

Stop the Wheeze, Breast-Feed!  
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Asthma is a chronic disease that causes the airways in one's lungs to inflame and narrow, resulting in wheezing, chest tightness, shortness of breath, and coughing. In the United States, there are about 22 million people with asthma, including 6 million children. Asthma tends to be most prevalent in boys in childhood, but women in adulthood. Most often this disease begins in childhood, but the cause is unknown and there is no cure for it (National Heart Lung and Blood Institute, 2008). Therefore, we need to focus on preventative measures that could reduce a child's risk of developing asthma.

Breast milk is regarded as the most beneficial and natural substance for a newborn child to consume during their early months. A substance called colostrum, which is a sort of pre-milk, is made and released for a few days after giving birth. This helps the child's digestive system develop and work properly. There are specific antibodies in breast milk that boost the immune system and work to lower the child's risk for obesity, asthma, allergies, and colic. Breast milk contains the right ratio of protein to fat to be better utilized by the body (American Congress of Obstetricians and Gynecologists, 2010). In 1997, the American Academy of Pediatrics developed a list of recommendations for feeding one's child, which include: human milk being most preferred, breast-feeding should begin during the first hour of life, feed when signs of hunger first appear, and there should be no supplements for the first 6 months, except when the mother has a medical condition (Weinstein, Oleske, & Bogden, 2006).

Breast-feeding is also beneficial for the mother; it is convenient, inexpensive, and burns calories. It releases a hormone, oxytocin, which functions to shrink the uterus and decrease bleeding after giving birth. Also, breast-feeding provides an opportunity for the mother to create a bond that no one else will be able to experience with that child (American Congress of Obstetricians and Gynecologists, 2010). Also, correlations have been made between breast-

feeding and a reduction in the risk for breast cancer (Weinstein et al., 2006). Therefore, breast-feeding provides numerous benefits that supplemental feeding cannot naturally provide.

Controversy surrounds the link between breast-feeding and asthma, especially whether breast-feeding helps to reduce the risk of asthma in developing children. Many researchers have attempted to study this relationship, but it is impossible to make a causative statement because many other factors (social, environmental, biological, etc.) affect the occurrence of asthma. Scientists have developed studies that control for these various confounds to provide the public with a correlation between breast-feeding and a reduced risk of asthma. Since causation cannot be made, disagreement around the issue arises with many researchers claiming there is no significant link between breast-feeding and asthma or that there is an increased risk for asthma due to breast-feeding. However, despite the controversy, there is ample evidence pointing towards an association between breast-feeding and the reduction of asthma risk in young children.

### **Reducing Risk of Asthma in Children**

Several studies have examined whether breast-feeding provides infants with a protective mechanism against the development of childhood asthma. In one such study, researchers determined whether breast-feeding had an effect on asthma rates in children during the first 8 years of life. Kull et al. (2010) collected data on 4,089 children who were part of a population-based birth cohort in Stockholm, Sweden. 93% of this sample was available for follow-up through the eight years. Methods included information on breast-feeding duration, age of introduction to other types of feeding, blood samples, and measurements of lung functioning. Of the sample, 99% of the children had been breast-fed for some amount of time, while the average length of exclusive breast-feeding was approximately five months. Kull et al. (2010) found that

overall, children who were breast-fed exclusively for four months or longer were less likely to develop asthma during their first 8 years of life (adjusted OR, 0.63; 95% CI, 0.50-0.78).

Children with prolonged exclusive breast-feeding were also found to have significantly better lung function as measured by PEF<sup>1</sup> ( $\Delta$ PEF, 4.1; 95% CI, 0.43-7.86). This result was shown even among those who developed late onset of asthma (asthma developing after 8 years).

### **Breast-Feeding and High-Risk Infants**

One main concern with breast-feeding has involved breast-feeding among mothers with asthma. Does a mother with asthma put her child at risk of developing asthma if she breast-feeds? This does not appear to be the case. Oddy et al. (2002) explored whether maternal asthma has any effect on the association between breast-feeding and asthma in children. Researchers used the Western Australian Pregnancy Cohort Study in order to obtain data; a total of 2,602 children (91% of the original participant group) were studied up until 6 years of age. The duration of exclusive breast-feeding was used as the standard measurement for infant feeding. Results revealed that most of the children were breast-fed; 48.4% of those children were exclusively breast-fed for fewer than four months (Oddy et al., 2002). Data showed that although maternal asthma does increase the prevalence of asthma in the child ( $P < .001$ ), this link is independent from breast-feeding and asthma. Risk of current asthma was increased in children if exclusive breast-feeding ceased before four months, regardless of maternal asthma status ( $P = .049$ ). For children exclusively breast-fed for four months or longer, there was no evidence suggesting that maternal asthma impacted the protective association between breast-feeding and current asthma in children. Thus, the researchers concluded that exclusively breast-feeding for

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<sup>1</sup> Peak expiratory flow

four months and longer should be encouraged, regardless of whether the mother has a history of asthma or does not have a history.

