ORIGINAL ARTICLE

BREASTFEEDING TYPE AND ITS RELATIONSHIP WITH THE DEVELOPMENT OF ALLERGIES IN CHILDREN

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ABSTRACT

Background: Breastfeeding has several health and nutritional benefits. The World Health Organization (WHO) recommends exclusive breastfeeding (EBF) for the first six months of life. However, the proportion of EBF in Morocco is decreasing. The breastfeeding type and its relationship with the development of allergies in children it have not been studied in region of Beni Mellal, Morocco. The aim of this study was to assess that breast-feeding can prevent or ameliorate allergies. **Methods**: We conducted a cross-sectional study using a questionnaire among mothers visiting primary healthcare clinics during the January-June 2018 in Beni Mellal city and region in Morocco. Mothers were interviewed using a structured questionnaire. **Results**: We observed that allergens that promote allergy in children are pollen (25.7%), dust (18.6%), mite (13.6%), food (30%), animal hair (10.7%) and drug (1.4%). It is concluded that the main allergens causing allergy are food. Among these results we find that only the food allergy where the statistical difference is significant (test of X2 = 0.026 to 2ddl, p <0.05) for the sample of 100 children from the Beni Mellal region. We show that the cutaneous symptoms and ocular symptoms are the most dominant. Our results also show that children who have had not exclusive breastfeeding are the most affected by allergy. **Conclusion**: These results provide the best demonstration that exclusive breastfeeding is the most effective nutritional strategy that has been identified for the prevention of different allergies.
Keywords: *Breastfeeding, exclusive breastfeeding (EBF), allergy, symptoms, children.*

1. INTRODUCTION

The World Health Organization recommended exclusive breastfeeding during the first 6 months of life and continued breastfeeding until 2 years of age or older depending on the mother's wishes [1].

Scientific advances in breastfeeding have been considerable over the past 50 years and have been recognized for many benefits in terms of health, nutrition, protection against viral and bacterial infections and the development of child [2].
The advantage of breastfeeding is certain at the social and economic level and it could save 1 to 2 million lives a year in the world [3][4].

Health outcomes in developed countries differ substantially for mothers and infants who formula feed compared with those who breastfeed. For infants, not being breastfed is associated with an increased incidence of infectious morbidity, as well as elevated risks of childhood obesity, type 1 and type 2 diabetes, leukemia, and sudden infant death syndrome [4-2].

By comparing breast milk, industrial infant formula and cow's milk, it is important to identify the specificities of breast milk and its superiority in infant protection [6]. The initiation of breastfeeding within one hour and continuation of only breast milk up to six months ensure maximum benefits [7].

Mixed feeding, or giving infants under six months of other fluids and / or food in addition to breast milk, is common in many countries. This practice may, however, pose a risk to infant health because it increases the risk of diarrhea and other infectious diseases. Mixed feeding, especially with water or any other liquid, can also cause a decrease in breast milk production while the baby is breastfeeding less often. Babies do not need any other liquid than breast milk, not even water, for the first six months because breast milk contains all the water needed for the infant, even in very hot climates [7, 8].

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Formula is not an acceptable substitute for breast milk because in its best formula it replaces only most of the nutritional components of breast milk: it is only food, where breast milk is a complex nutritional fluid containing antibodies, enzymes, long chain fatty acids and hormones, many of which simply cannot be added to formulas of artificial milks.

The major problem is the social and commercial pressures to stop breastfeeding, such as aggressive marketing and promotion by infant formula producers. In addition, many women have to return to work immediately after delivery that often leads them to stop breastfeeding quickly [9].

Numerous studies have been performed to determine whether breast-feeding protects against infections and immunological diseases such as asthma and allergy, autoimmune diseases and also tumours.
Early feeding plays a central role in development and maturation of the infant immune system. These differences in immune system differentiation may underlie the higher incidence of allergic disease observed in formula-fed children. Not breastfeeding may also affect disease risk through exposure to foreign antigens in formula [5].

An increase in the prevalence of atopic diseases in industrialized countries has been noted for several years. This has resulted in greater interest in analyzing possible factors that may influence the development of allergic disease, particularly during the perinatal and early infancy periods [10].

