

The impact of iron status during pregnancy on the newborn's auditory functions.

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Introduction

- Iron is an essential nutrient for the development of the foetus, more specifically, for its involvement in the myelination of nerve fibers and the synthesis of neurotransmitters [1].
- Both insufficient and excessive iron intake are prevalent among pregnant women in North America [2].
- Animal and human studies have shown that both low and high levels of iron have adverse effects on the auditory and nervous system [3, 5-8].
- However, little is known about the effect of insufficient and excessive iron intake during pregnancy on fetal development and newborn's hearing functions.
- The **goal** of this study is to determine the impact of iron status during pregnancy on the newborn's auditory functions.

Objectives

- Determine the association between an iron marker (hemoglobin) measured during pregnancy and auditory functions in newborns.
- Identify whether there is an effect of pregnancy trimester on the association between hemoglobin and auditory functions.

Hypothesis

Low or high concentrations of hemoglobin during pregnancy negatively impact the auditory nervous system of newborns.

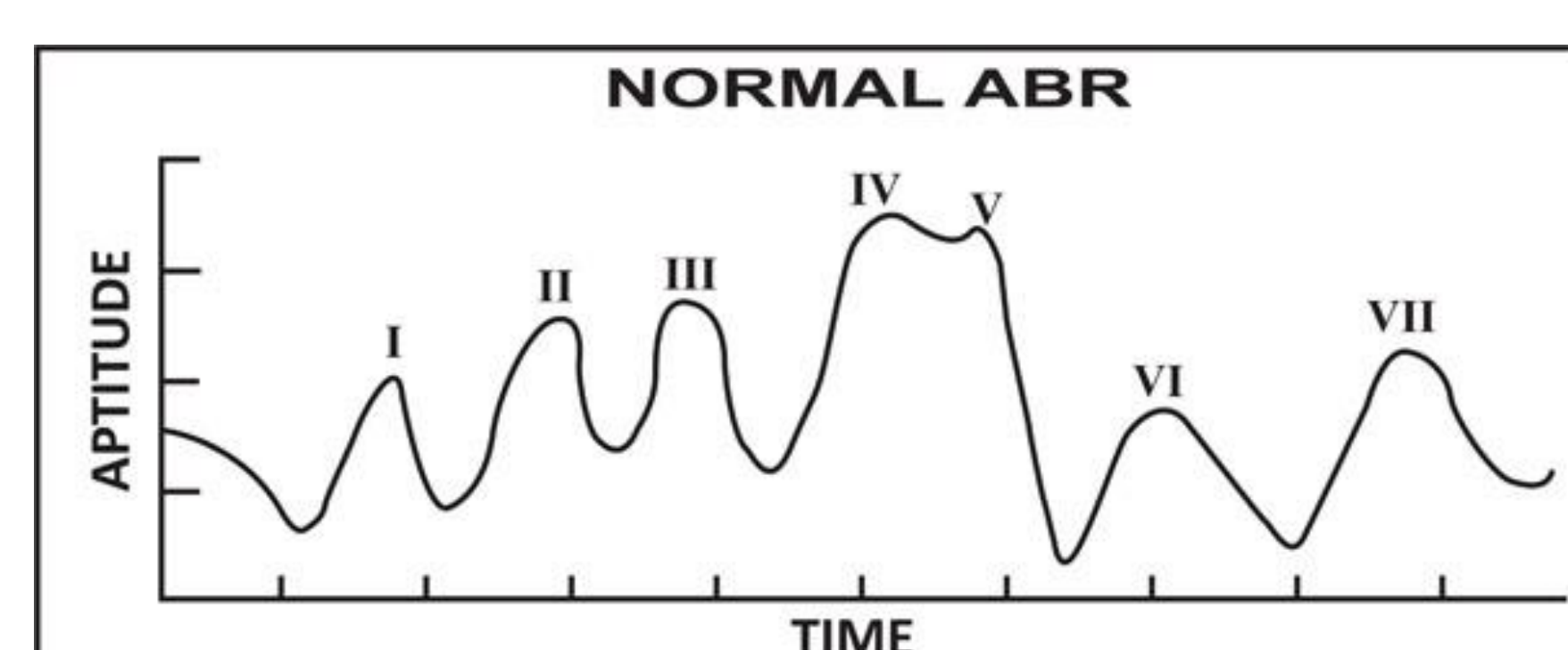
Methodology

Data collection

- Pregnant women giving birth at the Montfort Hospital were recruited in their 2nd or 3rd trimester.
- Sociodemographic, lifestyle and nutritional information was collected using a questionnaire.

Evaluation of auditory functions

- Auditory functions were assessed using the Auditory Brainstem Response (ABR) test.
