Maternal Post-Partum Depression and Parent-Child Interaction Mediate the Association between Infant Feeding and Child Behaviour

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1. BACKGROUND

Breastfeeding is an early life exposure associated with **fewer behaviour problems** in childhood[1,2]; however, it is unclear if this association is causal, or a result of unmeasured confounding.

Breastfeeding is associated with reduced **post-partum depression**[3] and improved **parent-child interaction**.[4]

Understanding these pathways can enhance our **causal understanding** of the relationship between breastfeeding and behaviour and identify **factors that could be bolstered** to improve child behaviour.

Objective

To examine the mediating roles of maternal depression and parent-child interaction in the relationship between breastfeeding and child behaviour.

2. METHODS

We studied 1,573 parent-child pairs from the Canadian **CHILD Cohort** study (www.childstudy.ca), a general population birth cohort.

Standardized questionnaire data was used to measure:

1. **Breastfeeding** status at 3 months and duration up to 30 months
2. **Post-partum maternal depression** at 6 months (Centre for Epidemiologic Studies Depression Scale)
3. **Parent-child interaction** at 2 years (Parent-Child Dysfunctional Interaction Subscale (PCDI))
4. **Child behaviour** at 5 years (Child Behaviour Checklist, Total Scale (CBCL)).

Higher scores indicate more maternal depression and behaviour problems and better quality relationships.

Two causal mediation models tested the independent roles of maternal depression and PCDI on the relationship between breastfeeding and child behaviour.

A model with **both mediators** was also tested.

Models were adjusted for 14 covariates including birth factors, socioeconomic status, and maternal characteristics including prenatal depression.

3. RESULTS

Figure 1: Distribution of Maternal Depression, Parent-Child Interaction and Child Behaviour Checklist Scores

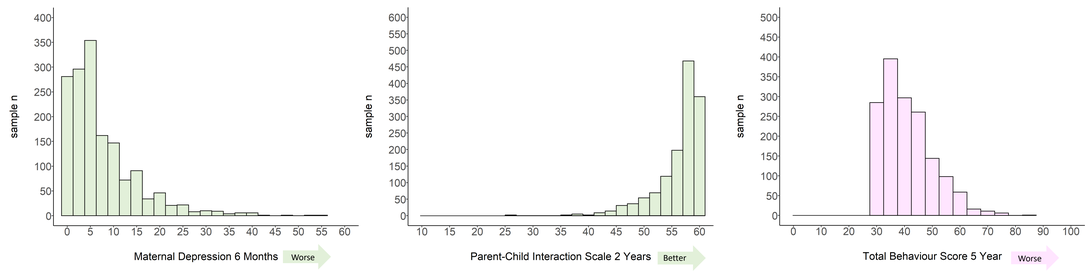


Figure 2: Breastfeeding Status at 3 months

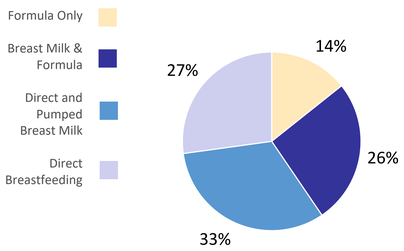
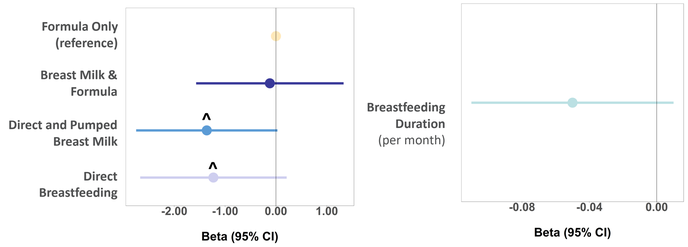


Figure 3: Relationship between Breastfeeding & Child Behaviour at 5 years



Model adjusted for: child sex, prenatal maternal stress, prenatal maternal depression, study site, birth mode, birthweight, gestational age, household income, maternal education, maternal race, marital status, number of older siblings, prenatal maternal smoking, attention deficit hyperactivity disorder genetic risk score. ^ p<=0.1

