The Benefits of Breastfeeding and its Influence on Children’s Development and Health

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Breastfeeding has been universally endorsed by many organizations as the best way to feeding infants. Research has taken over this topic for many years to try to understand the significance of breast milk and why it is critically important in the development of a child’s life. The purpose of this paper is to discuss the benefits of breastfeeding and to provide an overview of why mothers should breastfeed their babies.

The topic of breastfeeding is significant to clinical practice and is vital to nurses to increase national breastfeeding efforts. A mother in the NICU may ask a nurse, “Is there really a difference between breastfeeding and feeding my child formula?” and the simple answer should be “yes, there is a difference”. Nurses should be able to encourage and support mothers in their decision to breastfeed as well as promote health system changes to improve patient satisfaction and breastfeeding outcomes. They should also ensure breastfeeding is systemically addressed and supported at every clinical encounter.

One of the goals in *Healthy People 2020* is to reach a breastfeeding target of 0.819, which has an 8% improvement rate compared to the 2006 baseline of 0.739 (U.S Department of Health and Human Services, 2010). According to the CDC Breastfeeding report card for 2010, the United States did meet its *Healthy People 2010* goal with 75% of U.S mothers initiating breastfeeding their babies and 43% of mothers feeding till the 6-month old mark, which is what the World Health Organization recommends (CDC, 2010). This is an outstanding increase compared to 2007, when goals were not met and percentages were 73.8% and 41.5% conclusively (CDC, 2007). With this being said, we can concur that as more breastfeeding efforts are recognized, percentages are increasing year by year.

 **Research Question**

In pediatrics, what is the benefit of breastfeeding on the development and health of a child through his/her early years?

**Review of the Literature**

This evidence-based literature review examined five peer-reviewed articles on the basis of breastfeeding (Huus, Ludvigsson, & Enskar, 2008; Quinn et al., 2001; Oddy et al., 2011; Li, Whitehouse, Oddy, Zubrick, & Malacova, 2010; Gerd, Bergman, Dahlgren, Roswall, & Alm, 2011). They each discuss the benefits of breastfeeding and its influence on child development. The first article*,* Huus et al.*,* studied whether or not breastfeeding had an influence on the development of overweight and obesity in childhood. Quinn et al., 2001 investigated the relationship between the duration of breastfeeding and its impact on cognitive development in children. Similarly, Oddy et al., 2011also studied the relationship between duration of breastfeeding and child development, but with an emphasis of breastfeeding for 4 months or longer and child development at ages 1, 2, and 3. The article Li et al. examined the relationship between duration of breastfeeding with an emphasis on educational and academic outcomes. Lastly, Gerd et al.looked at the different reasons why mothers may discontinue breastfeeding due to the decline in recent years in Sweden. All five articles were published in various pediatric journals and were peer-reviewed.

Huus et al. (2008) sought to determine whether breastfeeding had an influence on the prevention of obesity in children, considering potential cofounders such as socioeconomic factors. This was a quantitative study that used a prospective cohort design, an ABIS (Advanced Brain Imaging) study, which 21,700 individuals were asked to participate. 5,999 are the minimum number of participants who answered all the questions. Parents were also asked to complete Questionnaires at the time the child was born, at one, two and a half, and five years of age. Questions included those regarding how many months after birth the mother stopped breastfeeding the child and other questions about socioeconomic variables, such as civil status, parental age, education, and smoking habits. Child and parental height and weight data were also collected and confirmed through the Child Health Services. SPSS was used for statistical analyses, and correlations were assessed using Pearson’s correlation. Lastly, Simple and multiple logistic regressions were used to predict the child’s BMI at five years of age. The Research Ethics Committee at the Faculty of Health Sciences, Linköping University, Sweden, approved the study (Huus et al., 2008).

The results showed 78.4% of children were still breastfed at three months of age. This information came from preliminary data one year after birth. The median exclusive breastfeeding duration was four months and the introduction of infant formula was five months. Both maternal and paternal age was associated with breastfeeding duration, with older mothers breastfeeding for a longer time than younger mothers. Maternal BMI greater than 30 and being a single parent was associated with short-term breastfeeding. Short-term breastfeeding was linked with obesity in five-year-old children but when including other independent factors in the inquiry, short-term exclusive breastfeeding did not conquer statistical significance (Huus et al., 2008).

Although there was a link between obesity and breastfeeding, this did not remain significant when other factors such as parental age, smoking, education, and age were included into the analysis. A weakness in the article, which may have come to play in the results, was the dropout rate. Many of the mothers who responded to the questionnaires were older and highly educated than those who just responded to the first baseline questionnaire. Thus, the risk of selection bias may have been evident hand cannot be excluded. It can be concluded that although there may be a possibility that breastfeeding influences obesity, there does not seem to be a relationship with development of weight at five years of age (Huus et al., 2008).

