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# Breast Feeding Duration And Cognitive Development: Review Of Observational Research In Childhood

## Search Strategy

Systematic search was carried out using PsychInfo Database. 'Advance-Search' option was used and the resources 'APA PsychInfo', 'Journals@Ovid Full Text' and 'APA PsychArticles Full Text' were enabled for a more precise search.

Firstly, title and abstract searches were carried out for "breast feeding" (4441 results), "breast adj3 feeding" (4901 results), "breastfeeding" (12925 results) and "breast fed" (1883 results). To combine these searches, a Boolean Operator (OR) was used which produced 18305 results.

Secondly, a similar process was done (using .ti,ab function) with the search of "Intelligence" (92165 results). The terms "IQ" (36808 results), "cognitive ability" (10851 results), "cognitive development" (14170 results) and "neurocognitive" (21935 results) was added to allow for a broader search. The combination using OR function produced 168749 results.

I decided to focus on children's preoperational stage (early childhood), defined as aged around 3 and 7. Title and abstract searches for "3 years old" (1029 results), "4 years old" (807 results), "5 years old" (results 2028), "6 years old" (results 1425), "7 years old" (results 866), "age 3" (6051 results), "age 4" (4670 results), "age 5" (results 6378), "age 6" (results 5772) and "age 7" (results 4129). Boolean Operator OR combined them producing results.

Finally, broad combinations previously done for breastfeeding, intelligence and 3-7 years old were all combined with the AND Boolean Operator which resulted in 36 papers. 'Additional limits' option filtered papers published from the past 10 years. This resulted in 26 papers which I scanned manually, selecting 4 studies investigating the relationship between breastfeeding duration and cognitive development in childhood. Studies that focused on low birth weight/preterm babies were excluded as results can't be generalised to the broader population. An additional paper (Zhou et al. 2007) was selected from Sajjad et al. (2015) reference list as it reported significant evidence.

## Literature review

A significant body of literature shows evidence about the short-term benefits of breastfeeding for the infant and mother. Exclusive breastfeeding for 6 months after birth is recommended by the WHO (Horta et al. 2007). However, the relationship between being breastfed in infancy and better cognitive development has been widely explored but it has remained as a subject of debate as evidence found is inconsistent. This review aims to evaluate research that investigated the relationship between breastfeeding duration and cognitive development during early childhood (3-7 years old). Intelligence represents people's mental ability to learn, to adapt and direct their thinking (Schacter et al. 2011). It is an important predictor of future life outcomes such as health and earnings (Strenze, 2006). Therefore, if a positive dose-response effect is found we could promote an affordable and attainable way of improving future outcomes.

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Sajjad, A. et al. (2015) evaluated the association between non-verbal IQ of 3716 participants (aged 6 years old) using the Snijders-Oomen Non-verbal intelligence test and data about breast feeding duration collected from maternal self-report questionnaires. Initially, researchers observed an advantage of 0.32 points every extra month of breastfeeding. However, once the effect of measured confounders were adjusted in a multivariable linear regression model, this was reduced to 0.09 points and associations with breastfeeding duration as a categorical variable dissipate. This alludes, the confounders maternal IQ, parents lifestyle, sociodemographic and child factors could explain this association. Important limitation on this study is that they categorised breastfeeding duration into 10 months instead of recording the exact number of weeks, which could lead to misclassification of the exposure, and that they selectively used people from low income backgrounds.

In contrast, a study showing positive association which also accounted for maternal IQ and other confounders, was done by Belfort et al. (2013). Researchers studied 1312 mother-child pairs (aged 3 to 7), measuring breast feeding duration and exclusivity, using a questionnaire, and child cognition. They observed, from their adjusted linear regression, that increased breastfeeding duration was associated with higher score in Peabody Picture Vocabulary Test at age 3 (0.21 points per month breastfed) and with higher intelligence on the Kaufman Brief Intelligence Test at age 7 years (0.35 verbal IQ points and 0.29 nonverbal points per month breastfed). A limitation of this study is that participants had high socioeconomic status and were less likely to be of minority race/ethnicity.

A recent study from Strøm et al. (2019) conducted a prospective observational study to explore breast feeding duration influence on children's IQ on a sample of 1782 of mother-child pairs. An adjusted linear regression showed an association between results from Wechsler Preschool Scales of Intelligence-Revised and Wechsler Primary on IQ of children at the age of 5 and data on breast feeding which was collected using telephone interviews. Results after taking core confounders into account showed that compared with children breast fed for 1 month or less, breastfeeding for 2-3 months scored 3.06 points higher, 4-6 scored 2.03, 7-9 scored 3.53 and 10 or more 3.28. Therefore, a dose-response relation cannot be concluded. A limitation found in this study is the lack of data on mothers who didn't breast feed.

The following study by Quigley et al. (2012) grouped a sample of 11101 term and 778 preterm children (aged 5) according to breastfeeding duration, to evaluate their cognitive ability using British Ability Scale tests. A parental interview was carried out 9 months after babies were born, which collected information on socioeconomic and health factors. Once confounders were fully adjusted, researchers observed a 2 point increase in mean score of term children for picture similarity and naming vocabulary when breastfed for 4 and 6 months respectively compared to children who were never breast fed. They also found a 4-points increase for naming vocabulary and picture similarity and a 6-point increase for patten construction in preterm children. Therefore, there is an association between breastfeeding and better cognitive development, especially in preterm babies. +limitation (The main limitation is that the study was not randomized and thus is prone to the problem of confounding. One of the strongest potential confounders is maternal IQ,)

Zhou, Baghurst, Gibson and Makrides (2007) assessed IQ on a sample of 302 children aged 4, using the Stanford-Binet Intelligence Scale. The duration of breastfeeding, the quality of the home environment and other potential confounders were recorded to investigate the relationship between breastfeeding duration and cognitive development. Using a multivariable

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regression, they found that IQ of children breast-fed for 6 months was only 2.0 point higher than children who had never been breast-fed. Furthermore, a strong association was found between the quality of the home environment (sociodemographic factors) and IQ at the age of 4.

## In conclusion

Finally, while breastfeeding is recommended by the WHO for other well-established health reasons, it is still important to allow parents decide without creating unnecessary guilt.

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