Aswan University Medical Journal, volume 5 / No.2/ June 2025 (1-10) Online ISSN: **2735-3117**

ORIGINAL ARTICLE

Association between breastfeeding and pediatric food allergy at Aswan University Hospital

Asmaa Saad Anwr *[1], Hanan M Abdel Moneim M[1], Ehab F Moustafa[2], Islam Elnakeeb[3], Khaled Abdelhay Mohamed Khaled[1]

[1]Department of Pediatrics, Faculty of Medicine, Aswan University

[2]Department of Tropical Medicine, Faculty of Medicine, Assuit University

[3]Department of Clinical Pathology, Faculty of Medicine, Aswan University

ABSTRACT

Keyword: food allergy, breastfeeding, skin prick test

* **Corresponding author**: Asmaa Saad Anwr
Mobile: 01004872551**E-mail**: asmasaad1953@gmail.com

Background: The role of breastfeeding in preventing food allergies remains a topic of debate within the medical community. Some studies suggest a protective role, while others find no significant effect or even a potential exacerbation under certain conditions. **Objective:** To clarify the relationship between breastfeeding and food allergies in children attending the gastroenterology clinic at Aswan University Hospital. **Methods:** This observational, cross-sectional study included 300 children below 15 years of age who visited the clinic from September 2023 to September 2024. Data were collected on basis of demographics, clinical presentations suggestive of food allergy and maternal breastfeeding history. The diagnosis was confirmed via skin prick tests (SPT), prick-prick tests (PPT), serum IgE levels, elimination diets, and oral food challenges. **Results**: Among the 300 children studied, 150 (50%) were diagnosed with food allergies ;61 (40.6%) were diagnosed Ig E-mediated food allergy and 89 (59.3%) were diagnosed Non-Ig E-mediated food allergy, The most common complaints in the enrolled patients were runny nose followed by diarrhea and bloody stool, in 91 (60.7%), 76 (51.0%) and 76 (51.0%) patients respectively. And there was no statistically significant correlation between Breast Feeding and all types of food allergy. **Conclusion:** The present study found no correlation between breastfeeding and food allergy.

INTRODUCTION:

The association between breastfeeding and the development of food allergies in children has been widely studied, yet remains complex and sometimes inconclusive. Breastfeeding is known to provide critical immune protection and nutritional support in early life, but its role in preventing food allergies is still debated within the medical community. Some research suggests that breastfeeding may protect against food allergies,

while other studies indicate it has a negligible or even an exacerbating effect under certain conditions **[1].**

Breast milk contains antibodies and other immunomodulatory components, including secretory immunoglobulin A (sIgA), which help shape the infant's immune system and may reduce the risk of allergic sensitization **[2].**

Early exposure to breast milk, particularly when exclusively provided during the first six months of life, has been associated with a lower risk of some allergic conditions, such as atopic dermatitis and asthma, though the evidence regarding food allergies is less consistent **[3].**

Additionally, factors like maternal diet during breastfeeding may influence allergy outcomes; for example, certain allergenic foods in the maternal diet might impact the infant's tolerance development **[4].**

The debate surrounding breastfeeding and food allergies suggests the need for more region-specific studies, as environmental and dietary factors vary greatly across populations.

AIM OF WORK: To clarify the relationship between breastfeeding and food allergies in children attending the gastroenterology clinic at Aswan University Hospital.

PATIENTS AND METHODS

Study design

An observational, cross-sectional study was conducted at the Pediatric department, Faculty of Medicine, Aswan University, including all children below 15 years who attended a gastroenterology clinic from September 2023 to September 2024 for detection of the prevalence of food allergy.

The study excluded those with anaphylactic shock, wheezy chest, failure to thrive, diarrhea, regurge or rash due to other causes than food allergy, children with cyclic vomiting, functional dyspepsia and local causes of rectal bleeding.

Methodology:

All enrolled patients were subjected to the following:

1. **Demographic data in the form of** age, sex, weight, order of child, type of milk feeding, consanguinity and family history of food allergy.
2. **Clinical presentation suggestive of food allergy as;**
    - Git manifestations: diarrhea, bloody stool, abdominal distension, vomiting, or dysphagia and nonspecific symptoms such as (bloating, regurge and infantile colic)
    - History of allergic condition: wheezy chest, runny nose, lip swelling ,itching, urticaria ,and eczema
    - Failure to thrive is not due to other diagnoses.

- Potential triggers such as physical exertion, non-steroidal anti-inflammatory medications and concurrent medical issues.