Another study showed similar results in children with a maternal history of asthma. Giwercman et al. (2010) investigated the association between duration of exclusive breast-feeding and the development of wheezy disorders in high-risk infants. 411 infants, sampled from the COPSAC<sup>2</sup> birth cohort, were evaluated during their first 2 years of life. The researchers only evaluated the effect of breast-feeding before disease onset in order to avoid inverse causation. Results showed that exclusive breast-feeding significantly reduced the risk of wheezing episodes, even after adjustment for possible confounding variables ( $P=.021$ ). Severe wheezy episodes were also statistically significantly reduced ( $P=.051$ ). Therefore, no evidence was shown that maternal asthma had an aversive effect on breast-feeding among high-risk infants.

Another factor that can put children at high risk for asthma development is environmental tobacco smoke exposure. Chulada et al. (2003) discovered in their study that breast-feeding significantly reduced the risk of asthma in children from smoking environments in comparison to children from nonsmoking environments ( $P<.05$ ). The age ranges for the children were 2 to 71 months, who were sampled from the NHANES III<sup>3</sup> in the United States. Approximately 3,131 children (37.9% of the original sample) were from households with at least one smoker, automatically putting these children at a higher risk for asthma. However, especially among children who were exclusively breast-fed for four months or more, asthma risk was reduced (crude  $HR^4 = 0.27$ ; 95% CI, 0.07-0.99). It is important to note, though, that protection against

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<sup>2</sup> Copenhagen Study on Asthma in Childhood

<sup>3</sup> Third National Health and Nutrition Examination Survey

<sup>4</sup> Hazard ratio

environmental tobacco smoke did not extend to children who were born to mothers who smoked while pregnant. Smoking while pregnant can impair fetal lung development; therefore breast-feeding cannot help in alleviating consequences related to that situation.

Overall, data support that breast-feeding, particularly exclusive breast-feeding for four months or longer, can decrease the risk of asthma development in children. The protective aspect of breast-feeding may be especially beneficial for infants with a history of maternal asthma and infants from smoking environments.

### **Breast-Feeding and No Protective Effect for Children**

Despite the presented evidence above that breast-feeding can provide a protective measure against diagnosis of asthma, there are dissenting opinions. Some studies have claimed that there is no protective effect or that the protection only lasts while the children is breast-feeding, while others report that breast-feeding can actually increase the risk of asthma.

In 2007, Kramer et al. produced a cluster randomized trial in the Republic of Belarus to find the effects of breast-feeding on asthma using their program, PROBIT<sup>5</sup>. The idea behind PROBIT was to use mothers who had made a decision to breast-feed, but encourage the amount of time one should breast-feed and to avoid the addition of supplemental nutrition. A total of 17,046 breastfed babies participated in this study, which were separated into a control and an experimental group. At 3 months of age, the amount of children being exclusively breastfed was 7 times higher in the experimental group, whereas at 6 months there were low numbers in both groups. At around age 6, a questionnaire for the prevalence of asthma was given as a follow-up tool. Kramer et al. (2007) found no relationship between breast-feeding and the risk of asthma. The experimental and control groups were equally likely to have asthma at 6 years of age.

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<sup>5</sup> The Promotion of Breastfeeding Intervention Trial

However, the researchers do mention to take caution on applying this research because the rates of asthma are lower in Eastern Europe than countries in the west.

### **Increased Risk of Asthma from Breast-Feeding**

Takemura et al. (2001) studied the relationship between breast-feeding and asthma in Tokorozawa, Japan. The researchers distributed a questionnaire to students aged 6-15 years and analyzed the data from 25,767 of these students. This questionnaire is used in the Japanese Environmental Agency to examine the issue and prevalence of asthma and allergies in Japan. The researchers added questions about family history of these conditions and children's (0-3 months) eating regimen. Based on their analysis, participants with asthma had a higher probability to be male, have a family background of asthma, and have been breastfed from 0-3 months. There was no seen correlation between parental smoking and asthma ( $P < 0.14$ ) as reported in other studies, such as Chulada et al. (2003). The researchers concluded that a strong correlation exists between a lower risk of asthma when children were partially breast-fed or formula-fed, but not exclusively breast-fed ( $P < 0.01$ ). These findings suggest that breast-feeding could lead to the development of asthma in infants, but 0-3 months is a small amount of time for the beneficial properties of breast milk to take effect. Other research has shown that a minimum of four months is necessary for the positive association of breast-feeding and a reduced risk of asthma (Oddy et al. 2002).

