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Endocrinology Department

Relation between Obesity and Maternal Hypothyroxenemia during Early Pregnancy

Thesis

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Endocrinology

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا

سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

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Marwa Mohamed Alsayed Algamal

List of Contents

Title	Page No.

List of Tables

List of figures

List of Abbreviations

Abb.	Full term
Ab	Antibody
ATD	Autoimmune thyroid disease
BMI	Body mass index
FT4	Free tetraiodothyronine
GAIN	Global alliance for improved nutrition
HT	Hypothyroidism
Th	T helper cell
TG	Thyroglobulin
TSH	Thyroid stimulating hormone
TPO	Tissue peroxidase
ANOVA	Analysis of variance
NHANES	National Health and Nutrition Examination Survey
TRH	Thyrotropin releasing hormone
WHO	World Health Organization
FT3	tri iodo thyronine
UINICEF	United Nations International Children's Emergency Fund"

Abstract

Aim of the Work: To study the relation between maternal obesity (indicated by BMI), maternal hypothyroidism, thyroid peroxidase antibodies and anti-thyroglobulin positivity during early pregnancy.

Patients and Methods: The study was conducted in Ain shams University Hospital and National Institute of Diabetes and Endocrinology. The study included women aged 19–40 who were pregnant at the 4th –8th weeks of gestation.

Results: obese group had the highest prevalence of overt (**5.33%**) and subclinical hypothyroidism (**2.6 %**), highest mean TSH value, p value (**0.007***). And the lowest mean FT4 with p value (**0.017***) .Also obesity was associated with the highest prevalence of anti TPO (**16%**)   and anti TG Abs (**12%**).

Conclusion: we concluded that maternal obesity may be associated with TPO anti TG positivity, subclinical hypothyroidism and overt hypothyroidism. Screening of thyroid function in obese pregnant females can detect maternal hypothyroidism and prevention of its hazard's effects for both mother and fetus.

INTRODUCTION

Hypothyroidism is the most common pregnancy-related thyroid disorder, affecting 3–5% of all pregnant women. Subclinical hypothyroidism is more common than is overt hypothyroidism, and is usually defined as a serum thyroid-stimulating hormone (TSH) concentration greater than the pregnancy-specific reference range for each laboratory value, or by serum TSH concentrations greater than 2.5 mIU/L in the first trimester and greater than 3 mIU/L in the second and third trimesters *(Teng et al., 2013).*

Iodine deficiency is the most common cause of hypothyroidism worldwide, but in areas of iodine sufficiency, chronic autoimmune thyroiditis is the main cause of hypothyroidism. Other causes of hypothyroidism include previous thyroidectomy or ablative radioiodine therapy, but secondary (pituitary) and tertiary (hypothalamic) causes of hypothyroidism are rare *(Granfors et al., 2013).*

Increased risk of abortion, anemia, gestational hypertension, gestational diabetes, placental abruption and postpartum hemorrhage. Poor fetal neurocognitive development, increased incidence of premature birth, and neonatal respiratory distress are the recorded complication of hypothyroidism during pregnancy *(Negro et al., 2014; Singla et al., 2016).*

Isolated hypothyroxinemia is defined as a normal maternal TSH concentration with FT4 concentrations in the lower 5th or 10th percentiles of the reference range. It is unclear whether isolated maternal hypothyroxinemia is associated with adverse neurodevelopmental outcomes *(Donny et al., 2013)*

Pop et al. (2013) reported a decrease in psychomotor test scores among offspring born to women with FT4 indices in the lowest 10th percentile. Other studies have not found a correlation between maternal thyroid hypofunction in pregnancy and offspring neurodevelopment.

Anti thyroid peroxidase and thyroglobulin (TG) autoantibodies can be detected in 10–20% of women of childbearing age. The majority of women who test positive for thyroid autoantibodies are euthyroid. Sixteen percent of the women who are euthyroid and positive for TPO or TG antibodies in the first trimester will develop a TSH that exceeds 4.0 mIU/Lby the third trimester and 33%–50% of women who are positive for TPO or TG antibody in the first trimester will develop postpartum thyroiditis.

Thyroid autoimmunity in pregnancy has been associated with adverse pregnancy outcomes, including miscarriage, recurrent abortion, preterm births, and low IQ *(Ghafoor et al., 2006).*

The issue of universal screening for thyroid dysfunction and euthyroid autoimmune disease in pregnancy remains controversial. Observational studies have demonstrated adverse maternal and fetal outcomes in both women with subclinical hypothyroidism and in euthyroid women who test positive for thyroid autoantibodies. To date, there is limited evidence to demonstrate that LT4 treatment can improve outcomes *(Donny et al., 2013).*

Many studies have suggested that overweight and obesity increase the risk of autoimmune thyroiditis and subclinical hypothyroidism. It may be that higher production of adipokines such as leptin characterizing obesity may involve the thyroid gland, thus favoring the development of autoimmune thyroiditis and subclinical hypothyroid *(De Pergola et al., 2014)*.

American Thyroid Association recommended screening thyroid function in obese pregnant women; however, the evidence for this is weak. For this purpose, this study will investigate the relationship between high BMI and thyroid functions during early pregnancy *(Pop et al., 2013).*

AIM OF THE WORK

The aim of this study is to study the relation between maternal obesity (indicated by BMI), maternal hypothyroidism, thyroid peroxidase antibodies and anti-thyroglobulin positivity during early pregnancy.