



## THYROID AND PREGNANCY

### Developmental test scores were similar in children of mothers with hypothyroidism treated with levothyroxine before pregnancy versus early pregnancy

#### BACKGROUND

Thyroid hormone plays an important role in the baby's normal development during pregnancy. Because the baby does not make his or her own thyroid hormone until much later in pregnancy, he or she depends on mother's thyroid hormone crossing the placenta during early pregnancy. If the mother has severe hypothyroidism (low thyroid hormone levels) that is not treated, it can cause problems in brain development in the baby, leading to a lower IQ and problems in movement or language skills. In mothers with subclinical hypothyroidism (mild hypothyroidism), the effect on the baby's brain development have not been as clear.

Recent studies suggested that there may be a link between mild hypothyroidism in mothers and problems with brain development in children. However, clinical trials of mothers with subclinical hypothyroidism have not shown that levothyroxine treatment has any effect on improving outcomes. One problem of these clinical trials may have been that the treatment was started too late in pregnancy, after the first trimester when a lot of brain development happens. The current study aimed to compare the brain developmental test scores of children born to mothers with hypothyroidism who were started on levothyroxine either before pregnancy or between 8 and 14 weeks of pregnancy.

#### THE FULL ARTICLE TITLE

Zhou Q, Wang C, Xu H, Li X. 2020 Impact of preconception treatment initiation for hypothyroidism on neurocognitive function in children. *J Clin Endocrinol Metab.* Epub 2020 Aug 25. PMID: 32841335.

#### SUMMARY OF THE STUDY

A total of 466 women were recruited from a hospital in Shanghai, China, from 2012 to 2013. Of these women, 187 were diagnosed with hypothyroidism before pregnancy (**BC group**) and 279 were diagnosed at the

first prenatal care visit at 8 to 14 weeks of pregnancy (**AC group**). Overt hypothyroidism was diagnosed if they had high thyroid-stimulating hormone (TSH) and low free thyroxine (FT<sub>4</sub>) levels in blood tests, and subclinical hypothyroidism was diagnosed if they had high TSH levels and normal FT<sub>4</sub> levels. All women with overt hypothyroidism were treated with levothyroxine. Women with subclinical hypothyroidism were treated with levothyroxine if the serum thyroid peroxidase (TPO) antibody level was high. TSH levels were checked every month during pregnancy, and the levothyroxine dose was adjusted to keep TSH level in normal range for pregnancy. Children were tested for brain development using the Gesell Developmental Diagnosis Scale (GDDS) that tests motor function, adaptability, language, and social emotional response, at 6, 12, and 24 months of age.

The average TSH of the BC group before pregnancy was 4.30 mIU/L. At the first prenatal visit, 97.9% of the BC group were taking levothyroxine and had an average TSH of 3.89 mIU/L. In the BC group, 82.4% of women were diagnosed with overt hypothyroidism and 17.6% with subclinical hypothyroidism, and 27.3% had a positive TPO antibody. The average serum TSH of the AC group at the first prenatal visit was 5.47 mIU/L. In the AC group, 37.6% of these women were diagnosed with overt hypothyroidism and 62.4% with subclinical hypothyroidism, and 35.5% had a positive TPO antibody. At delivery, the average TSH was 1.84 mIU/L in the BC group and 2.71 mIU/L in the AC group. At delivery, 77.5% of women in the BC group and 74.2% of women in the AC group who were taking levothyroxine.

There were no significant differences in overall scores of the GDDS assessment in children at 6 and 24 months. The overall score was 2 points lower in the BC group than in the AC group at 12 months. Of the individual scores, the adaptability score was 5 points higher in children in the BC group at 6 months and the motor function score





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was 2 points lower in children in the BC group at 12 months. There were no significant differences in GDDS scores at 6, 12 or 24 months when overtly hypothyroid women and subclinically hypothyroid women were compared separately, except that the motor function score was 9 points lower in the subclinically hypothyroid BC group than in the subclinically hypothyroid AC group at 12 months.

### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

This study shows that the brain development scores in children born to hypothyroid mothers was the same whether the mothers started levothyroxine before pregnancy as compared to starting at 8 to 14 weeks of

pregnancy. The finding of this study is similar to the results of previous clinical trials that showed no significant improvement in children’s brain development test scores when mothers with subclinical hypothyroidism were treated with levothyroxine. This study showed no adverse effects of starting levothyroxine treatment of the mother in early pregnancy as compared with before pregnancy. All mothers with hypothyroidism were treated and there was no group of women with normal thyroid function to compare. Despite this limitation, it is important to show that the brain development scores in children of hypothyroid women were similar as long as levothyroxine therapy is started within the 1st trimester of pregnancy.

— Sun Y. Lee, MD

### ATA THYROID BROCHURE LINKS

Thyroid Disease in Pregnancy: <https://www.thyroid.org/thyroid-disease-pregnancy/>

Hypothyroidism (Underactive): <https://www.thyroid.org/hypothyroidism/>

### ABBREVIATIONS & DEFINITIONS

**Hypothyroidism:** a condition where the thyroid gland is underactive and doesn’t produce enough thyroid hormone. Treatment requires taking thyroid hormone pills.

**Overt Hypothyroidism:** clear hypothyroidism an increased TSH and a decreased T<sub>4</sub> level. All patients with overt hypothyroidism are usually treated with thyroid hormone pills.

**Subclinical Hypothyroidism:** a mild form of hypothyroidism where the only abnormal hormone level is an increased TSH. There is controversy as to whether this should be treated or not.

**TSH: thyroid stimulating hormone** — produced by the pituitary gland that regulates thyroid function; also the best screening test to determine if the thyroid is functioning normally.

**Thyroxine (T<sub>4</sub>):** the major hormone produced by the thyroid gland. T<sub>4</sub> gets converted to the active hormone T<sub>3</sub> in various tissues in the body.

**Levothyroxine:** the major hormone produced by the thyroid gland and available in pill form as Synthroid™, Levoxyl™, Tyrosint™ and generic preparations.

**TPO antibodies:** these are antibodies that attack the thyroid instead of bacteria and viruses, they are a marker for autoimmune thyroid disease, which is the main underlying cause for hypothyroidism and hyperthyroidism in the United States.