Previous studies established by our team have shown that almost quarter of the young people surveyed present the allergy in the Beni Mellal region of Morocco [11]. Our epidemiologic studies revealed a crucial role of olive pollen in increasing of prevalence of allergic disorders. Furthermore our results show dependence between asthma and cardiovascular diseases in people allergic to olive pollen suggesting that asthmatic people who are allergic to olive pollen are the most susceptible to develop cardiovascular disease [12]. Our studies also show that exclusive breastfeeding is declining in this region [13].

these results allows us to ask several questions about the relationship between breastfeeding and the development of allergy among children in Beni Mellal region [11,12,13]. In this work we evaluated the relationship between the development of allergies in children and the choice of type of breastfeeding in the Beni Mellal region.

2. MATERIALS AND METHODS

2.1 Study site:

This study was conducted in three essential steps: data collection, development of a computer database and finally statistical processing.
The collection of data was made mainly in the health centers of the city of Beni Mellal and its regions: Souk Sebt, Sidi Aissa, Oulad Ayad and Fkhih Ben Salh in Morocco during the January-June 2018. The data collected are cross-sectional for analytical purposes and relate to 100 "mother-child" couples of women and their allergic children who came to consult in pediatric allergology or for the vaccination of their children.

The data from this study were collected using a 13 question questionnaire that was tested on a sample of 10 women to assess understanding of questions and formulations. This type of questionnaire was chosen because of its simplicity and its reliable cost. This questionnaire includes information on the age of women, the type of breastfeeding, the place of residence, the age of the children, the weight of the child, the sex of the child, the type of allergy and the allergic symptoms.

2.2 Statistics:

After coding the various variables, the collected data was entered as an Excel computer file and analyzed using the SPSS®/ PC software (version 21 for Windows). After seizure, the file was purified to eliminate any outlier or erroneous data.
The data was processed by the same software. These treatments consisted of descriptive statistics (frequencies, means, standard-deviations, percentages,...), distribution tests (chi-square test) and average comparison and correlation tests.

3. RESULTS

3.1 Description and characteristics of children allergic and their mothers

The characteristics of allergic children and their mothers are described in Table 1. The surveyed mothers belong to all age groups between 17 and 50 years old. Of all the mothers interviewed, 41% belong to the age group of (21-30) years, 31% belong to the age group of (31-40) years, 24% belong to the age group of age (17-20) years and only 4% belong to age group of (41-50) years.

Most children with allergies 34% belong to the age group of (0-3) years, 31% belong to the age group of (7-10) years, 21% belong to the age group (4-6) years and 14% are in the age group (11-14) years. The allergic children studied are 47% female and 53% male. Most children have a normal weight of 69%.

The women interviewed and their children live in the city of Beni Mellal (38%) and its regions: Souk Sebt (26%), Sidi Aissa (14%), Oulad Ayad (13%) and Fkhih Ben Salh (9%).

From total of interviewed women, the prevalence of exclusive breastfeeding is only 31%, 51% are mixed feeding and 18% artificial feeding reported visiting health institution for postnatal care. These results suggest that children's allergy may be due to breastfeeding type.

Table 1: characteristics of allergic children and their mothers visiting primary health care clinics in the city of Beni Mellal and the region in the study sample (n = 100).

Variable	Number	(%)
Age of the mothers		
17-20	24	(24)
21-30	41	(41)
31-40	31	(31)
41-50	4	(4)
Age of children (in years)		
0-3	34	(34)
4-6	21	(21)
7-10	31	(31)
11-14	14	(14)
Sex		
Female	47	(47)
Male	53	(53)
Weight of children		
Insufficient	23	(23)
Normal	69	(69)
Overweight	8	(8)
Place of residence		
Beni Mellal City	38	(38)
Souk Sebt	26	(26)
Sidi Aissa	14	(14)
Oulade Ayad	13	(13)
Fkih Ben Salh	9	(9)
Feeding Types		
Breastfeeding exclusive	31	(31)
Mixed feeding	51	(51)
Artificial feeding	18	(18)

3.2 Allergens responsible of allergy in children

According to the information collected from the children studied, the main allergens responsible of allergy in children are shown in Figure 1. We observed that allergens that promote allergy in these children are food (30%), pollen (25.7%), dust (18.6%), mites (13.6%), animal hair (10.7%) and the drug (1.4%). It is concluded that the main allergens causing allergy in children in our sample are food and pollen.

