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Assessing Maternal Dietary Iodine Intake During Pregnancy and its Effect on Infant Birth Growth Outcomes

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Summer Undergraduate Research Program

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Background

- Iodine is an essential micronutrient that must be obtained through dietary sources such as dairy products, fish, seaweed, and iodized salt
- Iodine plays an important role in thyroid function and in triiodothyronine (T_3) and thyroxine (T_4) production
- The fetus is solely dependent on the maternal supply of iodine through mid-gestation and remains partially dependent through delivery and during lactation as the fetal thyroid develops
- Maternal iodine deficiency can lead to congenital hypothyroidism which results in significant neurocognitive impairment, and defects in growth, metabolism, and stature
- **Objective: To assess whether maternal dietary iodine intake during pregnancy affects birth anthropometrics and gestation length in infants**

Methods

- This IRB-approved study enrolled mother-infant pairs (N=46) at the time of delivery for collection of maternal and cord blood serum and placenta samples and completion of dietary intake assessment questionnaire
- Maternal dietary intake of iodine during pregnancy was calculated from the Willet Food Frequency Questionnaire (FFQ)
- Mothers were classified as being adequate or inadequate for dietary iodine intake based on the following daily intake recommendation from the American Thyroid Association (ATA): adequate intake ≥ 250 micrograms/day
- Birth anthropometric measurements and length of gestation were collected from the infant's Electronic Medical Record (EMR); the Fenton growth chart was used for Infants born <37 weeks and the WHO growth chart was used for infants born ≥ 37 weeks
- Correlations between dietary iodine intake and infant growth outcomes were assessed using Spearman Correlation Coefficients; a p-value of <0.05 was considered statistically significant

Demographics

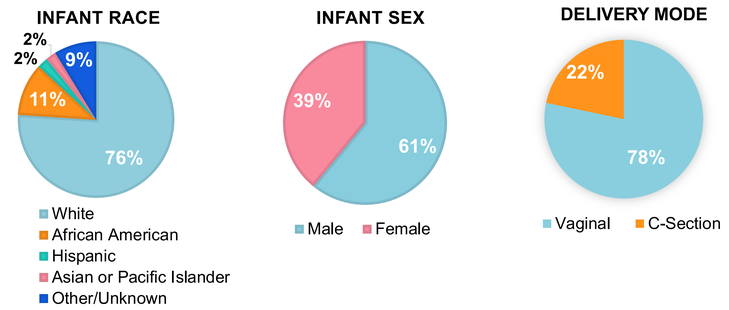

Table 1. Descriptive statistics of study population

	Median	Interquartile Range
Maternal Age	29.5	25.0-33.0
Gestational Age	39.1	38.0-40.1
Iodine Intake (mcg)	75.0	21.4-150.0
	Adequate	**Inadequate**
Iodine Intake	2.2% (N=1)	97.8% (N=45)

Results

Table 2. Spearman correlation coefficients between iodine intake and infant birth outcome measures

	Correlation	p-value
Birth Weight Percentile	0.266	0.074
Birth Length Percentile	**0.318**	**0.031***
Birth Head Circumference Percentile	0.207	0.167
Gestational Age	0.137	0.364

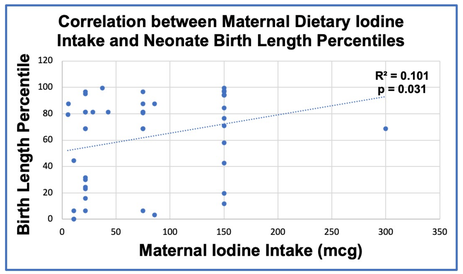

Figure 1. Scatter plot showing positive correlation between maternal dietary iodine intake and neonate birth length percentiles, (R = 0.318, p = 0.031)

Discussion

- Severe maternal iodine deficiency can lead to congenital hypothyroidism and goiter in neonates
- Only one mother in our study was found to have adequate intake of iodine during pregnancy
- Birth length percentile was found to be positively correlated with maternal dietary iodine intake (R = 0.318, p = 0.031) and birth weight percentile approached significance (R = 0.266, p = 0.074)
- A study done in Norway with a large pregnancy cohort found that low iodine intake was associated with reduced fetal growth and an increased risk of preeclampsia, showing that iodine deficiency is not limited to our cohort
- One of the study limitations is the possibility that our dietary intake assessment tool was unable to adequately quantify iodine intake in this population; FFQ results were available for 411 women but only 46 had an iodine intake greater than zero

Conclusion

- These results indicate a possible relationship between maternal dietary iodine intake during pregnancy and birth growth outcomes
- Future directions include enrolling a larger sample size, considering a nutrition assessment tool better suited for measuring iodine intake, and comparing iodine intake to levels of iodine in maternal blood, cord blood, and placental tissue
- Understanding the impact of iodine deficiency during pregnancy may be crucial to improving patient outcomes and guiding dietary recommendations for this vulnerable patient population

Acknowledgements

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