

# Reference Intervals of Thyrotropin (TSH) during Pregnancy in Korea, an Iodine-replete Area

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## OBJECTIVES

Maternal thyroid dysfunction has been associated with adverse pregnancy outcomes. Reference intervals for thyroid hormones during pregnancy has not been defined in Korean population. Our purpose was to establish trimester-specific reference intervals for thyroid hormones and to examine the implications of these reference intervals for interpretation of thyroid function among pregnant women in Korea, where iodine intake is more than adequate.

## METHODS

A prospective, observational design. Serum TSH, free thyroxine (free T4), and urine iodine concentration (UIC) were measured and analyzed in 417 healthy pregnant women. Serum TSH reference ranges were determined according to the guidelines of the National Academy of Clinical Biochemistry. Perinatal outcomes from 314 mothers were compared according to maternal thyroid function.

## RESULTS

### Baseline characteristics of study subjects (n=417)

Variable	Trimester		
	First	Second	Third
No. of subjects	135	143	139
Age, mean±SD (years)	32±3	33±4	33±3
Weight, mean±SD (kg)	55±8	60±7	65±8
TSH, median (mIU/L)	1.32	1.62	1.59
Free T4, median (ng/dL)	1.14	0.91	0.88
UIC, median (µg/L) <sup>a</sup>	439	397	451
UIC, median (µg/gCr) <sup>a</sup>	415	417	628

### Trimester-specific percentile values of TSH and Free T4

Trimester	No.	Percentile values							Subclinical hypothyroidism based on two criteria, n (%)	
		2.5th	5th	25th	50th	75th	95th	97.5th	This study	ATA
<b>TSH (mIU/L)</b>										
First	135	0.03	0.08	0.65	1.32	2.48	3.92	4.24	4 (3.0)	34 (25.2)
Second	143	0.13	0.39	0.98	1.62	2.34	3.67	4.84	4 (2.8)	18 (12.6)
Third	139	0.30	0.56	1.10	1.59	2.35	4.52	5.57	4 (2.9)	18 (12.9)
<b>Free T4 (ng/dL)</b>										
First	135	0.84	0.92	1.05	1.14	1.22	1.40	1.43	–	–
Second	143	0.68	0.72	0.81	0.91	0.99	1.13	1.21	–	–
Third	139	0.67	0.69	0.79	0.88	0.95	1.08	1.13	–	–

A total of 417 healthy pregnant women were eligible for analysis. Median TSH was 1.32 mIU/L, 1.62 mIU/L and 1.59 mIU/L in the first, second, and third trimester ( $p=0.282$ ).

Reference values of TSH were defined as the range between the 2.5th and 97.5th percentiles; TSH between 0.03–4.24 mIU/L in the first trimester, 0.13–4.84 mIU/L in the second trimester, and 0.30–5.57 mIU/L in the third trimester.

Using ATA guidelines, 34 (25%) women in the first trimester, 18 (13%) in the second trimester, and 18 (13%) in the third trimester met criteria for subclinical hypothyroidism.

Perinatal outcomes (n=314) based on the presence of subclinical hypothyroidism in mothers defined by two different criteria those established in this study and the reference ranges from ATA's guidelines did not vary between groups (data was not shown).

## CONCLUSIONS

Trimester-specific thyroid hormone reference intervals in Korean pregnant women differ from those of other countries with different iodine nutrition status and ethnicity. The establishment of population-based, reliable trimester-specific reference intervals is critical for the interpretation of thyroid function in pregnant women to avoid unnecessary tests and treatments.