Quinn et al. (2001) considered the fact that duration of breastfeeding and cognitive development may be related. The article stated that if there was an association between breastfeeding and cognitive development, it might be due to two possible explanations. One, is that there is a unique nutritional element included in the breast milk that may be optimal for cognitive development, or two, it may be as a result of psychological attachment between the mother and her baby enabling brain development. The hypothesis for this study is stated as, “The duration of breastfeeding would have direct beneficial effects on child development at five years of age, and that this would be independent of social and family influences” (Quinn et al., 2001).

A total of 7357 women participated in the study after exclusions for various reasons were made. Mater Hospital-University of Queensland Study of Pregnancy (MUSP) Project was used to gather data and participants for the study. Data was collected at four different periods: at enrollment, shortly after birth, at six months, and at five years of age. It was collected using questionnaires, biological measures of the pregnancy and birth, and a clinical assessment at five years old, which included administration of the Peabody Picture Vocabulary Test Revised (PPVT-R). This was a “standardized test of receptive language and was indicative of verbal intelligence” (Quinn et al., 2001). Due to funding and distance issues, 4049 children were left at the five-year follow up. In the six month questionnaire, mothers were asked whether or not they breastfed their child and how long they breastfed in which they were given 6 categories to choose from, ranging from ‘never breastfed’ to ‘still breastfeeding at six months’ (Quinn et al., 2001).

A large number of psychological and biological variables were used to reduce the risk of confounding. Information included factors like sex of the infant, birth weight, APGAR scores, and overall health of the child. At five years old, they measured marital status, number of children in the household, time spent in daycare, maternal education, maternal cigarette smoking while pregnant, social status, and the degree of stimulation, such as talking and playing with the child. Analysis of variance was used to measure the average scores for the PPVT-R (Quinn et al., 2001).

There was a significant trend when comparing those with longer duration of breastfeeding and increased PPVT-R scores. Those children who’s mothers breastfed them till 6 months of age had a mean score of 103.6 at five years old, compared to 94.2 for those who did not breastfeed at all. This was consistent with the hypothesis. Scores were adjusted using the multiple linear regression for factors independent predictors of the PPVT-R. Even with adjustments, the difference remained significant and consistent. In the discussion section of this article, a concern that was conversed was the home environment score. When this socio-environmental influence was included, the score were no longer significant. The article stated, “This suggests that the positive relationship between breastfeeding and cognitive development was not due to the nutritional advantage of breast milk but rather to a more nurturing and enriching environment and parenting style and possibly to genetic influences such as maternal IQ” (Quinn et al., 2001).

Similar to the previous article, Oddy et al. (2011) assesses the relationship between breastfeeding and child development. However, this article is specified for breastfeeding that is longer than four months and assesses child development at one, two, and three year olds rather than at age five. It has been said that infants with longer duration in breastfeeding have advantages over neurodevelopment, are less likely to experience behavioral problems through their childhood and adolescent years, and may have significant increases in their IQ by the age of six years old. However, it has also been argued that these associations may be due socio-demographic confounding rather than a real relationship. With that said, the article stated, “The major challenge for this study was to adequately control confounding of parental and family characteristics which are strongly associated with both breastfeeding for longer periods of time and good developmental outcomes for children” (Oddy et al., 2011). The study used a Longitudinal Western Australian Pregnancy Cohort study, which they believed had the right capabilities for adjusting confounding factors. The hypothesis stated that longer duration of breastfeeding would improve developmental outcomes.

As mentioned previously, the study used a Raine Study – Longitudinal Western Australian Pregnancy Cohort, in which 2900 pregnant women with an average of 18 weeks gestation were enrolled. The study followed the children for approximately three years and many of the women had to have an intention of remaining in Western Australia so that a follow up can be completed. Data was collected about the mother’s health, social, obstetric, and demographic history and babies were examined at the one, two, and three year marks. For follow up assessments, the mothers had to complete questionnaires which included information regarding family functioning, the development of speech, behavior, history of injuries, and their overall cognitive development. The questionnaires were measured using IMQ, which stands for Infant/Child Monitoring Questionnaires. This was designed to monitor the child’s development at one, two, and three years old. It was divided into 5 categories, in which parents had to answer a couple questions in each category about the child’s functioning. A physical examination was also required. The predictor measures, breastfeeding durations, were measured by two categories, either been breastfed for longer than 4 months or breastfed for less than 4 months. Confounding factors were also measured and adjusted, and because this was a quantitative study, statistical analysis used a multivariable logistic regression model. Ethical considerations were also taken into account, in which two committees approved the protocol, and consents were signed by the parents. (Oddy et al., 2011).

