

The association between breast milk and the reduction of allergies: An ILR

Kellie Oliver

University of Central Florida College of Nursing

## THE ASSOCIATION BETWEEN BREAST MILK AND THE REDUCTION OF ALLERGIES: AN ILR

## Abstract

The subject of breast feeding as opposed to formula feeding has been up for debate in regards to health benefits for some time. Children present with eczema, wheezing and other allergic reactions. With multiple formula types as well as breast milk parents need to have informed choices on which may help or hinder the reduction of allergies. In the United States, a leading cause of morbidity in children is asthma. This disease is a chronic condition causing upwards of \$50.1 billion in direct medical costs in 2007 alone. This cost extends to missed school days and traveling costs to and from medical facilities thus increasing the financial burden (Nurmagambetov *et al.*, 2011). The aim of this integrative literature review (ILR) is to critique evidence to understand if the inclusion of breast milk in a pediatric diet reduces the incidence of allergies. Although the majority of the six articles reviewed stated breast milk has no effect on the incident of allergies, the results found will aid nurses in the pros and cons of breast milk and allergy teaching. Limitations due to the ethical relationship with randomized trials should be taken into consideration when reading this review.

*Key words:* breast and feeding, formula, atopic dermatitis, acute rhinitis, allergy, allergies

### **Significance**

For many years reports of children presenting with allergies are present and climbing ultimately peaking in their twenties. According to Zeretzke, K. (1998), these allergies include but are not limited to asthma, eczema or atopic dermatitis (AD), colic, vomiting and even sleeplessness. The correlation between breast milk (BM) and allergies has seen much controversy. There have been claims that BM actually increases the incidence of AD in junior high students yet decrease the incidence of AD in children with a family history (Han, Y., Chung, A., J., Kim, J., Ahn, K., & Lee, S., L. 2009).

Freidman, N. and Zeiger, R. (2005) state that since the 1930's, reports of the association of breast milk and reduction of allergies have been proclaimed. Breast milk is composed of a variety of components that presume to make it essential in the development of allergies. Secretory IgA (S-IgA) is a particular agent found in BM or colostrum and has been stated to have a beneficiary effect on the reduction of cows' milk allergies (Freidman, N.,J. & Zeiger, R., S., 2005). The benefits of prebiotics, long chain polyunsaturated fatty acids and nucleotides in breast milk help bifidobacteria to flourish in the intestinal tract. Bifidobacteria and lactobacillus in the gut of an infant is stated to diminish the incidence of developing allergies. La Leche League (2013), recommends to breast feed for a minimum of six months; as this is the age children begin to produce their own S-IgA

Formula is the other option parents have for feeding their children. In many instances formula is composed from modified cows' milk with additional nutrition. Whey dominant and casein dominant are the two most common types of formula. Current day formula has been engineered to be as genetically close to BM as possible (Venter, C. & Dean, T., 2008). However,

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there are components of formula that is not comparable to BM, such as the absorption level of differing supplements. For instance, in BM, iron, phosphorus and calcium is presented at a much lower level than that found in formula. This is due to the high bioavailability found in the BM. This comes to light in the comparison of iron absorbed from BM compared to that of formula. Breast milk has an absorption rate of 50%-75% in comparison to the 4% absorption rate from formula. With this being said, formula is now adding the allergy fighting supplements of oligosaccharides and long chain fatty acids (Venter, C. & Dean, T., 2008).

It is imperative to know how many allergy fighting supplements are being absorbed by the child. Allergies of all types decrease quality of life for these children. Despite the singular research done on BM and allergies, and formula and allergies, there was not much research received on the combination of each. The purpose of this integrative literature review is to try and attain the answer to the question; does the inclusion of BM in a pediatric diet reduce the incidence of allergies?

### **Method**

An initial search strategy was devised to compile articles written in English published January, 1999- January 2013. Databases searched were Cumulative Index to Nursing and Allied Health (CINAHL), the Cochrane Database of Systematic Reviews, MEDLINE, and Google Scholar. MeSH and other applicable search terms utilized in the databases were:

- Breast feeding,
- breast milk,
- nursing,
- allergy,

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- allergies,
- infants,
- pediatric,
- and child.

