

# Examining beta-cell reserve in extremely obese children

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## Background

Obesity is a major risk factor for developing type 2 diabetes mellitus (T2DM). Despite the obesity epidemics, the incidence of childhood T2DM in Europe is not increased.

## Objectives

To assess the beta-cell reserve expressed as an oral glucose disposition index (GDIo), an independent predictor of developing T2DM (*Sjaarda et al., 2012*).

## Methods

80 adolescents (61.3 % girls), aged from 10.0 to 17.6 years (mean  $13.59 \pm 2.34$  years), with age and gender-specific BMI above the 95th percentile (*CDC 2000 BMI reference*) and waist circumference (WC) above the 90th percentile (*Galcheva et al., 2008*), were included. The participants underwent anthropometry, fasting blood analyses, OGTT and abdominal ultrasound according to standard procedures.

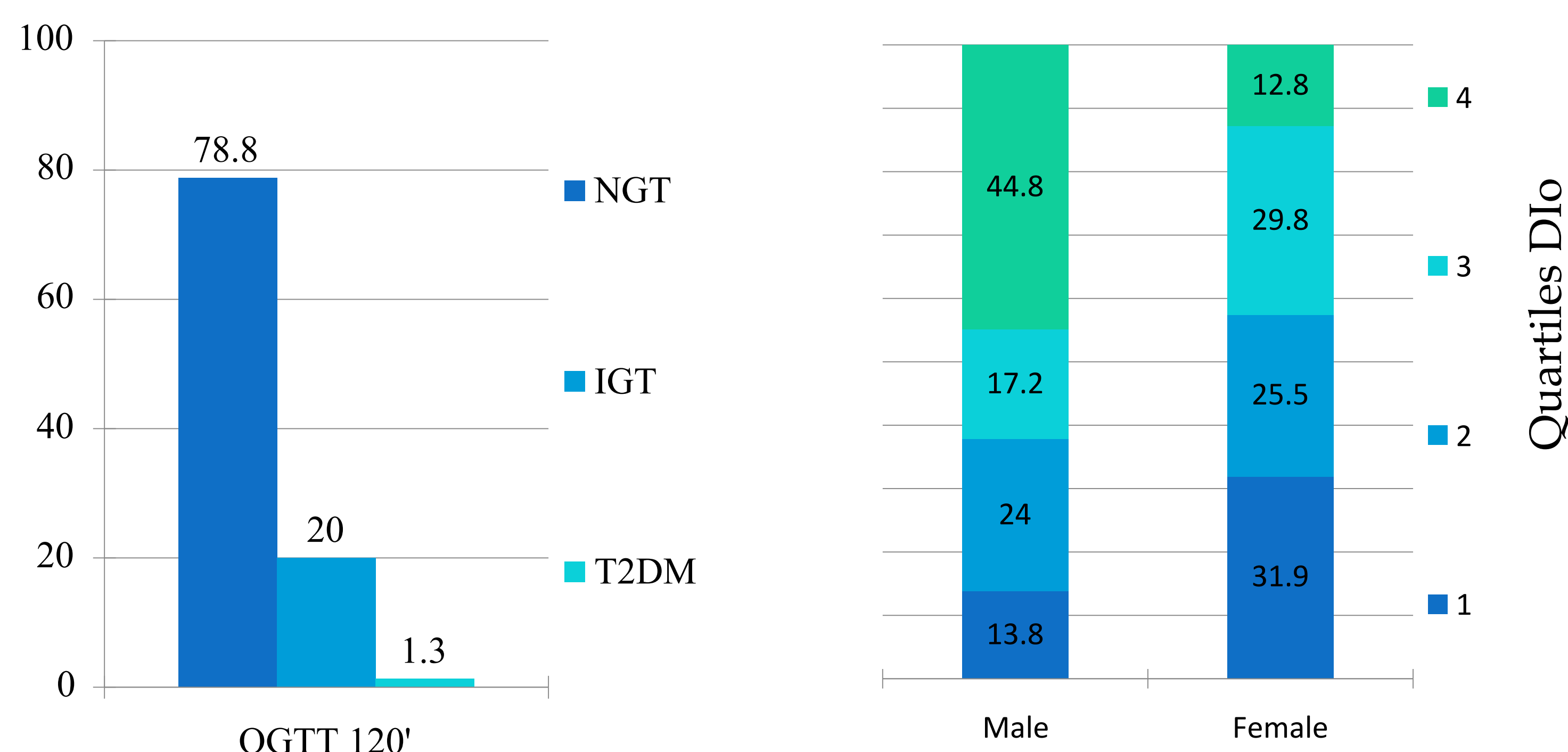
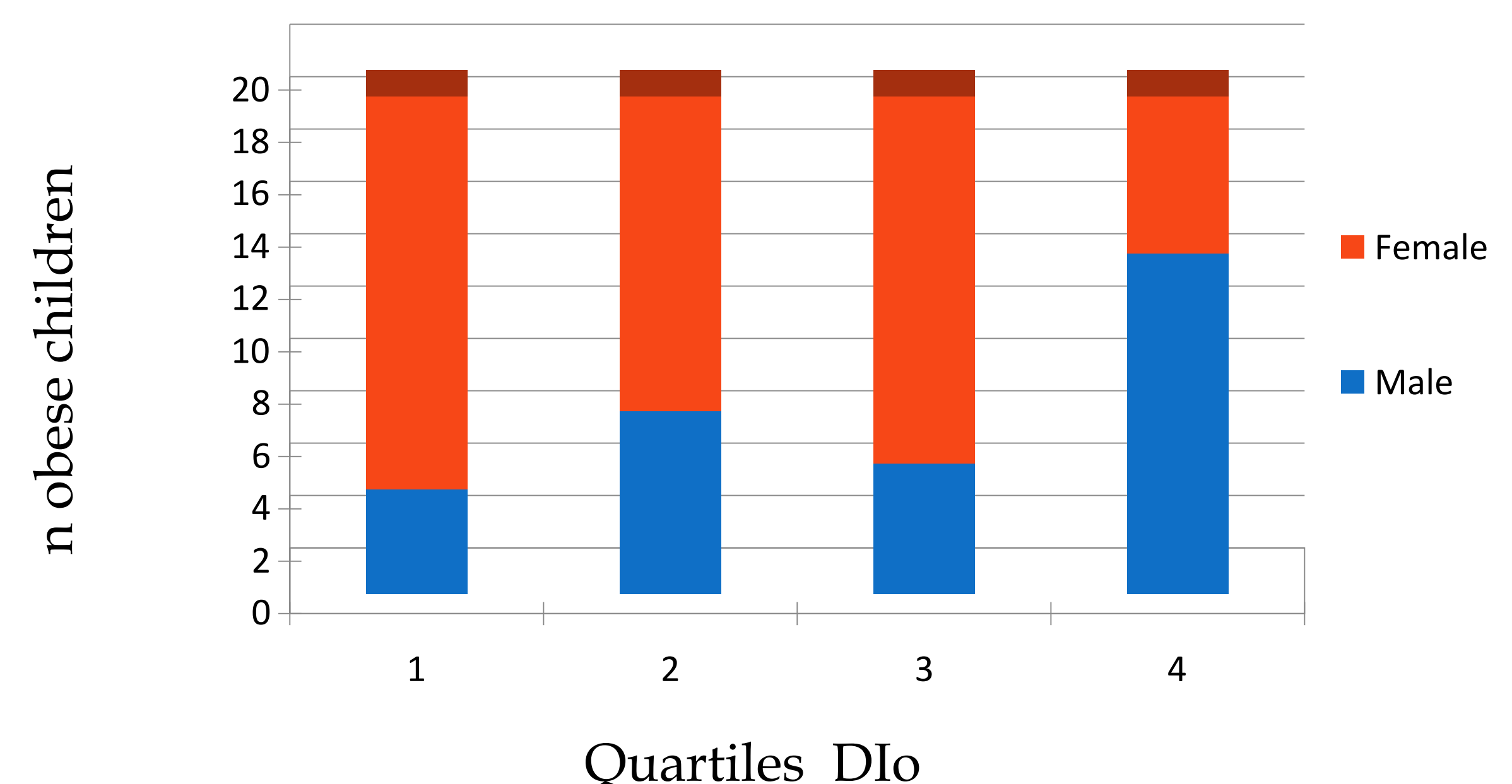
- Insulin sensitivity =  $1/\text{fasting insulin}$ ;
- Insulin response = change in insulin/change in blood glucose (BG) from 0 to 30 min;
- GDIo = insulin sensitivity/beta-cell function.

## Results

At fasting, a total of 50 adolescents (62.5%) were normoglycemic and 30 (37.5%) were with impaired fasting glucose (IFG).

After OGTT subjects were divided into 3 categories depending on 2 hour postload glucose levels:

- normal glucose tolerance - 63 (78.8 %);
- impaired glucose tolerance (IGT) - 16 (20.0 %);
- T2DM - 1 (1.3 %).



The mean GDIo was  $2.2450 \pm 2.30$  mM<sup>-1</sup> (boys  $2.8057 \pm 1.93$ , girls  $1.8991 \pm 2.46$ ,  $p = 0.096$ ).

The group with the lowest GDIo consisted of 31.9 % of all girls vs. 13.8 % of all boys. The GDIo decreased with increasing of 2 h post load BGLs ( $p=0.042$ ).

The GDIo also had a strong association with the family history of obesity ( $p=0.005$ ) and showed no associations with T2DM family history.

## Conclusion

The current study confirms the low frequency of type 2DM and impaired parameters of the  $\beta$  cell reserve in the pediatric population. It suggests a stronger correlation between future disease risk and familial obesity. The worse results in females deserve further exploration.