Assessment Of Normal Range Of Thyroid Functions In Healthy Egyptian Pregnant Women

Thesis

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Ahmed Magdi Hegab

Contents

List of Abbreviations

ACTH	: Adrenocorticotropic Hormone
AD	: Addison's Disease
ADA	: The American Diabetes Association
AIT	: Autoimmune thyroiditis
AITDS	: Autoimmune thyroid diseases
ATA	: American Thyroid Association
ACE	: Angiotensin-Converting-Enzyme
ATDs	: Anti-thyroid Drugs
BMI	: body mass index
CATS	: Controlled Antenatal Thyroid Screening
ELISA	: Enzyme-linked immunosorbent assay
ETA	: European Thyroid Association
FNA	: Fine-needle aspiration
Hb A1C	: Glycated Hemoglobin
hCG	: human chorionic gonadotropin
HT	: Hashimoto's Thyroiditis
IQ	: Intelligence Quotient
LT4	:levothyroxine
MMI	: methimazole
NACB	: National Academy of Clinical Biochemistry
OH	:overt hypothyroidism
PTU	:Propylthiouracil
PPT	: Postpartum thyroiditis
SCH	: Subclinical Hypothyroidism
SGA	:Small for gestational age

List of Abbreviations (Cont.)

T1DM : Type 1 Diabetes Mellitus
TBG : Thyroxin binding globulin
T3 : Triiodothyronine
T4 : Thyroxine
TFT :Thyroid function test
Tg : Thyroglobulin
TPO : Thyroid Peroxidase
TRAb : TSH receptor antibodies
TRH : Thyrotropin-releasing hormone
TSH : Thyroid- Stimulating Hormone
TUS : Thyroid Ultrasound

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Introduction

Diseases of the thyroid gland are common, affecting about 5% of the general population, and predominantly affect females. Thyroid gland dysfunction is relatively common during pregnancy. The prevalence of hyperthyroidism is approximately 0.4%, subclinical hyperthyroidism about 3.3%, hypothyroidism about 0.3%, and subclinical hypothyroidism may reach 2.5% or more (**Almomin et al., 2016)**.

Modern studies describe thyroid disease as the second most frequent endocrine disorder that can affect women in their reproductive age. When thyroid disease remains untreated in a pregnant woman some disorders can appear (**Moncayo et al., 2015).**

During pregnancy, proper maternal thyroid function is important for both the mother and child (**LaFranchi et al., 2005)**.This is especially true during the first trimester, when the developing fetus is completely dependent on the mother for thyroid hormones that are critical for optimal development. Maternal thyroid dysfunction during pregnancy has been shown to be associated with a number of adverse outcomes. For example, elevated maternal thyroid-stimulating hormone (TSH) has been associated with an increased risk of pre-term birth, placental abruption, fetal death, and impaired neurological development in the child (**Casey et al., 2005)**.

Also hypothyroidism may be associated with miscarriages, low birth weight, anemia, pregnancy-induced hypertension, preeclampsia, abruption placenta, postpartum hemorrhage, congenital circulation defects, fetal distress, preterm delivery, and poor vision development, in addition

to the probable neuropsychological defect in the child **(Nazarpour et al., 2015).**

Current guidelines advocate thyroid stimulation hormone (TSH) as a nearly universal thyroid screening test in non-hospitalized patients with intact hypothalamic/pituitary function. In addition, thyroid hormones should also be measured to clarify the picture of thyroid dysfunction when indicated **(Garber et al., 2005).**

Thyroid function test results of healthy pregnant women differ from those of healthy non-pregnant women. This calls for pregnancy-specific and ideally trimester-specific reference intervals for all thyroid function tests, but in particular for the most widely applied tests, TSH, free T4 and free T3 **(Bahn Chair et al., 2011)**.

Although screening for thyroid dysfunction in healthy non-pregnant woman is not recommended, thyroid screening in pregnancy is controversial. Some suggest targeted screening (case finding) of only the high-risk group, while others recommend TSH screening for all pregnant women by the ninth week of gestation or at the time of their first visit **(De Groot et al., 2012).**

In the last decade a large number of studies have been published on thyroid function reference intervals during pregnancy. These intervals between populations can be explained by the use of different assays, and a number of population-specific characteristics such as ethnicity and BMI have also been identified as determinants of reference intervals. So, institutions determine their own population-based intervals**.** Institutions should not rely on a fixed universal cutoff concentration worldwide, but should calculate their own pregnancy-specific population-based reference intervals. If such reference intervals are not

available, adopting population-based reference intervals from a population with similar characteristics is the best option **(Medici et al., 2015).**

Aim of the Work

Assessment of normal range of thyroid functions (TSH, free T3 and free T4) in healthy pregnant Egyptian women with negative Anti-Tpo antibodies in the three trimesters

Chapter I

Thyroid and Pregnacy

Thyroid dysfunction is a commonly encountered endocrine disorder during pregnancy. Overt thyroid dysfunction occurs in almost 1% of all pregnant women **(Glinoer, 1998).**

The management of thyroid disease during pregnancy has been reviewed in the guidelines of several societies including the American Thyroid Association (ATA) and the Endocrine Society and the European Thyroid Association (ETA) **(Lazarus et al., 2014).**

It is well documented that maternal overt thyroid dysfunction is associated with an increased risk in adverse maternal and fetal outcomes. However, there is conflicting evidence as to whether subclinical hypothyroidism (SCH) is associated with adverse pregnancy outcomes, and whether universal thyroid screening during pregnancy is efficacious **(De Groot et al., 2012).**

Thyroid dysfunction during pregnancy can result in serious complications for both the mother and infant; however, these complications can be prevented by optimal treatment of maternal overt thyroid dysfunction**.** Although several studies have demonstrated that maternal subclinical

hypothyroidism is associated with obstetric complications and neuro-cognitive impairments in offspring, there is limited evidence that levo-thyroxine treatment can improve these complications. Therefore, most professional societies do not recommend universal screening for thyroid dysfunction during pregnancy, and instead recommend a case-finding approach in which only high-risk women are tested **(Yim, 2016).**

However, recent studies have estimated that targeted thyroid function testing misses approximately 30% to 55% of hypothyroidism cases in pregnant women, and some associations and researchers have recommended universal screening of pregnant women to facilitate the early detection and treatment of overt hypothyroidism **(Yim, 2016).**

Physiological Changes in Pregnancy and Effects on Thyroid Function

There are several physiological changes during pregnancy that affect maternal thyroid function and thyroid hormone levels. Most important is that human chorionic gonadotropin (hCG) is structurally similar to TSH, and has a direct stimulating effect on the thyroid gland mediated through the TSH receptor. During pregnancy hCG peaks towards the end of the first trimester followed by a decrease