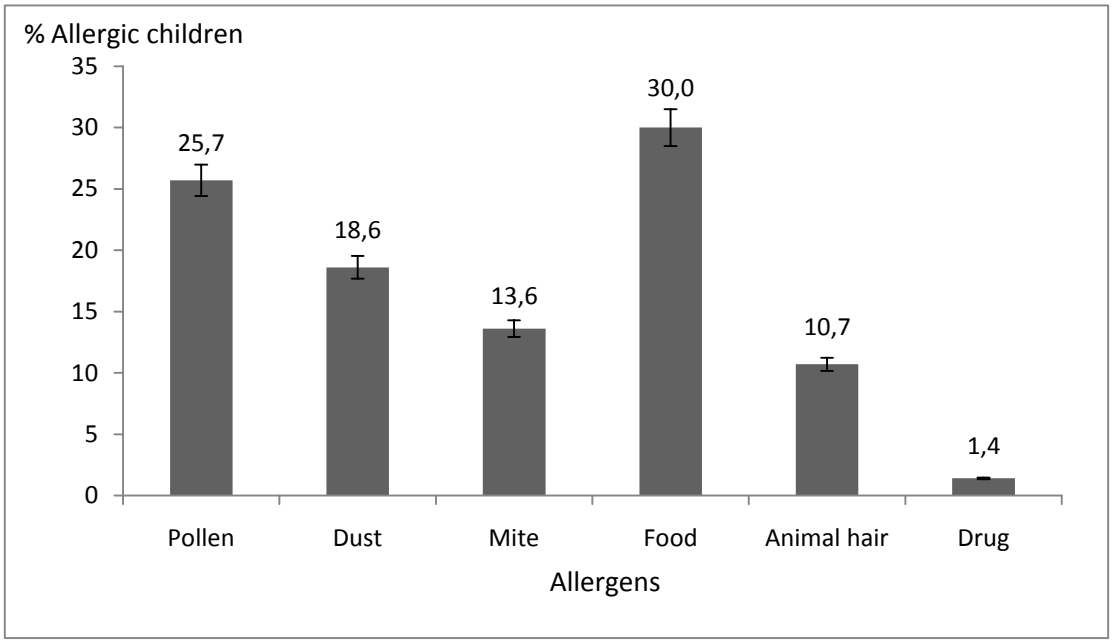

Figure 1: Distribution of allergens responsible for allergy in the children studied.

3.3 Symptoms due to pollen allergy among children allergic

The most common symptoms responsible of the allergy among children in the Beni mellal are: cutaneous (28.2%), ocular (27.8%), nasal (18.1%), respiratory (18.1%) and laryngopharyngeal (7.9%) (Figure 2). These results show that the cutaneous symptoms and ocular symptoms are the most dominant in children allergy.