Figure 4: Mediation of Maternal Depression at 6 Months (n=1,573)

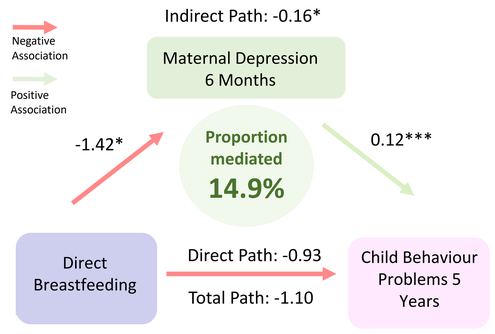


Figure 5: Mediation of Parent-Child Interaction at 2 Years (n=1,369)

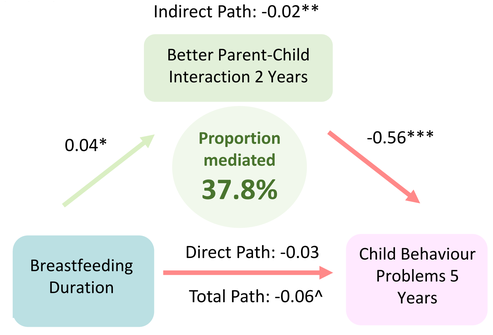
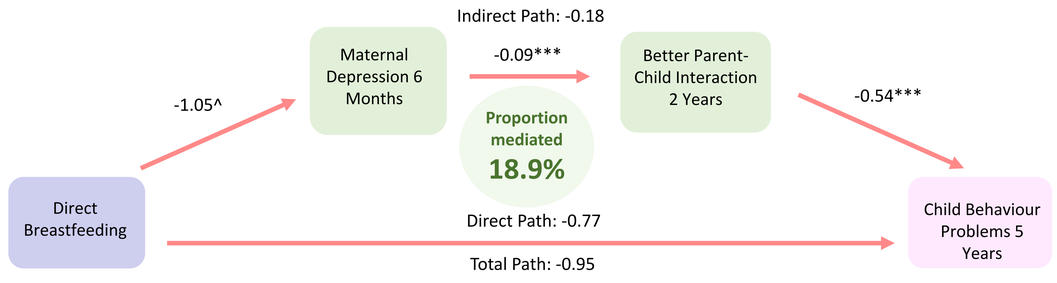


Figure 6: Mediation of both Mother Depression and Parent-Child Interaction (n=1,369)



All mediation models adjusted for: child sex, prenatal maternal stress, prenatal maternal depression, study site, birth mode, birthweight, gestational age, household income, maternal education, maternal race, marital status, number of older siblings, prenatal maternal smoking, attention deficit hyperactivity disorder genetic risk score.
^ p<=0.1, *p <=0.05, **p<= 0.01, *** p= 0.001

4. KEY FINDINGS

Compared to formula feeding, **breastfeeding directly at the breast** (but not direct *and* pumped breast milk) was related to a **1.42 point decrease on the maternal depression score** at 6 months (0.19 of a standard deviation decrease). Figure 4

Every month of breastfeeding was related to a **0.04 point increase on the parent-child interaction scale** at 2 years (24 months of breastfeeding was related to a 0.96 point increase on the PCDI; 0.23 of a standard deviation increase). Figure 5

Together, **maternal depression and parent-child interaction mediate 18.9%** of the association between direct breastfeeding and child behaviour, although this mediating pathway is not statistically significant. Figure 6

In independent adjusted mediation models, **maternal depression significantly mediated 14.9%** of the association between breastfeeding and child behaviour and **better parent-child interaction significantly mediated 37.8%** of this association. Figure 4 & 5

Conclusion

Maternal depression and parent-child interaction significantly mediate the relationship between breastfeeding and child behaviour.

5. IMPLICATIONS & NEXT STEPS

Both **direct breastfeeding and breastfeeding duration** are important for improving child behavioural outcomes and act through different mediating pathways.

Supporting breastfeeding, as well as **efforts to reduce maternal depression and improve parent-child interaction**, may help to improve child behaviour.

Future research will examine **breast milk components** and other potential mediators such as the **gut microbiome**.

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