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## Evaluation of the impact of abdominal obesity on glucose and lipid metabolism disorders in adults with Down syndrome

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**Background & Objectives:** We aimed to describe anthropometric differences in weight-related disorders between adults with Down syndrome (DS) and healthy controls, as well as their disparate impact on glucose and lipid metabolism disorders.

**Material & Methods:** We underwent a cross-sectional study of 49 consecutively selected, community-residing adults with DS and 49 healthy controls in an outpatient clinic of a tertiary care hospital in Madrid, Spain. Siblings of adults with DS were studied as controls in 42 cases. Epidemiological, anthropometric, clinical and laboratory data were measured and compared between the groups, using SPSS software.

**Results:** Adults with DS were significantly younger and more often male, with a higher prevalence of overweight and obesity than controls. Adults with DS also had a higher waist-to-height ratio (WHR), and more frequently presented abdominal obesity, but total body fat percentage was similar between the groups and lipid profiles were similar between groups. The kappa correlation index for the diagnosis of abdominal obesity between waist circumference and WHR was 0.24 (95%CI: 0.13–0.34). Thyroid-related disorders were more frequent in adults with DS. Adults with DS had a significantly higher daily fruit and fiber consumption than controls, and more often received antidepressants (all of them being selective serotonin uptake inhibitors) and neuroleptic drugs than controls; no other relevant differences in medication were found between the groups. A new diagnosis of diabetes mellitus was reached in two adults with DS. Both HOMA indexes were higher in adults with DS, indicating that insulin resistance, measured using the homeostatic model assessment, was more prevalent among adults with DS – and specially in those presenting abdominal obesity; however, this difference did not remain after adjustment for age and gender. Subjects were then classified according to the presence of abdominal obesity, as determined by WHR. Adults with DS and abdominal obesity had higher BMI values, and both HOMA indexes were also significantly higher in adults with DS and abdominal obesity than in those without abdominal obesity (HOMA-IR 3.48 vs. 1.41; HOMA-b 164.4 vs. 82.3;  $p < 0.05$  for both comparisons). Total cholesterol, triglycerides, cholesterol fractions, and blood pressure values were similar between groups. Adults with DS who were newly diagnosed with impaired fasting glucose, insulin resistance, diabetes mellitus, and/or metabolic syndrome were in the abdominal obesity group.

**Discussion & Conclusions:** Weight-related disorders were highly prevalent among adults with DS. Adults with DS and abdominal obesity showed the highest insulin resistance indexes, which were higher than those of adults with DS but no abdominal obesity and than those of controls with abdominal obesity. We found a significant relationship between abdominal obesity and insulin resistance in adults with DS; this finding has been extensively studied in the general population, but had not been previously described in DS. We observed a relatively low prevalence of metabolic syndrome among adults with DS and abdominal obesity (10%), probably explained by low pressure values and normal lipid profile. Dietary differences could have partially accounted for the lower prevalence of overweight and obesity than observed in cohorts from outside the Mediterranean area. WHR was a useful tool for the evaluation of abdominal obesity in this population, with a poor correlation with waist circumference and excess body fat due to differences in body build in adults with DS. Favorable leptin/adiponectin balance and sustained arterial hypotension in adults with DS could account for a beneficial effect on both adipose tissue metabolism and on endothelial function, and thus cardiovascular protection. Hypothyroidism did not play a major role in explaining their results.

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