



INVESTIGATING THE POSSIBLE BENEFITS OF MATERNAL THIAMINE SUPPLEMENTATION FOR ENHANCING ALERTNESS IN INFANTS AT RISK OF THIAMINE DEFICIENCY

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Introduction

Millions of Southeast Asian children are at risk for thiamine deficiency, which in turn puts their neuro-cognitive development in peril. Our study investigates whether thiamine supplementation for Cambodian mothers protects infants' neurocognitive development, specifically in the domain of infant social alertness. Infant social alertness indexes neuro-cognitive well-being, while also supporting further neuro-cognitive progress.

Research Questions

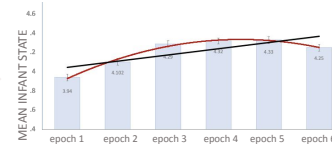
- Does the Primary Engagement Task (PET) elicit systematic changes in infants' alertness state?
- To what extent does increasing age and access to thiamine lead to a more predictive infant response pattern during the PET?
- To what extent does an infants' pre-supplementation alertness in the PET predict their end line cognitive functioning?

Methods

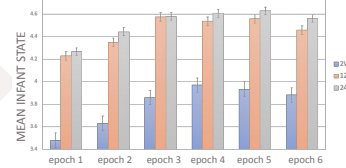
- Part of a larger, double-blind, randomized controlled trial in which 335 mothers received one of four levels of thiamine supplementation (0, 1.2, 2.4, or 10mg/daily) beginning at 2- weeks postpartum.
- Measured infants' alertness in relation to caregivers' efforts to interact via the Primary Engagement Task (PET) when infants were 2-, 12-, and 24-weeks.
- In the PET, mothers were asked to encourage their infants to smile, and sustain a mutually positive interaction. As the task progressed, mothers were prompted to add and then remove engagement modalities (facial expression, voice, and touch) during six 30-second epochs.
- Behavioral coding from video using the 6-state scale from the NICU Neurobehavioral Scale determined changes in infants' alertness.

Results

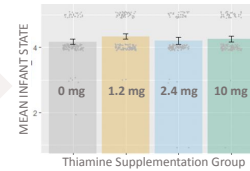
Validation of the PET: Infants showed linear and quadratic trends in their responding to mothers' efforts to engage in the PET



Age differences: Infant alertness levels increased from 2- to 12-weeks, and infants at 12- and 24-weeks showed a more pronounced linear trend in their response during the PET



Maternal thiamine supplementation effects: Supplementation was not related to linear and quadratic trends in the PET. It was, however, related to infants' alertness in epoch 1 of the PET (1.2 mg > 2.4 mg, 0 mg).



Maternal milk thiamine relationships: 2- and 4-week milk thiamine levels were related to with infant pattern of alertness and 12-week milk thiamine levels we associated with overall infant state.

Prediction of end-line cognitive functioning: Infant epoch 1 state was associated with end line Mullen Scales of Early Learning (MSEL) in the composite as well as the receptive language, fine motor, and expressive language subscales in the negative direction.

Conclusions

- PET is a valuable new tool for probing infants' responsiveness to their caregivers' efforts to engage in mutually positive ways.
- The NNNS 6-state scale is a valuable long range predictor of cognitive functioning.
- Clarity about the precise benefits of maternal thiamine supplementation for infant social alertness awaits further investigation.

References

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Acknowledgments

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Partially funded by the CHC mentored research program.