Articles were included in this review if they utilized:

- Breast milk, donor or primary,
- impacting the reduction of allergies in those that were exclusively or supplemented for an average of 7 months,
- who had or were at risk for developing atopy, asthma, atopic dermatitis, food allergies and/or cow's milk allergy
- thus resulting in infant nutrition and longer feeding.

Articles were excluded if they utilized terms of:

- Breast feeding problem and/or
- pain felt by mother,
- or allergies prominent in mother and/or father,
- that led them to hypoallergenic child care,
- including infant formula reviews.

The quality and level of evidence of articles used were determined by using criteria published by Melnyk and Fineout-Overholt (2011).

## **Results**

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Sixty-two articles were found from the search engine of CINHALL with Full Text to include, Medline and the Cochrane Database. Although the search conducted was systematically applied and comprehensively conducted, the resulting articles showed few primary studies in relation to the prevalence made by BM on the incidence of allergies in pediatrics. Ideally there should be two times the amount of relevant articles found in order to increase usable articles. This would give increased substance and value to this review.

An independent review made by one researcher found forty-six articles not to be of significance for this integrated literature review. These articles did not meet criteria needed as described by their abstract or title. The sixteen articles retrieved were further evaluated and only six were deemed to be suitable for review in correlation with this research study.

Four of the six studies were cohorts, one was a cross-sectional study and the remaining was a meta-analysis. The four cohorts were assigned level IV, the cross-sectional study was assigned level III and the meta-analysis assigned level I (Melynk & Fineout-Overholt, 2011)

Tables I and II summarize the design, level of evidence, sample, and characteristic of intervention and results of the six articles reviewed. The articles are organized chronologically and divided into two themes according to the concept of their intervention critiques. The two themes are; BM induced allergies and that there is no relationship between BM and allergies.

### **Breast milk induced allergies**

One study reported an increase in allergies with the inclusion of BM (see Table 1). This is believed to be in part, due to the breast milk's natural protective qualities. As BM does not

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allow the immune system to develop a defense towards AR or AD, this is believed to be the cause for increased findings (Lowe *et al.* 2008). The composition of BM was believed to be the leading cause for some type of allergic reaction (Lowe *et al.* 2008). According to Lowe *et al.* (2008), the n-6 fatty acid (FA) content has a direct correlation with the increased incidence of AR. AR was defined as one or more episode of nasal drainage and/or congestion without the incidence of an upper respiratory infection. This was measured by the status of AR at 6 years of age as defined by parent through a telephone report.

**Table 1** Primary studies- Breast milk induced allergies

Primary study, Country	Design, level of evidence, sample	Characteristics of intervention	Results
Lowe <i>et al.</i> (2008) Australia	Cohort Level IV N=194 mothers providing colostrum	Multinomial logistic regression was used for the association between infant AD and non-AD. Gender, household pets, maternal history or allergies, and parental age found no relationship with allergies. Formula nor a formula and BM combination presented allergies	Infants drinking colostrum were at increased risk for AD OR=1.33,95%, CI=1.11-2.48 Increased risk for AR by drinking colostrum OR=1.59, 95%, CI= 1.12-2.25

### No relationship between breast milk and allergies

Five studies addressed the lack of correlation between BM and allergies (see Table 2). Four were primary studies on the effects of BM and allergies and one was a meta-analysis. All studies related BM, formula feeding and a formula group supplemented with formula.

Laubereau *et al.* (2003), Wegienka *et al.* (2005), Hans *et al.* (2009) and Zachariassen *et al.* (2011), composed studies around BM and its effect on infants to age four months. The

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researchers gained information via the parents who were self-reporting of the results. These results were from varying subjects of diet (maternal and infant), familial history, socioeconomic factors as well as environmental factors.

The conclusion of Smith (2012), Han *et al.* (2009) and Zachariassen *et al.* (2011) was that allergies presented from a multitude of sources. These sources found to increase the incidence of allergies were;

- cows' milk, leading to cows' milk allergy (CMA),
- maternal disposition rather than dietary intake, and specifically AD was higher in
- multiple births, male gender, maternal smoking and ventilation.

BM was not a source of contention for allergies. However it was neither found to reduce allergies either.