3. Onset, intensity of symptoms and management of the allergic condition
4. History of daily dietary intake and allergic reactions following the consumption of this food.
5. **Determination of food sensitization skin prick test (SPT) and prick-prick tests (PPT):**
   - **SPT:** is a quick, reliable test, and standardized for many allergens, a small drop of the suspected allergen (e.g., food extract) is placed on the skin, typically on the forearm or back. The skin is then pricked with a fine needle to allow the allergen to penetrate the surface. If the person is allergic to the substance, a raised, red, itchy bump (wheal) will form within 15–20 minutes but its results can be affected by factors like antihistamine use, skin conditions, and technique variability **[5].**
   - **PPT:** it is a more specific test for identifying reactions to raw foods. A fresh piece of the suspected food is directly pricked and applied to the patient's skin (usually on the forearm). The prick of the food item releases the allergen onto the skin, A wheel (like in SPT) suggests sensitization to that food, but it is a less standardized test and can be more prone to false positives, particularly with foods that may cause mild reactions **[5].**
6. **Measurement of the serum IgE**: in instances when the skin prick test was contraindicated or unfeasible, such as in patients with severe asthma, significant skin allergies, or those who declined the skin prick test. The concentration of sIgE was measured using an immunoblot technique designed for the semi-quantitative assessment of circulating allergen-specific immunoglobulin E in human serum.
7. **When the patients are highly suspicious of Ig-E-mediated food allergy, confirmation is done by:**
   - **Elimination diets:**
     The patient avoids the suspected allergenic foods for a specified period (usually 2-6 weeks). Common allergens include dairy, eggs, nuts, shellfish, wheat, soy, and certain fruits/vegetables.
     The diet may involve only foods that are less likely to cause allergic reactions, such as rice, potatoes, and certain meats.
   - **Symptom Monitoring:**
     The patient or healthcare provider monitors symptoms (e.g., gastrointestinal symptoms, skin reactions, respiratory issues) during the elimination period. Improvement or resolution of symptoms supports the suspicion of a food allergy.
   - **Oral food challenge test (OFC):**
     After the elimination phase, suspected foods are reintroduced one at a time, typically starting with a small amount and gradually increasing.
     The patient is monitored closely for any signs of allergic reactions, which can occur within minutes to hours of ingestion. A positive reaction during the reintroduction phase helps confirm the food allergy.
8. **Other laboratory investigations were done**; CBC for all patients to detect hemoglobin level, WBC especially eosinophilic count, and other labs according to suspected diagnosis as anti-TTG for celiac cases.

Statistical analysis:

- Data were gathered, refined, encoded, and input into the Statistical Package for Social Sciences (IBM SPSS) version 20. Qualitative data were expressed as numbers and percentages, but quantitative data were reported as means, standard deviations, and ranges when their distribution was shown to be parametric.
- The comparison of two groups with qualitative data was conducted using the Chi-square test; the Fisher exact test was employed when the predicted count in any cell was less than 5.
- An independent t-test was employed to compare two independent groups with quantitative data and parametric distribution.
- The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following: $P > 0.05$ = non-significant (NS) ,$P < 0.05$ = significant (S) and $P < 0.001$ = highly significant (HS).
- Finally, Statistical correlation between breast feeding and food allergy to detect if it is a preventive method for food allergy or not.

Ethical Considerations:

- Approval from the Ethics of Scientific Research Committee, Faculty of Medicine Aswan University was obtained.
- Verbal and written consents were obtained from all the caregivers of the patients.
- Privacy and confidentiality of all obtained information was observed without intervention in the prescribed treatment.

RESULTS:

Out of 300 enrolled children in the present study, 150 (50%) patients have food allergy

Table (1): Demographic data of the food allergy patients n=150:

Demographic data		No= 150
Sex	**Female**	59 (39.3%)
	Male	91 (60.7%)
Age	**Mean ± SD**	7.11 ± 4.61
	Range	1 – 15
Weight	**Mean ± SD**	19.81 ± 8.22
	Range	7 – 34
Children order	**First**	83 (55.3%)
	Second	42 (28.0%)

	Third	25 (16.7%)
Breastfeeding		91 (60.7%)
Family history		44 (29.3%)
Consanguinity		63 (42.0%)

Most cases were males (60.7%) vs (39.3%) were female, the ages ranged from 1 to 15 years (mean 7.11 years) and the mean weight was 19.81 ± 8.22,

As regards past history, there were 91 patients had breastfeeding, 44 patients had a positive family history and 63 patients had Consanguinity.

