

Association Between Maternal Vitamin B12 Intake and Early Childhood Cognitive Development: Implications for Public Health

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Abstract:

Background: Maternal nutrition plays a crucial role in fetal brain development, with vitamin B12 being essential for neuronal myelination and cognitive function. The paper by Hrezova et al. entitled "Vitamin B12 Intake During Pregnancy Linked to Child Speech Development and Intelligence Quotient", examines the association between maternal B12 intake and early childhood neurodevelopment. **Methods:** Using data from 5,151 mother-child pairs in the ELSPAC-CZ cohort, maternal B12 intake was assessed through dietary questionnaires, and child cognitive outcomes were evaluated at 18 months, 3 years, and 8 years. Multivariate adjustments were applied to control for potential confounders. **Results:** The research reports that higher maternal B12 intake was positively associated with improved language comprehension at 18 months ($B=0.20, 95\% \text{ CI } 0.06, 0.34$) and increased verbal IQ at 8 years ($B=1.08, 95\% \text{ CI } 0.09, 2.08$). However, no significant relationship was observed between maternal B12 intake and speech intelligibility at age 3 ($OR=1.03, 95\% \text{ CI } 0.99, 1.07$). Findings suggest B12's role in early cognitive development but highlight gaps in its long-term effects. **Conclusions:** Ensuring adequate maternal B12 intake is vital for optimizing early neurodevelopment. Public health initiatives should promote B12 supplementation, especially for pregnant women at risk of deficiency. Further research with objective biomarkers is needed to clarify long-term effects.

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Letter to Editor

Dear Editor,

The recently published article entitled "Vitamin B12 Intake During Pregnancy Linked to Child Speech Development and Intelligence Quotient" by Hrezova et al. [1], in the *Journal of Public Health*, Volume 1, Issue 2 Page 67, contains crucial data that addresses maternal nutrition during pregnancy and its effects on childhood neurodevelopment. Understanding the research results makes strong public health sense and highlights the need to further maternal feeding practices during the most critical windows of child development during pregnancy. From the analyses of 5,151 mother-child duos in the ELSPAC-CZ cohort, the researchers investigated the relationship between maternal vitamin B12 intake and children's cognitive outcomes while outperforming standard care concerning public health policy and clinical practice.

Expanding on this, the results suggest that the improvements in language scores at 18 months ($B = 0.20, 95\% \text{ CI } 0.06, 0.34$) and the improved talking and understanding

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outcomes ($B = 2.39$, 95% CI 0.97, 3.80) are associated with increased maternal vitamin B12 intake. These results are in line with these authors' statements regarding the increase of vitamin B12 having effects on neuronal myelination, synaptic plasticity, and overall brain development. They also mention the increase of verbal IQ at 8 years old ($B = 1.08$, 95% CI 0.09, 2.08), which further strengthens the case made regarding the cognitive benefits of adequate maternal vitamin B12 intake in the long term. However, the study also supports the argument that there exists little to no relationship between maternal B12 intake and intelligibility at later ages (e.g., OR = 1.03, 95% CI 0.99, 1.07 at 3 years). This raises important questions about whether the early developmental advantages provided by vitamin B12 persist into adolescence, emphasizing the need for additional longitudinal studies [2-4].

The study employed multivariate adjustments to enhance the accuracy of the findings and eliminate biases. On the other hand, there are instances where the analysis can be hindered through self-reported dietary data. Consequently, future research should consider more objective methods of measuring vitamin B12 levels, such as plasma B12 concentration, to provide a clearer picture of maternal B12 status. Moreover, examining the relationship between vitamin B12 and folic, iodine, omega-3 acids, and other important nutrients can give a broader understanding of maternal nutrition and how it affects the development of a child [5,6].

Previous research around the world has backed the correlation between maternal vitamin B12 intake and early cognitive development. Notably, mothers with low vitamin B12 tend to exhibit higher levels of homocysteine concentrations, which have been associated with poorer expressive language skills and delayed gross motor development in infants [7,8]. Therefore, it is crucial to take into consideration the levels of vitamin B12 mothers consume, especially from populations with limited access to fortified food or those who support plant-based diets.

The growing popularity of plant-based diets and vegetarianism has significant implications for public health, particularly regarding vitamin B12 intake among pregnant women. As these dietary trends continue to rise, ensuring that expectant mothers receive adequate B12 becomes even more critical. Health authorities should prioritize educational campaigns to raise the importance of B12 supplementation among pregnant women. By promoting access to fortified foods and increasing knowledge of B12's role in fetal development, policymakers can play a key role in preventing developmental delays associated with B12 deficiency [9].

In conclusion, this study sheds light on the importance of maternal vitamin B12 consumption and its implications on the child's early development and the mother's nutrition before and during pregnancy, which helps prevent associated risks. It is critical to address the lack of dietary consumption during the reproductive stage. These findings also have implications for healthcare practitioners and policy planners who seek to enhance the health of future generations' children.

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