Comparison between CDC (Centers for Disease Control and Prevention) and Italian growth charts in the characterization of pediatric obesity

Stefania Pedicelli[1], Carla Bizzarri[1], Giuseppe Stefano Morino[2], and Marco Cappa[1]

[1]Unit of Endocrinology and Diabetes - [2]Unit of Clinical Nutrition

"Bambino Gesù" Children's Hospital, IRCCS, Rome, Italy

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Background

The use of international or local growth charts for the definition of pediatric obesity is still debated.

Inappropriate reference standards may lead to under/over-estimation of the prevalence and consequently of the number of patients to be included in diagnostic work-up.

Objective

To define the differences between patients considered obese according to either CDC or Italian growth charts.

Methods

A **single-centre cohort** of **177 children** was studied: all children (59 males; mean age 12.85 ± 1.94 years) underwent clinical and anthropometric assessment by the same pediatric endocrinologist.

BMI SDS were calculated by both **CDC** and **local growth standards**.

Obese (>95th percentile) and overweight (>85th percentile) patients, according to local BMI SDS, underwent oral glucose tolerance test (**OGTT**), blood tests for **metabolic and endocrine evaluation**, and **DEXA scan** to define body composition.

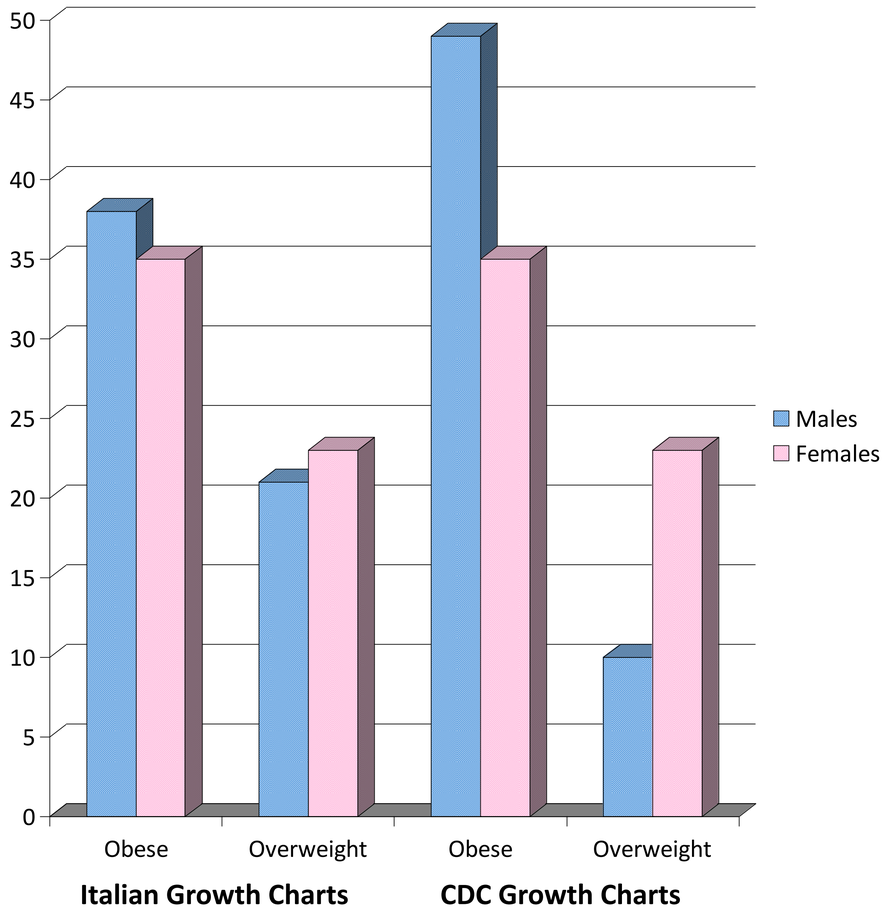
Results

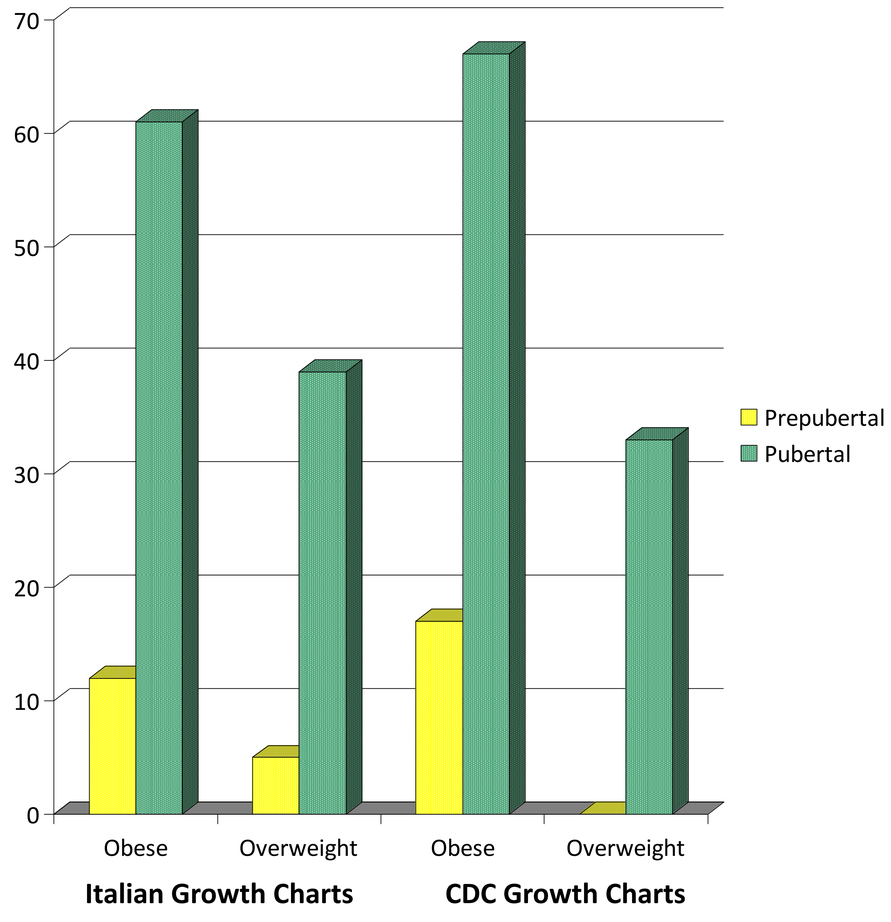
According to the **CDC growth charts**, 84 out of 117 patients (**71.8%**) were considered **obese** (BMI ≥ 2 SDS); this percentage decreased to **62.4%** (73/117 patients) when **national BMI SDS** were used.

No significant differences in the distribution of patients **according to sex** (males: 58.3% in CDC growth charts vs 52.1% in local growth charts) **and puberty** (prepubertal: 20.2% vs 16.4%) were found (Fig. 1).