**Table 2** Primary studies- No incidence between breast milk and allergies

Primary study, Country	Design, level of evidence, sample	Characteristics of intervention	Results
Laubereau <i>et al.</i> (2004) Germany	Cohort Level II N=900 BF familial history (FHX) of allergy-Group I N=684 Breast & Hypoallergenic Formula (FHX) allergy-Group I N=1131 BF no FHX allergy Group II N= 1188 Breast & Hypoallergenic Formula no FHX allergy- Group II	Two subgroups with (FHX) or no FHX allergy was given a physician diagnosis of AD or not	There was no difference in risk Group I ORadj=0.92;95%, CI,0.67-1.25 Group II ORadj=0.97;95% CI,0.77-1.21
Wegienka <i>et al.</i> (2005) United States	Cohort Level IV N=405 children	Children were monitored for positive SPT for AD between the different	No valid difference between formula fed and those

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of America	N=146 formula only N=106 formula & breast N=154 breast only	feeding groups.	breast fed and supplemented with formula RR 1.5; 95% CI,1.1-2.1
Hans <i>et al.</i> (2009) Korea	Cross-sectional Study Level VI N=143 children N=16 formula only N=62 formula and breast N=65 breast only	These groups were monitored for egg & CMA allergy though IgE antibody testing. SAS software was used with the X2 test to compare maternal HX of allergy. A <i>t</i> test was used for egg and milk allergy	Maternal HX not significant P=0.13 No risk between groups in egg & milk allergy P=0.006-egg allergy P=0.47 milk allergy
Zachariassen <i>et al.</i> (2010) Denmark	Cohort Level II N=324 children N=14 formula only N= 51 formula and breast N=70 breast only	IgE analyzed from groups for CMA thus leading to AD or AR	There was no difference for risk between BM and formula fed P=0.006, OR, 0.97, CI=95% (0.95-0.99)
Smith (2012) Great Britain	Meta-analysis Level I Host <i>et al.</i> (1988) Cohort Saarinen <i>et al.</i> (1999) RCT Sanchez-Valverde <i>et al.</i> (2008) Cohort	A review of 6 studies was performed of which 3 were strong enough for meta-analysis. Studies analyze the possibility of cows' milk allergy (CMA) on breast fed infants when supplemented with a cows' milk formula (CMF). The purpose of this study was to give examples of how infants supplemented with CMF were at an increased risk for CMA thus causing AD	Breast fed infants supplemented with CMF was shown to have a higher risk of developing CMA thus no protective effect of breast milk was shown. P=0.0001 1.75(95% 1.30-2.27)

**Limitation of evidence**

The inability to randomize control groups due to the ethical nature of breastfeeding resulted in having unequal group sizes. It is ethically impossible to do a randomized and blinded trial (Laubereau *et al.* 2003). This was a limitation known to all articles. Another limitation set by all articles was the fact of no standard definition for AD in children under two years of age. Most articles were self-reporting thus creating room for error in exaggeration or incomplete entry due to forgetfulness.

**Recommendation for practice**

The quality and quantity of research completed in this specific area of breast milk and allergy influence is limited and spans decades. There is a need for more research in the outcome of breast feeding and the association with allergies. To have a minimum of ten relevant articles published after 2006 would have been ideal for this ILR to have greater value. Breast milk has, world-wide, been the choice for infant nutrition since the conception of mankind. The nutritional and bonding experience found via BM is widely recognized, yet the evidence is not overwhelming in the protective effects of BM and the reduction of allergies. Thus the conclusion drawn from this ILR is that BM does not reduce the incidence of allergies

In current practice it is recommended to maintain education on the health benefits of breast milk as well as connect with nurses that handle lactating mothers and form a committee to discuss findings, such as in the Student Nursing Association. Nursing professionals are recommended to encourage the use of breast milk, as all articles agree in the nutritional and psychological value, yet inform parents that there is no advantage for allergy reduction or prevention. Health care policy and procedures are recommended to implement public educational

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forums for expecting mothers in the arena of pet keeping, smoking and prematurity. Government funding should be set aside to truly understand the impact breast milk has on allergies and children. In order to better understand BM and childhood allergens, what would an analysis of BM in composition for individualized mother/infant combo determine? Would a maternal dietary log show a difference? How would the results vary to have sub groups of infants depending on the type of formula used versus breast milk?

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