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**Growth and nutritional status of Spanish delinquent male youths** *(title)*

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Short title: Nutritional status of Spanish delinquent youths.

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**Abstract**

Growth and nutritional status of 240 delinquent male youths at the time of their admission to a juvenile correctional center was assessed using the anthropometric method. Comparison of the established anthropometric parameters and indices with national normal standards of reference did not show statistically significant differences. Mean value of nutritional index was found to be within normal intervals. Only the individualized analysis of the established parameters and indices showed a growth and/or nutritional disorder by deficiency in 9.1% of the patients, consistent with the concept of "growth and developmental delay of psychosocial deprivation origin", and a nutritional disorder by excess in 5.4%.

**Conclusion:** A substantial rate of Spanish delinquent male youths showed growth and nutritional disorders.

**Key words:** Adolescence, anthropometry, juvenile delinquency, male, nutritional status.

## **Growth and nutritional status of Spanish delinquent male youths.**

Through previous studies, we know that delinquent youths that have entered to a juvenile correctional center evidence a high rate of physical health problems, that includes growth and nutritional disorders (1,2). The objective of the present study is to assess the growth and nutritional status of a group of delinquent male youths at the time of their admission to a juvenile correctional center in a mid-sized city (Zaragoza, Spain).

A cross-sectional study was performed over a 6-year period (1995-2000). Two hundred forty male adolescents were included, with a mean age of 15 years (1.3 SDU) (age range: 13-17 years) at the time of admission into juvenile correctional center. All adolescents were in custody because of a legal offense, including property offenses, offenses against persons, offenses related to use of alcohol of alcohol and drugs, probation violations, and other offenses.

Growth and nutritional status was assessed using the anthropometric method. Weight, height, head and upper arm circumferences, body-mass index and nutritional index were established. Internationally accepted techniques for auxological studies were followed. The technical equipment used consisted of a Seca platform scale (10g.) with incorporated stadiometer for height and non-extensive millimeter metric measuring tape. Through the operative program StatView 4.0., the descriptive statistic of the analyzed parameters was performed. The collected data were compared with national normal standards of reference processed by Hernández et al (3). For the comparative study, Z score (Standard Deviation Score) was calculated, assessing typical deviations that distance our data from the mean values of reference for age and sex. The existence of statistically significant differences was calculated by the comparison of two means (Student's t test not paired), with a level of significance exacted for  $p < 0.05$ .

Comparison of the established anthropometric parameters and indices in the group of delinquent male adolescents with national normal standards of reference did not show statistically significant differences. Mean value of nutritional index was found to be within normal intervals (Table 1). Only the individualized analysis of the established parameters and indices showed a growth and/or nutritional disorder by deficiency in 9.1% of the patients, consistent with the concept of "growth and developmental delay of psychosocial deprivation origin", and a nutritional disorder by excess in 5.4%.

Based on our results, we can conclude that a substantial rate of delinquent male youths showed growth and nutritional disorders. These are probably caused by a variety of factors, including past physical or psychosocial abuses, life-style habits, and a lack of prior health care (1,2,4). Behavioral problems such as aggressive and antisocial behavior, and juvenile delinquency have been purportedly linked to the potential influence of foods or nutrients (5). The time in custody presents a unique opportunity to address the basic health concerns of this high-risk population, especially regarding their nutritional status, and also to provide general health and nutritional education (6).

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Table 1. Values of the analyzed parameters and indices and its comparison with normal standards of reference.

Parameters and indices	Delinquent male adolescents		Standard of reference		Z-score	p value*
	Mean	SDU	Mean	SDU		
Weight (kg)	55,96	10,14	56,25	10,27	-0,03	NS
Height (cm)	163,80	9,11	165,46	8,06	-0,21	NS
Body-mass index (kg/m <sup>2</sup> )	20,75	2,70	20,37	2,82	0,13	NS
Head perimeter (cm)	55,18	1,68	55,61	1,60	-0,27	NS
Upper arm perimeter (cm)	24,84	2,85	23,92	2,64	0,35	NS
Nutritional index (%)	100,58	9,80				

\* Student's t test not paired: NS: not significantly