Table (2): Clinical Presentation of the food allergy patients n=150

Clinical Presentation n=150	No.	%
Runny nose	91	60.7%
Diarrhea	76	51.0%
Bloody stool	76	51.0%
Failure to thrive	69	46.3%
Abdominal distension	63	42.3%
Vomiting	41	27.5%
Wheezy chest	39	26.0%
Lip swelling and itching	39	26.0%
Urticaria	36	24.0%
Dysphagia	35	23.5%
Eczema	28	18.7%
Nonspecific GIT Symptoms	23	15.3%

The most common complaints in the enrolled patients were runny nose followed by diarrhea, bloody stool, failure to thrive and abdominal distension in 91 (60.7%), 76 (51.0%), 76 (51.0%), 69 (46.3%) and 63 (42.3%) patients respectively

But other complaints presented in lesser percentages as vomiting, wheezy chest, lip swelling ,itching, urticaria, dysphagia, eczema and nonspecific GIT Symptoms in 41 (27.5%), 39 (26.0%), 39 (26.0%), 36 (24.0%), 35 (23.5%), 28 (18.7%), and 23 (15.3%) patients respectively.

Table (3): The diagnosis of the food allergy patients n=150

Food allergy types n=150	Number	Percentage (%)
Ig E-mediated food allergy	61	40.6%
Non-Ig E-mediated food allergy:	89	59.3%
• **Celiac disease**	77	51.3%
• **Cow's milk protein allergy**	9	6%
• **Food protein-induced enterocolitis syndrome**	3	2 %

Out of 150 (50%) patients who have a food allergy; 61 (40.6%) were diagnosed with an IgE-mediated food allergy and 89 (59.3%) were diagnosed with Non-IgE-mediated food allergy.

Non-Ig E-mediated food allergy: group; out of them 77(86.5%), 9 (10%) and 3(3.3%) have Celiac disease, Cow's milk protein allergy and Food protein-induced enterocolitis syndrome respectively.

Table (4): Relation between Breast Feeding and Diagnosis

Diagnosis	Breast-feeding		No Breast-Feeding		Test value*	P-value	Sig.
	No.	%	No.	%			
IgE Mediated	39	42.9%	22	37.3%	0.460	0.498	NS
Non IgE Mediated							
Celiac	44	48.4%	33	55.9%	0.823	0.364	NS
Cow's Milk protein allergy	6	6.6%	3	5.1%	0.144	0.704	NS
Food protein-induced enterocolitis syndrome (Fpies)	2	2.2%	1	1.7%	0.046	0.830	NS

P-value >0.05: Non significant (NS); P-value <0.05: Significant (S); P-value< 0.01: highly significant (HS) *: Chi-square test

No statistically significant difference between Breast Feeding and Celiac, IgE-mediated, Cow Milk Protein Allergy, and Food protein-induced enterocolitis syndrome

DISCUSSION

As regards demographic data, the current study showed that males had a higher prevalence of allergy (60.7%), and ages ranged from 1 to 15 years (mean 7.11 years). This finding is similar with ***Shaker et al.,(2017)*** who calculated that the average age of food-allergic children was 10.8 years (range, 5 to 18 years), with 59% being male [6]. As regards family history, there were 44 patients had positive family history and 63 patients had Consanguinity. As Consanguinity can contribute to the development of food allergies

by increasing genetic similarities between parents, leading to a higher likelihood of inheriting immune-related genes that predispose individuals to allergic conditions. Genetic factors, such as those related to immune system regulation (like HLA genes), play a key role in the likelihood of developing food allergies. Therefore, consanguinity may increase the risk of food allergies in offspring through these genetic mechanisms **[7].**

Furthermore, ***Jasielska et al.,(2023)***, estimated that the group of FA patients comprised of 45 children (64.4% were boys), including 19 children less than 30 months of age (FA1) and 26 children over 30 months of age **[8].**

The current study showed that 44 children among 150 allergic children (29.3%) had a positive family history; this is higher than a study conducted by ***Al-Hammadi et al.,(2011)*** in Asia who found that 20% of children with food allergies had a positive family history **[9].** and lower than a study conducted by ***Abdallah et al.,(2020)*** at Assiut University Children's Hospital, (66%) **[10].**

Regarding the clinical presentation, the current study estimated the clinical presentation results, as there were 91 (60.7%) patients with runny nose, 39 (26.0%) patients with wheezy chest, 39 (26.0%) patients with swollen and itchy lips, 36 (24.0%) patients with Urticaria, 28 (18.7%) patients with Eczema, and 23 (15.3%) patients with non-specific GIT Symptoms. This finding is consistent with ***El-Shabrawy et al.,(2021)*** who reported that among youngsters, 41 (52.5%) had urticaria, 31 (39.7%) had runny nose, and 13 (16.6%) had swollen and itchy lips **[11]** ,While this data contradicts ***Jasielska et al.,*****(2023)** who calculated that the clinical presentation of food allergy cases included atopic dermatitis in 23 patients (51%), abdominal pain in 18 patients (40%), constipation in 7 patients (15.5%), and diarrhea in four patients (8.8%). Only one patient had wheezy chest (2.2%). In total, 42% of FA patients experienced symptoms from several systems **[8].**