The comparison between patients considered **obese only for CDC** growth charts and patients considered obese for both growth charts (Tab. 1) showed that the first were **younger** (p<0.001) and had **lower abdominal** (p<0.001), **waist** (p<0.001) and **wrist circumference** (p=0.002), **abdominal circumference/height ratio** (p<0.001) and **triglyceride** concentrations (p=0.032), **higher HDL cholesterol** (p=0.028) and **lower percentage of fat mass** (p=0.001).

Figure 1





	Obese (CDC) *n=13*	*Obese (CDC and Italian)* *n=71*	*p*
***Age** (years)*	11.02 ± 1.20	13.14 ± 1.97	<0.001
***Abdominal circumference - AC** (cm)*	90.85 ± 6.37	107.04 ± 8.87	<0.001
***Waist circumference** (cm)*	92.58 ± 3.55	110.20 ± 9.53	<0.001
***Wrist circumference** (cm)*	16.73 ± 0.83	17.81 ± 1.19	0.002
AC/height ratio	0.61 ± 0.03	0.67 ± 0.05	<0.001
***Triglyceride** (mg/dl)*	65.52 ± 22.83	102.52 ± 74.73	0.032
***HDL cholesterol** (mg/dl)*	52.45 ± 10.55	46.21 ± 9.12	0.028
***Fat mass** (%)*	38.07 ± 4.14	42.41 ± 3.99	0.001

IDF criteria in patients considered **obese** only according to **CDC**:

- **CA >90th** percentile: 11 patients
- **Triglyceride** >150 mg/dl: none
- **HDL** <40 mg/dl (10-16 yrs) or <40 mg/dl (males over 16 yrs) or 50 mg/dl (females over 16 yrs): 2 patients
- **PAS** >130 mmHg or **PAD** >85 mmHg: 1 patients
- **Fasting plasma glucose** >100 mg/dl: none

None of them fulfilled all the IDF criteria for metabolic syndrome.

Conclusions

Local growth charts showed **lower BMI SDS** than CDC growth charts.

The use of **CDC growth charts** could result in an **earlier identification** of patients with **anthropometric and radiological characteristic of obesity**, before biochemical alterations can be detected.

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Stefania Pedicelli

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