- The test measures amplitudes of waves lengths and their conduction times (latencies).



Source: Paulraj et al. [4]

Assessment of iron status

- Hemoglobin concentrations for the 1st and 2nd trimesters were obtained from medical records.

Statistical analysis

- Descriptive statistics are presented as mean \pm standard deviation (SD) and frequencies.
- Correlations were performed to test the relationship between hemoglobin and sound wave latency.

Results

Table 1

Maternal characteristics of the study sample (n = 6).

Mothers	
Age ^a	36 \pm 3.0
Number of children ^b	
1	4
2	2
Level of education ^b	
College education	1
University education	1
Undergraduate degree	1
Graduate degree	3
Family income ^b	
\$60,000 – 99,999	1
\$100,000 – 150,000	1
> \$150,000	4
Prenatal multivitamin ^b	
Yes	6
No	0
Iron supplement ^b	
Yes	5
No	1
Anemia during pregnancy ^b	
Yes	4
No	2

Data presented as ^a mean \pm SD and ^b frequencies (n).

Table 2

Neonatal characteristics of the study sample (n = 6).

Newborns	
Sex ^b	
Male	2
Female	4
Weight (kg) ^a	3.6 \pm 0.5
Gestational age (week) ^a	39.8 \pm 1.2
Type of feeding ^b	
Exclusive breastfeeding	2
Partial breastfeeding	3
Formula	1

Data presented as ^a mean \pm SD and ^b frequencies (n).



<http://www.gcastd.org/56b709-baby-headphones-quick-shopping>

Table 3

Correlation between maternal hemoglobin and newborn's auditory functions for the first two trimesters (n = 6).

	Trimester 1		Trimester 2	
	R	P value	R	P value
Latency, ms				
Wave I	0.15	0.52	0.04	0.70
Wave III	0.48	0.20	0.00	0.99
Wave V	0.14	0.53	0.002	0.93
Inter-latency, ms				
I-III	0.66	0.09	0.02	0.79
III-V	0.34	0.30	0.01	0.88
I-V	0.11	0.58	0.04	0.72