This topic interested Sears et al. (2002), and prompted them to conduct a longitudinal study in Dunedin, New Zealand. There were a total of 1,037 participants, which were evaluated at ages 3, 5, 7, 9, 11, 13, 15, 18, 21, and 26. This evaluation involved assessing the prevalence of asthma, family history of this disease, environmental exposures, and allergies. Whether or not the child was breastfed (for at least four weeks) was analyzed at three years through interviews

with the parent and these results were validated through records obtained from a nursing program. Of all the subjects, 49% were breastfed, which correlated with being first-born, coming from a high socioeconomic status, having a mother who did not smoke, and having a sheepskin laid on their bed. After the questionnaire presented at 9 years, the researchers found a more than doubled risk of developing asthma with those breastfed. This relationship remained high throughout the rest of the study (until the participants were 26 years old).

### **Asthma a Risk Only After Cessation of Breast-Feeding**

Wright et al. (1989) conducted a study to test the effects of breast-feeding on lower respiratory tract diseases. In Tucson, Arizona, 1,246 subjects were enrolled and their parents were instructed to alert a pediatrician when the child showed signs of such a disease. The doctor would diagnose the patient and this provided the data for the researchers. The child's feeding pattern was analyzed from pediatrician check-ups and a parent completed a questionnaire when the child was between 12 and 15 months. Of all the subjects, 55% of children ceased breast-feeding after four months. The researchers found a correlation between being breastfed for four months and a decreased risk for asthma, but no effect later in the first year. These results made them conclude that breast-feeding could have a protective effect for the length of time that breast-feeding occurs, but has little effect after it has ceased. Also, this study remarks on factors, such as sharing a room and being of Mexican descent, as having a higher probability of a protective effect for asthma.

All of these studies provide the various dissenting opinions in this controversy. However, these findings should not be used as a reason to not breast-feed a child. Kramer et al. (2007) found no correlation between breast-feeding and asthma at 6 years of age, but Eastern Europe has low rates of asthma compared to the West. Whether this is due to environmental, biological,

etc. factors, significance may be difficult to establish because of a small prevalence of asthma in this region. Also, the amount of time that researchers analyze exclusive breast-feeding differs among studies. Takemura et al. (2001) looked at the feeding pattern between 0 and 3 months, whereas Sears et al. (2002) researched breast-feeding for only four weeks. Research has shown that exclusive breast-feeding for at least four months is the threshold for a beneficial impact (Chulada et al., 2003; Kull et al. 2010). Breast-feeding should still be viewed as beneficial, since data support a reduction of the risk of asthma while the child is being breast-fed (Wright et al., 1989). A protective effect during breast-feeding is enough to keep the child from pain and discomfort during those months in his or her life. Therefore, breast-feeding should be encouraged and supported by physicians and community members.

## **Discussion**

These studies, although they may differ in opinion on asthma, conclude that breast-feeding is best for a child, at least temporarily. Since there is much controversy surrounding this stance, the benefits of breast-feeding should not be over-shadowed by the disagreement. It provides the most beneficial nutrients in the right proportions for a developing infant. Therefore, new mothers should be encouraged to breast-feed for at least six months by their physicians, especially since the United States has low rates of exclusive breast-feeding during this crucial period. In 2007, the percentage of infants being exclusively breastfed was approximately 33% at three months and 13% at six months. Also, in the same year, one in four breast-fed children were introduced to formula within two days of life (CDC, 2010). Cultural factors could influence these low rates of breast-feeding in the U.S.

Several factors can impact the duration of exclusive breast-feeding, or any breast-feeding, for women. Particularly in Western society, breast-feeding in public is considered a taboo or

socially inappropriate. This view may lead mothers to feel that they can only breast-feed in the privacy of their own homes; therefore they may use formula supplementation as a means for public feeding. Societal views are not the only reason for early cessation of breastfeeding though. In a clinical survey, Lewallen et al. (2006) found 34.7% of women who stopped breastfeeding were due to beliefs that their milk supply was insufficient. These women felt their babies were not satisfied or that they were not making enough milk to provide adequate nutrition. Other factors affecting breast-feeding duration included: complaints of sore nipples, returning to work or school, personal reasons such as self-consciousness, and medication use by mothers (Lewallen et al, 2006).

Because breast-feeding has many health benefits associated with it, including the potential to reduce diagnosis of asthma, sufficient education and support needs to be provided to women about breast-feeding. Lewallen et al. (2006) reported that 92% of the women in their sample were given assistance with breast-feeding while in the hospital, but that percentage dropped to 54.8% once the women were home. With education that helps address these common factors for early breast-feeding cessation, then perhaps more women will not be so quick to turn to formula supplementation when a conflict arises.

Although these factors are commonly seen in Western society, they may not be applicable to all societies worldwide. However, there may be different reasons for early cessation of breast-feeding in other cultures, so more research is needed in this area. In order to establish more control in future studies, a set protocol needs to be developed when researching the association between breast-feeding and asthma. For instance, a standard should be set for the duration of exclusive breast-feeding so that different studies are comparable. Perhaps the reason for controversy surrounding the general issue is due to the lack of a strict measurement of breast-

feeding duration. With more standard measurements and control, studies that show a positive protective function of breast-feeding against asthma could have the potential to influence breast-feeding recommendations and support for women globally.

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