The present study indicated a 50% prevalence of food allergies among preschool children, which is virtually identical to the findings at Ain Shams University Hospitals in Egypt (45%) **[12].** and another study at Assiut University Children's Hospital in Egypt (47%) **[10].** But findings of the present study are significantly higher than those reported by **AbdulAal and Alalwan (2023**) between school-aged children in Bahrain (15.5%) **[13],** 8% incidence of pediatric food allergies in the United States, 9.3% prevalence among children aged one to four years in Finland, and the 8.3% prevalence among children aged one to seventeen years in Poland **[14].** The increased prevalence in our study compared to that in the United States and Europe could be attributed to racial differences, as black and Asian children had a much higher risk of food allergies than white children.

In the present study the incidence of celiac disease was 51.3% this is higher than ***El-Metwally et al.,*****(2020)** who reported the incidence of celiac disease in his study was 25.667%, and also significantly higher than the prevalence between the general population in Saudi Arabia and among type 1 DM patients in Egypt that was 3.2% and 5.48% respectively **[15] .**

The recent investigation found that the incidence of cow's milk protein allergy was 6%. This is consistent with a study of ***Vandenplas et al.*, (2021)** which found that the prevalence of CMA ranged from 0.54% to 4.9% among European children **[16].**

As regards relation between breast feeding and food allergy, there was No statistically significant difference between Breast Feeding and Celiac, IgE Mediated, CMPA, and Fpies.

In accordance to our results, another study by VAN **GINKEL,etal.,(2018)** reported, the prevalence of food allergy was 58.9% ($n = 382$). Of all subjects, 75.8% ($n = 492$) was breastfed and 24.2% ($n = 157$) bottle-fed. There was no significant association between food allergy and breastfeeding versus bottle-feeding after correction for the confounding effect of increased breastfeeding by atopic parents and a history of asthma in the child (OR = 1.24, 95% CI = 0.85–1.79, $p = 0.27$). However, in breastfed children, every additional month of breastfeeding lowered the risk for food allergy by ~4% (OR = 0.96, 95% CI = 0.93–0.99, $p = 0.02$ **[17].**

Other studies are contradictory or inconclusive on this subject, with a decreasing incidence of food allergy with breast feeding [**18]** or increasing incidence at the study of **Brew et al.,(2012)** [**19],** or even lack of association in another study [**20],** having all been reported. Interestingly, another study reported a relationship between breastfeeding and food sensitization which varied significantly by individual genotype **[21].**

CONCLUSION

Among the 300 children studied, 150 (50%) were diagnosed with food allergies;61 (40.6%) diagnosed Ig E-mediated food allergy and 89 (59.3%) diagnosed Non-Ig E-mediated food allergy, The most common complains in the enrolled patients were runny nose followed by diarrhea 91 (60.7%) and 76 (51.0%) , 91 patients had breastfeeding, but there was no statistically significant correlation between Breast Feeding and all types of food allergy , so we concluded that breastfeeding is not protective method for food allergy.

REFERENCES:

[1] Brandwein M, Enten Vissoker R, Jackson H, Rogan T, Pitcock J, Krinkin E, Venter C. Redefining the Role of Nutrition in Infant Food Allergy Prevention: A Narrative Review. Nutrients. 2024 Mar 14;16(6):838.

[2] Peters RL, Kay T, McWilliam VL, Lodge CJ, Ponsonby AL, Dharmage SC, Lowe AJ, Koplin JJ. The interplay between eczema and breastfeeding practices may hide breastfeeding's protective effect on childhood asthma. The Journal of Allergy and Clinical Immunology: In Practice. 2021 Feb 1;9(2):862-71.

[3] Lodge CJ, Tan DJ, Lau MX, Dai X, Tham R, Lowe AJ, Bowatte G, Allen KJ, Dharmage SC. Breastfeeding and asthma and allergies: a systematic review and meta-analysis. Acta paediatrica. 2015 Dec;104:38-53.

[4] Idris FS, Shaikh HA, Vahora I, Moparthi KP, Al Rushaidi MT, Muddam M, Obajeun OA, Abaza A, Jaramillo AP, Hamid P. Maternal diet and infant risk of eczema and food allergy: a systematic review. Cureus. 2023 Sep;15(9).