 The results showed that 63% of the participants breastfed for longer than four months. 29% Individuals in that same category had a family income below the poverty line and 41% of mothers had completed high school. At the age of one year old, 1:5 infants had at least one atypical score in one of the IMQ domains. An atypical score was defined as scoring below the cutpoint. The atypical scores increased at age two to 32%, and then decreased to 29% at age three. Infants who were breastfed for longer than 4 months had significant higher scores for fine motor skills, adaptability and communication for ages one to three years. Infants who were breastfed for less than four months were more likely to have higher atypical scores for the same three categories over the three years of the study (Oddy et al., 2011).

The discussion section of the study talked about a few weaknesses and strengths that the authors were made aware of during the study. Like the previous study, it was found that a number of domains of the IMQ in child development were sensitive to longer duration of breastfeeding after making adjustments to the confounding variables. In specific, the two domains were the adaptability and communication domains. Children who were breastfed for longer than 4 months were more likely to score higher in those two categories. One important strength in the study was the adjustments made in socio-demographic, biological, and psychological factors that were at a potential risk for confounding. These factors included maternal education, family income, and maternal stress, and shared a relationship with a delay in child development and breastfeeding duration. The study was able to adjust these factors to minimize confounding factors. Conclusively, the study was determined as statistically significant, but may be subtle for the impact of breastfeeding on child development (Oddy et al., 2011).

The study written by Li et al. (2010), took a different approach when comparing breastfeeding duration and child development. The study reviewed academic achievement at 10 years old rather than ending at 1, 2, 3, or even 5 years of age. The article was published in the *Journal of the American Academy of Pediatrics* and three of the authors are from the previous article described above by Oddy et al. (2011). These authors included Li, Oddy, and Zubrick. This article hypothesized that children who were breastfed for 6 months or longer would achieve higher score on literacy and numeracy, independent of extra stimulation received at home and maternal and sociodemographic factors. This study was also a longitudinal study that used the Western Australian Pregnancy Cohort (Raine) design. Mothers who were 16-18 weeks pregnant and who intended to stay in Western Australia were enrolled, which came to be to a total of 2900 random women. Children were assessed six different times at the ages of 1,2,3,5,8, and 10 using questionnaires and clinical examinations. A significant change altered with this study compared to previous studies was regarding infant data collection. Instead of waiting 5-11 years after the breastfeeding period to collect the data, feeding data in this study was collected at 1,2, and 3 years old. It was revealed that maternal recall was not as reliable after a number of years, and collecting infant data as early as possible made the data collection more valid. Similarly, socio-demographic factors were collected by the mother and included family status, family income, stimulation, and maternal age. Maternal stimulation was measured by asking the parents how much they read to the child, which was asked at 3 and 5 years old. Western Australian Monitoring Standards in Education (WAMSE) was used to measure the level of achievement in different learning areas in children. For statistical analysis, a multivariable general linear regression model was used, and socio-demographic factors for family income and maternal education were adjusted (Li et al., 2010).

After the withdrawal of children from the study for different reasons, the cohort total was 1038, and all biases were addressed. At 6 months of age, 54% of mothers were still breastfeeding while 28% predominantly breastfed. The article stated, “In univariate associations between breastfeeding and the educational outcomes at 10 years, parameter estimates from linear regression revealed that continuous breastfeeding was significantly associated with an increase in scores with each additional month of breastfeeding for mathematics, reading, writing, and spelling” (Li et al., 2010). However, although they still increased when confounding factors were adjusted, they were no longer significant. Results also showed that predominant breastfeeding greater than 6 months were significant for improved educational scores using the multivariable model. Lastly, lower maternal education and the family income were associated significantly with decreased academic scores and reading with the child at ages 3 and 5 improved their reading and writing scores (Li et al., 2010).

The discussion was able to provide important points about the study. It was mentioned that previous studies only focused on cognitive abilities and only a few have examined academic achievement, which have proved stronger associations. The study also discussed a few strengths and limitations. Strengths included a large community sample, prospective pregnancy data, and infant feeding data collected close to the period of cessation. A limitation was lack of information for those children who attended private schools rather than government schools. It was thought that children who attended nongovernment schools may have had higher academic scores and been more likely to be breastfed. Conclusively, the study added evidence that 6 months of breastfeeding is recommended and would have beneficial effects on academic and cognitive abilities (Li et al., 2010).