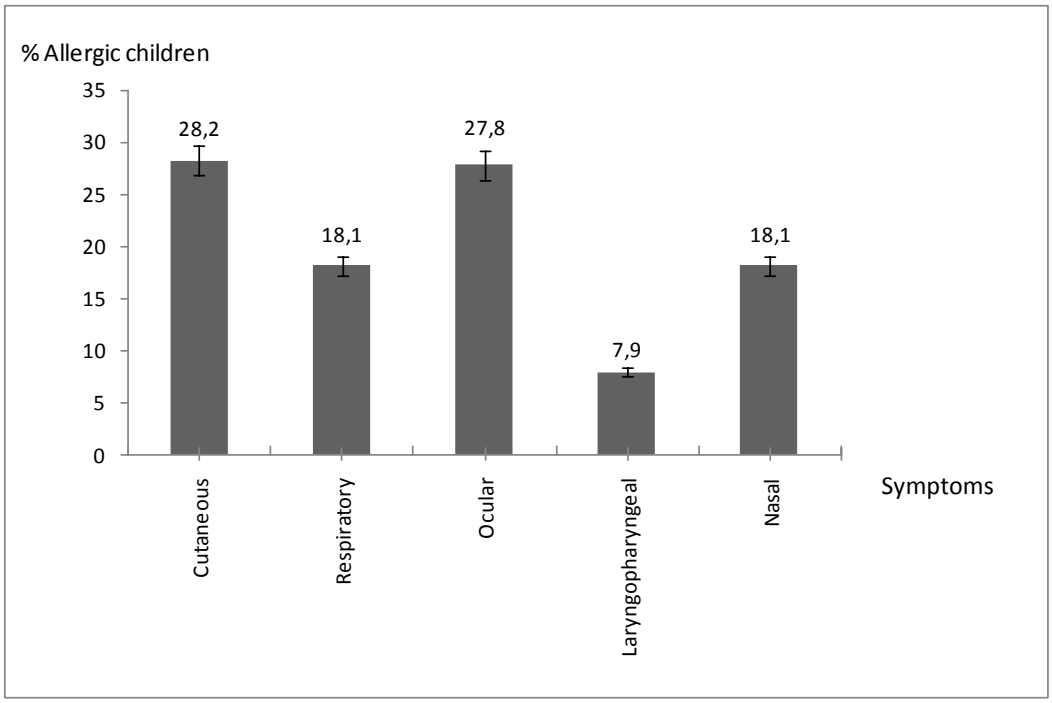

Figure 2: Distribution of symptoms due to allergy among children studied.

3.4 Relationship between feeding type and allergy type

The analysis of the results of our questionnaire shows 51% of allergic children are breastfed by breast and bottle (mixed feeding), 18% by bottle and only 31% by breasts (Table1). This means that the majority of children had non-exclusive breastfeeding (mixed breastfeeding and bottle).

Our results also show that children who had not exclusive breastfeeding (NEBF) are the most affected by the allergy that children have been breastfed by exclusive breast (EBF) (Table 2). The results of all types of allergies show: pollen allergy is 72.3% in children who have NEBF compared to 27.8% who have EBF, allergy to dust 76.9% in children who have NEBF compared to 23.1% who have EBF, mite allergy 73.7% in children who have NEBF compared to 26.3% who have EBF, allergy to food 58.02% in children who have non-exclusive breastfeeding compared to 41.9% who have exclusive breastfeeding, allergy to animal hair 80% in children who have a NEBF compared to 20% who have EBF and allergy to drugs 100% in children who have NEBF compared to 0% who have EBF.

Among these results we find that only the food allergy where the statistical difference is significant (test of X_2 = 0.026 to 2ddl, p <0.05) (Table 2) for the sample of 100 children from the Beni Mellal region.

Table 2: Distribution of allergy type among children studied compared to breastfeeding mode in the city of Beni Mellal and the region in the study sample (n = 100).

Allergy type		Feeding-type						Test χ^2
		EBF		NEBF				
		Breast		Mixed feeding		Bottle		
		Effectif	%	Effectif	%	Effectif	%	
Pollen	*Allergic*	10	27,8	20	55,6	6	16,7	0,743 ns
	Not Allergic	22	33,8	31	17,7	12	18,5	
Dust	*Allergic*	6	23,1	18	69,2	2	7,7	0,072ns
	Not Allergic	26	34,7	33	44	16	21,3	
Mite	*Allergic*	5	26,3	12	63,2	2	10,5	0,437 ns
	Not Allergic	27	32,9	39	47,6	16	19,5	
Food	*Allergic*	18	41,9	15	34,9	10	23,3	**0,026 ***
	Not Allergic	14	24,1	36	62,1	8	13,8	
Animal-hair	*Allergic*	3	20,0	9	60,0	3	20,0	0,571 ns
	Not Allergic	29	33,7	42	48,8	15	17,4	
Drug	*Allergic*	0	0	1	50	1	50	0,40 ns
	Not Allergic	32	32,3	50	50,5	17	17,2	

χ^2 = Chi-square test; **N** = effective; **%** = Percentage, ns = not significant; *: p <0.05, EBF=Exclusive Breast Feeding; **NEBF**= Not Exclusive Breast feeding (Mixed feeding+Bottle).

4. DISCUSSION

Numerous previous researches show breastfeeding as the preferred method of infant nutrition for many reasons. It is widely accepted that breastfeeding is the ideal form of infant nutrition. Breast milk is very nutritious and the psychological benefits of mother-child bonding that occur during breastfeeding are innumerable [14].

