

# THYROID FUNCTION AND AUTOIMMUNITY AND THEIR RELATION TO WEIGHT STATUS IN HEALTHY CHILDREN AND ADOLESCENTS

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## BACKGROUND

The interrelationships between **thyroid function** and **body weight status** are complex.

**Serum thyroid stimulating hormone (TSH)** is typically **increased** in **obesity**.

Several mechanisms have been hypothesized.

## OBJECTIVES

- To compare **thyroid function** and **autoimmunity** in **normal, overweight and obese** healthy children and adolescents in our population.

- To analyse any **metabolic risk factor** related to **hyperthyrotropemia**.

## SUBJECTS AND METHODS

### Design:

Cross-sectional epidemiological study.

### Setting:

The city of Almería.

### Subjects:

**N = 1317** divided in **three groups**:

**-380 "adolescents" 12 - 17 years old**  
 Secondary Education students

**-675 "school children" 4 - 12 years old**  
 Primary Education students

**-262 "preschool children" 2 - 4 years old**  
 registered in the Health District.

**Multistage probability sampling** Epidat 3.0.

### Population:

-9.823 **adolescents**

-17.934 **school children**

Source: *Regional Education Department*

-5.453 **preschool children**

Source: *Regional Health Department*

### Variables

Weight, height, waist circumference  
 Body Mass Index (BMI)

**Overweight and obesity** using the thresholds proposed by the **International Obesity Task Force**.

Blood pressure (BP)

**Laboratory:** glucose, insulin, lipids, free thyroxine (T4), TSH, antithyroglobulin and antiperoxidase antibodies.

Urinary iodine (I).

**Thyroid autoimmunity:** any antibody positive

**Autoimmune thyroiditis:** autoimmunity plus goitre and/or thyroid dysfunction.

Qualitative variables: %

Quantitative variables: **mean (standard deviation)**.

### Statistical tests

Chi-square and ANOVA.

## RESULTS

**Thyroid function, thyroid autoimmunity, autoimmune thyroiditis and urinary iodine in obese, overweight and normal subjects.**

Variable	Total group	Obesity	Overweight	Normal	p
TSH (mU/L)	2,79 (1,48)	<b>3,12 (2,44)</b>	2,79 (1,51)	2,73 (1,30)	<b>0.02</b>
T4 (ng/dL)	1,32 (0,22)	1,27 (0,15)	1,31 (0,30)	1,33 (0,20)	0.52
TSH > 4,2 mU/L	11,0	14,4	11,5	10,4	0.38
TSH > 5,6 mU/L	2,6	2,4	3,7	2,3	0.47
Thyroid autoimm	3,7	<b>5,6</b>	<b>6,3</b>	2,9	<b>0.02</b>
Autoimmune thyr	1,4	<b>2,4</b>	<b>2,6</b>	1,0	0.11
Urinary I (µg/L)	209 (101)	194(89)	202(99)	213(104)	0.14
Urinary I <100µg/L	15,2	15,5	14,8	15,2	0.37

**Results excluding patients with thyroid autoimmunity.**

Variable	Total group	Obesity	Overweight	Normal	p
TSH (mU/L)	2,75 (1,18)	<b>2,98 (1,17)</b>	2,73 (1,17)	2,72 (1,19)	<b>0.09</b>
T4 (ng/dL)	1,32 (0,20)	1,28 (0,14)	1,31 (0,27)	1,32 (0,17)	0.12
TSH > 4,2 mU/L	10,6	14,5	10,3	10,1	0.36
TSH > 5,6 mU/L	2,4	1,8	2,9	2,4	0.82

**Cardiovascular risk factors in children and adolescents with overweight and obesity with and without hyperthyrotropemia > 4,2 mU/L.**

Variable	TSH >4,2	TSH normal	p
BMI SDS	1,75 (1,14)	1,59 (0,98)	0,37
Waist circumf SDS	1,15 (0,92)	1,11 (1,05)	0,82
Systolic BP mmHg	110,9 (15,3)	112,9 (15,2)	0,47
Diastolic BPmmHg	60,6 (10,1)	63,3 (9,7)	0,13
Glucose mg/dl	82,5 (7,0)	82,4 (8,0)	0,98
Triglycerides mg/dl	74,5 (37,7)	69,9 (34,0)	0,36
Total cholest mg/dl	158,6 (31,9)	156,0 (24,7)	0,57
HDL cholest mg/dl	53,5 (12,6)	57,0 (13,4)	0,15
LDL cholest mg/dl	87,8 (26,6)	84,8 (20,8)	0,44
Insulin mcU/ml	7,68 (5,50)	9,27 (7,87)	0,23

SDS: standard deviation score

## CONCLUSIONS

**TSH levels are significantly higher in obese** than in overweight and normal children and adolescents.

**Significance is statistical but not clinical.**

Hyperthyrotropemia in obese and overweight children and adolescents is **not related to any cardiovascular risk factor**.

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