After reviewing the benefits of breastfeeding and its influence on child development, the final article, Gerd et al. (2011), was chosen as part of the literature review to assess factors associated with suspending breastfeeding during the first month. The purpose of the study was done in part to discern why there had been a slight decline in continuation rates in breastfeeding. It was found that many women had made their decision on whether to breastfeed or not during their pregnancy and less than one month after their birth. By understanding the factors associated with discontinuation, organizations would be able to determine what kind of adequate support is needed to encourage breastfeeding (Gerd et al., 2011).

 The study took place in Southwestern Sweden and was part of a longitudinal birth cohort design. Participants were chosen randomly when their child was between 1-2 weeks old and included a total cohort of 2,666. They were followed at 1, 3, 6, 12, and 18 months, as well as 2, 3, 4, and 5 years old. Data collection included their height, weight, head and waist circumference, as well as social and medical factors asked through questionnaires at follow-ups. Questions about maternal length, pre and post-pregnancy weight, and parental smoking were also inquired. Data analysis used the SPSS, which stands for Statistical Package for the Social Sciences. Binary logistic regression was used to explore maternal and infantile variables, which in this situation were discontinuation of breastfeeding and breastfeeding problems. For ethical considerations, the study was approved by the Research Ethics Committee of Lund’s University (Gerd et al., 2011).

For the results, at one week old, 74% of infants were breastfed and 1.5% were formula fed. At one month of age, formula feedings had increased to 6.7%. 26.9% of mothers identified a problem with breastfeeding. Problems identified, starting with the majority, included sore nipples, poor sucking technique, perceived insufficient milk supply, breast engorgement, and difficulty in starting up breastfeeding. As for health care organization, may of the mothers were satisfied for the support and help they received (94%), and 68% answered yes to receiving help/support during the first month. When examining factors related to unsuccessful breastfeeding, low paternal educational level, smoking parents, low gestational age, low birth weight, neonatal ward, pacifier use, thumb sucking, were all correlated in the univariate analysis. The multivariate analysis showed that use of pacifiers, breastfeeding problems, breastfeeding support group, and parental smoking were significant for non-successful breastfeeding. Finally, it was found that one-third, or 30.6%, of the mothers who discontinued breastfeeding was due to a breastfeeding problem (Gerd et al., 2011).

Conclusively, 26.9% of mothers identified that they had breastfeeding problems that lead them to discontinue breastfeeding, even with adequate help and support that was offered. The most common variables that were found to have an effect on duration of breastfeeding were lactational and nutritional factors such as poor sucking technique, nipple problems, and perceived insufficient milk supply. With that being said, the authors in the study made it clear that further investigation was needed to understand the concept of ‘perceived inadequate breast milk’, and to what extent this objective was actually attributed. This would assist in gathering data to better convey faith in those mothers who perceive an adequacy and are mistaken (Gerd et al., 2011).

**Discussion**

Examining the importance of breastfeeding is essential due to its significance in clinical practice. Many mothers don’t understand the importance of breastfeeding and its positive effects it can have on their children, both developmentally and health wise. By researching the advantages, we are able to set standards for future and current practice. As discussed earlier in this literature review, many mothers may discontinue breastfeeding because of problems and difficulties, and it’s our jobs as nurses to improve these rates by providing extra help and support. Researching about this topic also allows us to assess data to determine specificity about what makes breastfeeding so distinctive than infant formula, which in the end contributes to better patient teaching and education. An example of encouragement of breastfeeding was seen back in March of 2010, when The Patient Protection and Affordable Care Act, a bill that was passed by the senate and the house, was signed by President Barack Obama. This federal law requires unpaid breaks for nursing mothers to breastfeed. It also encourages public breastfeeding other than a bathroom and states that breastfeeding is an important and basic act of nurture in the interest of the mother and baby. By allowing and encouraging such practices, mothers may find it easier to comply with breastfeeding for longer periods. Using the five studies as examples, we can assume that the current practice is consistent with literature. As stated earlier, CDC reports show that the U.S met its *Healthy People 2010* goal, and currently the rates for mothers who breastfeed have increased by 1.2% in just over a year. With the extra support by nurses and doctors across hospitals and clinics, and educating mothers about the advantages of breastfeeding, rates should become favorable across the U.S and other countries.

**Conclusion**

After examining five peer-reviewed studies, we were able to concur that there is a possible relationship between duration of breastfeeding and the development and health of a child. Further research is needed to decide how to adjust confounding variables, which was a major factor for insignificance in many of the articles. In regards to the relationship between breastfeeding and obesity, the study by Huus et al. (2008), was not statistically significant. This may have been due to independent factors not related to breastfeeding. With this evidence in review, researchers may take measures for prevention in obesity in other ways. Lastly, the study by Gerd et al. (2011) was able to conclude that when examining influences related to discontinuation of breastfeeding after one month or less, low birth weight, parental education level, pacifier use, low gestational age, and smoking parents were suggestive factors.

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