[5] Ansotegui IJ, Melioli G, Canonica GW, Caraballo L, Villa E, Ebisawa M, Passalacqua G, Savi E, Ebo D, Gómez RM, Sánchez OL. IgE allergy diagnostics and other relevant tests in allergy, a World Allergy Organization position paper. World allergy organization journal. 2020 Feb 1;13(2):100080.

[6] Shaker MS, Schwartz J, Ferguson M. An update on the impact of food allergy on anxiety and quality of life. Current opinion in pediatrics. 2017 Aug 1;29(4):497-502.

[7]Johansson E, Mersha TB. Genetics of food allergy. Immunology and Allergy Clinics. 2021 May 1;41(2):301-19.

[8] Jasielska M, Buczyńska A, Adamczyk P, etal,. Nutritional Status of Children with Newly Diagnosed Food Allergies. Children. 2023 Oct 14;10(10):1687.

[9] Al-Hammadi S, Zoubeidi T, Al-Maskari F. Predictors of childhood food allergy: significance and implications. Asian Pacific journal of allergy and immunology. 2011 Dec 1;29(4):313.

[10] Abdallah AM, Osman NS, Mohammad HA, Metwalley KA, Embaby M, ElMelegy TT. Food sensitization in preschool Egyptian children with recurrent wheezing. Pediatric Research. 2020 Oct;88(4):580-6.

[11] El-Shabrawy RM, El Shabrawy NM, El-Rafey DS. Patterns of sensitization to food allergens among allergic adults and children following-up in Zagazig university hospitals, Egypt. Egyptian Journal of Pediatric Allergy and Immunology (The). 2021 Jul 27;19(1):27-35.

[12] Yousif ZA, Mohammed MF, Zakaraya DN. Prevalence of Food Allergy in Egyptian Patients complaining of food adverse events attending allergy clinic at Ain Shams University Hospitals. QJM: An International Journal of Medicine. 2021 Oct 1;114(Supplement_1):hcab100-046.

[13] AbdulAal N, Alalwan TA. The reported prevalence of food allergy among school-aged children in Bahrain. Allergologia et Immunopathologia. 2023 Mar 1;51(2):90-8.

[14] Warren CM, Jiang J, Gupta RS. Epidemiology and burden of food allergy. Current allergy and asthma reports. 2020 Feb;20:1-9.

[15] El-Metwally A, Toivola P, AlAhmary K, Bahkali S, AlKhathaami A, AlSaqabi MK, Al Ammar SA, Jawed M, Alosaimi SM. The Epidemiology of Celiac Disease in the General Population and High-Risk Groups in Arab Countries: A Systematic Review. BioMed research international. 2020;2020(1):6865917.

[16] Vandenplas Y, Belohlavkova S, Enninger A, Frühauf P, Makwana N, Järvi A. How are infants suspected to have cow's milk allergy managed? A real world study report. Nutrients. 2021 Aug 30;13(9):3027.

[17] Van Ginkel CD, Van der Meulen GN, Bak E, Flokstra-de Blok BM, Kollen BJ, Koppelman GH, Dubois AE. Retrospective observational cohort study regarding the effect of breastfeeding on challenge-proven food allergy. European journal of clinical nutrition. 2018 Apr;72(4):557-63.

[18] Kull I, Melen E, Alm J, Hallberg J, Svartengren M, van Hage M, Pershagen G, Wickman M, Bergström A. Breast-feeding in relation to asthma, lung function, and sensitization in young schoolchildren. Journal of Allergy and Clinical Immunology. 2010 May 1;125(5):1013-9.

[19] Brew BK, Kull I, Garden F, Almqvist C, Bergström A, Lind T, Webb K, Wickman M, Marks GB. Breastfeeding, asthma, and allergy: a tale of two cities. Pediatric allergy and immunology. 2012 Feb;23(1):75-82.

[20] Venter C, Pereira B, Voigt K, Grundy J, Clayton CB, Higgins B, Arshad SH, Dean T. Factors associated with maternal dietary intake, feeding and weaning practices, and the development of food hypersensitivity in the infant. Pediatric Allergy and Immunology. 2009 Jun;20(4):320-7.

[21] Hong X, Wang G, Liu X, Kumar R, Tsai HJ, Arguelles L, Hao K, Pearson C, Ortiz K, Bonzagni A, Apollon S. Gene polymorphisms, breast-feeding, and development of food sensitization in early childhood. Journal of allergy and clinical immunology. 2011 Aug 1;128(2):374-81.