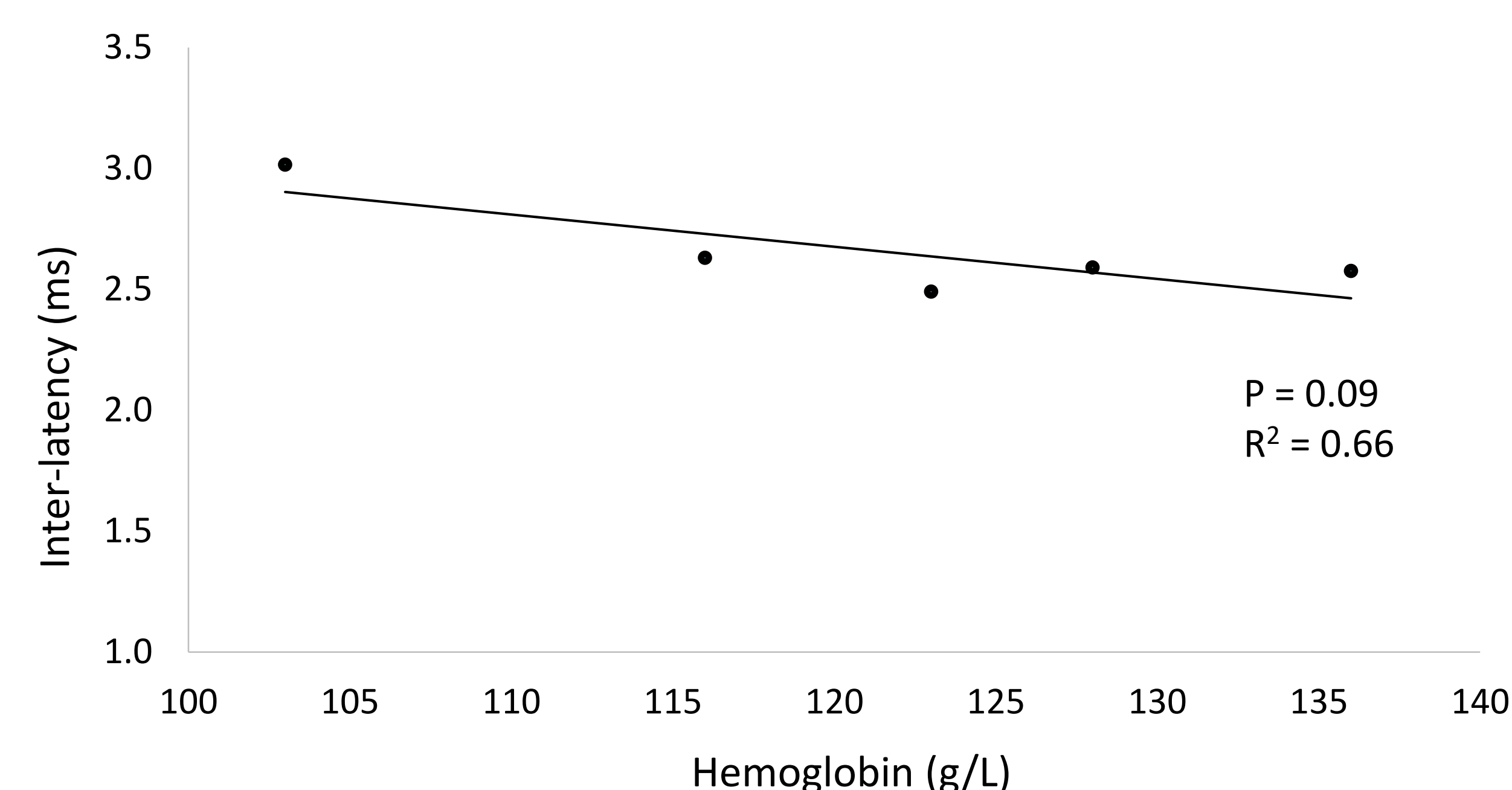


Figure 1

Correlation between hemoglobin during the 1st trimester and inter-latency of wave I-III (n = 5).

Discussion

- Our results do not provide evidence of a relationship between hemoglobin concentrations during the first two trimesters of pregnancy and hearing functions in the newborn.
- Other studies have provided evidence for the association between anemia and sensorineural hearing loss among children and adults [5, 6].
- An animal study has shown that mild iron deficiency during pregnancy in guinea pigs has resulted in an altered auditory functions among offspring [3].
- In contrast, clinical evidence suggested that iron overload is also associated with sensorineural hearing loss in humans [7, 8].

Limitations

- The sample size is too small and does not allow to make inference on the larger population.
- The iron status marker was collected retrospectively from medical records.

Conclusion

The results do not support our hypothesis. However, due to the small sample size, future studies are required in order to better assess the effect of iron status during pregnancy on the newborn's auditory functions. As such, these studies should be conducted by using a bigger sample size, collecting more accurate iron markers prospectively, and using multiple hearing tests.

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