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Excessive Iodine Intake in Pregnancy and Its Effect on the Neurodevelopment of Offspring - A Systematic Review

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We use this protocol and it's working

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Abstract

Iodine is a micronutrient crucial for a child's brain development during the first 1000 days of life. It is the leading cause of globally preventable neurodevelopmental abnormalities due to maternal iodine deficiency during pregnancy. The normal urinary excretion of iodine according to the World Health Organization is between 150-249 µg/L in pregnancy. Both deficiency and excess iodine during pregnancy are associated with adverse thyroid function of both mother and offspring. Excessive iodine intake during pregnancy has been associated with thyroid dysfunction, resulting in clinical and subclinical hypothyroidism, miscarriages, and preterm delivery. Deficiency of iodine during the gestational period has been proven to be associated with adverse neurodevelopment of offspring. However, excess iodine intake during pregnancy and its effect on the children's neurodevelopment is a grey area of research. There is no systematic review regarding the association of excess iodine in pregnancy and its impact on offspring neurodevelopment. Hence, the purpose of this study is to assess the effect of excess iodine (>250 µg/L) during pregnancy on offspring neurodevelopment.

Materials

Eligibility criteria: Inclusion criteria: Studies which assessed iodine status in pregnancy by urinary iodine concentration (UIC), and UIC levels >250 µg/L. Studies evaluated the neurodevelopment of the offspring of respective pregnant mothers. Only prospective cohort studies will be included. Studies published in the English language. Exclusion criteria: Studies that reported only iodine deficiency (UIC <150 µg/L) in pregnancy will be excluded. Studies do not assess the neurodevelopment of offspring. Information sources: The search will be conducted in the PubMed, Scopus, and Google Scholar databases.

Method and Materials

1 Eligibility criteria

- 1.1 Inclusion criteria: Studies which assessed iodine status in pregnancy by urinary iodine concentration (UIC), and UIC levels $>250 \mu\text{g/L}$.
- 1.2 Studies evaluated the neurodevelopment of the offspring of respective pregnant mothers.
- 1.3 Only prospective cohort studies will be included.
- 1.4 Studies published in the English language.

2 Exclusion criteria

- 2.1 Studies that reported only iodine deficiency (UIC $<150 \mu\text{g/L}$) in pregnancy will be excluded.
- 2.2 Studies do not assess the neurodevelopment of offspring.

3 Information sources

- 3.1 The search will be conducted in the PubMed, Scopus, and Google Scholar databases.

Search

4 The PECOS strategy will be adopted to identify the research question.

- 4.1 Population (P) will be pregnant women and their children.

- 4.2 Exposure (E) will be excessive consumption of iodine.
- 4.3 Control (C) will be pregnant women with normal iodine levels.
- 4.4 Outcome (O) will be the effect on neurodevelopment of offspring.
- 4.5 Study design (S) will be prospective cohort study design.
- 5 Strategy: (((pregnancy) OR (pregnant women) OR (gestation) OR (expecting women) OR (pregnant mothers) OR (trimester)) AND ((excess iodine) OR (iodine) OR (iodine intake) OR (excess UIC) OR urinary iodine concentration OR (excess iodine intake)) AND ((neurodevelopment) OR (cognition) OR (IQ) OR (language) OR (intelligence quotient) OR (mental development) OR (neuro cognitive)))
- 6 The search will be conducted within 6 months.

Selection of Studies

- 7 First, the titles of the articles will be read, followed by the abstracts, and finally, a full-text appraisal will be conducted by the two independent reviewers. If the study fulfills the inclusion criteria, it will be selected for this research.

Data Extraction

- 8 The data for this research will be extracted from the articles, including authors, year of publication, sample size, trimester of pregnancy, Urinary Iodine Concentration (UIC), scale used for detecting cognition, neurodevelopmental status of offspring, age of offspring, main findings, and conclusion.

Outcomes

- 9 The effect of excess iodine intake (measured by Urinary Iodine Concentration (UIC >250 µg/L)) by pregnant women on the neurodevelopment of offspring will be assessed.

Additional Outcome



10 Not applicable.

Risk of Bias

11 For assessing the quality of studies, the Newcastle-Ottawa Scale, adapted for Cohort studies, will be used.

Strategy for Data Synthesis

12 We will investigate the impact of excessive iodine intake during pregnancy on various neurodevelopmental domains in children, including motor, language, cognitive, and social development. We will use a narrative approach to synthesize the main findings of the study. Tables and graphs will be used to present the findings of the study.