Breastfeeding is protective against the development of allergies. The preponderance of evidence, however, suggests that there is much to lose by not recommending breastfeeding. In general, studies have shown that infants fed cow's milk or intact soy protein preparations have a higher incidence of atopic dermatitis and wheezing in young children. Consistent with these findings, exclusive breastfeeding should be encouraged for at least 4 to 6 months in infants at high or low risk of atopy and regardless of their history of maternal asthma [14]. These studies relate the type of breastfeeding and allergy [15].

However, despite decades of research and the fact that WHO and ministries of health recommend breastfeeding as part of an allergy prevention program and Link mechanisms are not always understood.

In Morocco, allergy in children is a public health problem despite the efforts made by the Ministry of Health to promote exclusive breastfeeding, including the organization of the breastfeeding Week, there is a lack of information on women's interest and the benefits of exclusive breastfeeding [16]. Our previous study shows that the educational level is significant factors in the choice of exclusive breastfeeding in the region of Beni Mellal [13].

Our epidemiological study on the prevalence of allergy in relation to breastfeeding in children is the first study carried out in the Béni Mellal-khénifra region**.**

Our study for a sample of 100 children from five places in the Beni Mellal-khénifra region: the city of Beni Mellal, Souk sebt, Oulade ayade, Fkih ben salh and Sidi issa. The allergic children studied are of both sexes: 47% female and 53% male. According to our survey, we find that allergy affects all age groups of children**.**

The analysis of the results of our questionnaire shows 51% of allergic children are breastfed by breast and bottle (mixed feeding), 18% by bottle and only 31% by breasts. This means that the majority of children had non-exclusive breastfeeding (mixed breastfeeding and bottle). These results suggest that children's allergy may be due to breastfeeding type. We observed that allergens that promote allergy in children not exclusive breastfeeding are pollen (25.7%), dust (18.6%), mite (13.6%), food (30%), animal hair (10.7%) and drug (1.4%).

The main symptoms of allergy in children are manifested by skin symptoms and ocular symptoms. Our results also show that children who had not exclusive breastfeeding are the most affected by the allergy that children have been breastfed by exclusive breast. We show that the pollen allergy is 72.3% in children who have NEBF compared to 27.8% who have EBF, allergy to dust 76.9% in children who have NEBF compared to 23.1% who have EBF, mite allergy 73.7% in children who have NEBF compared to 26.3% who have EBF, allergy to food 58.02% in children who have non-exclusive breastfeeding compared to 41.9% who have exclusive breastfeeding, allergy to animal hair 80% in children who have a NEBF compared to 20% who have EBF and allergy to drugs 100% in children who have NEBF compared to 0% who have EBF. Among these results we find that only the food allergy where the statistical difference is significant (test of X_2 = 0.026 to 2ddl, p <0.05) (Table 2) for the sample of 100 children from the Beni Mellal region.

These results show that food is the first allergen in children in the region. We note that there is a percentage difference in the other allergens in children with EBF and NEBF which could suggest that these allergens could be involved by increasing the sample size.
Our results are in agreement with other research showing the involvement of breastfeeding in the development of allergic diseases. A survey also carried out by Bener et al., (2007) indicates that EBF prevents development of allergic diseases in children. The main factors associated with breastfeeding for allergic diseases were being the first baby, maternal history of asthma, and parental history of allergic rhinitis.

Another study of sensitization in atopic children in Marrakesh established by A Ghadi et al., (2007), a prospective study of 160 children between 2002 and 2005, suggests the relationship between the type of breastfeeding and the development of allergy [16]. Mulier S et al., (2007) show that food allergy is a public health problem because of it's increasingly prevalence in children,
and that food is the main allergen in children [17]. Our results also show that food is the main allergen that causes allergy in children (30%).

5. CONCLUSION

These results provide the best demonstration that exclusive breastfeeding is the most effective nutritional strategy identified for the prevention of different types of allergies specially food allergy.

The study findings open a big avenue for interventional role of breastfeeding. Therefore, we recommend breastfeeding is as one possible way to reduce the risk of food allergic diseases in developing countries.

Breastfeeding promotion programs should be established, such as family support, community-based behavior change education and communication on infant feeding at the community level, by health professionals and community health workers to help mothers improve the practice of breastfeeding and inform them of their health benefits.

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