Supplementary material

Comparability of clinical measures.

In both study cohorts, the final waist circumference was calculated as the average of at least three independent measurements. Blood pressure was recorded by taking two readings while the child was in a relaxed, supine position to mitigate the risk of "white coat syndrome".

- In the Hispanic-European cohort, glucose, triglycerides, and HDL cholesterol levels were assessed using an automated analyzer with enzymatic methods (Roche-Hitachi Modular P and D Autoanalyzer; Roche Laboratory Systems, Mannheim, Germany). Insulin levels were measured using a separate analyzer (AxSYM; Abbott Laboratories, Abbott Park, IL, USA) by radioimmunoassay.

- In the Hispanic-American cohort, glucose, triglycerides, and HDL cholesterol levels were measured with an automated analyzer using enzymatic methods, including one of several instruments: Roche Cobas c501 (Mannheim, Germany), EPOCH BioTek, DRY-CHEM NX500i (Fuji Film), or ILAB 300 (Instrumentation Laboratory, Barcelona, Spain). Insulin levels were measured using chemiluminescence with one of the following analyzers: IMMULITE 2000 (Euro, DPC, Llanberis, UK), Roche Cobas c501 (Mannheim, Germany), or EPOCH BioTek.

The study compared clinical measurements across the two cohorts, with data stratified by obesity status. Results indicated that clinical measures were comparable across the varied sources of measurement.

Inclusion criteria

The study applied the following inclusion criteria for each cohort:

1) Hispanic-European Cohort: Caucasian children aged 2 to 18 years without a diagnosis of diabetes or any other pre-existing pathology.

2) Monterelos Cohort: Children without diagnosed pathologies, aged 10 to 12 years.

3) Monterrey Cohort: This cohort consisted of schoolchildren aged 6 to 12 years from public elementary schools in Monterrey and surrounding metropolitan areas, with a mixed ethnic background (individuals of European, Indigenous, and Mestizo descent). Children with other pathologies were not excluded.

4) Mexico City Cohort: Schoolchildren from 1st to 4th grades (ages 6 to 10 years) of both sexes and any nutritional status were included. Exclusion criteria applied to children

enrolled in weight-loss programs, those with chronic illnesses, or those taking medications that could alter metabolic profiles.

5) Pachuca Cohort: This cohort included a representative, probabilistic sample of schoolchildren from Hidalgo, Mexico, comprising 750 Mexican children aged 5 to 12 years without diagnosed pathologies. Participants were randomly selected in 2010 from public, private, and indigenous schools.

6) Medellin Cohort: Children aged 2 to 17.99 years without diagnosed pathologies, were included in the study.

These rigorous inclusion and exclusion criteria ensured a focus on geographically and ethnically representative pediatric populations free from pre-existing health conditions that could confound metabolic assessments.

Futher information about ObMetrics

The results generated by ObMetrics have been validated against manual calculations by clinical researchers, showing a high agreement rate of 93%. Discrepancies, primarily due to missing data, were effectively resolved through the app's automated script, significantly reducing error potential.