgE level. However, Friedman et al revealed that breastfeeding is associated with lower serum IgE level[17]. Our result showed both groups (breastfed and non-breast-fed) children have elevated IgE levels.

Family history of atopic disease is a confounding factor of development of allergic diseases[16]. In our study, the mean allergic symptom score for non-breastfeeding with positive family history is higher compared to breastfeeding children. Despite that, there was no association between the allergic symptom and breastfeeding status that have a positive family history. Study by Hide[18] showed that breast-fed group of infants with family history of allergy had fewer eczema and chronic rhinitis, but this did not achieve statistical significance. This study failed to give absolute evidence that breastfeeding protects against the development of eczema and does not show any significant difference in the prevalence of allergic disorders either in the parents or the infants.

Quality of life is impaired in patients with asthma

and allergic rhinitis[19]. Our result revealed the mean score of quality of life in non-breastfed was higher compared to breastfeed children. However, it is not statistically significant.

Conclusion

Our study showed that breastfed children had better quality of life. However, breastfeeding did not influence serum IgE level and family history of atopy diseases in allergic rhinitis patients.

Conflict of interest: None declared

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