CARDIOMETABOLIC EFFECT OF SUGAR-SWEETENED BEVERAGES REDUCTION IN OBESE CHILDREN

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BACKGROUND

The excessive sucrose consumption, primarily used in sweetened beverages, has been considered an important inducer of cardiometabolic diseases. Besides the association between metabolic syndrome and fructose found in animal models, literature is lacking prospective studies in humans, especially in paediatric ages, when its intake is even higher.

Recent epidemiological studies performed in Portugal, verified that 30% of scholars were overweight (12% of whom were obese), and that 25% of children <3y had sugar-sweetened beverages at least 4 times a week. This precocious contact represents a heavy annual burden during life span, whose consequences are yet to be uncovered.

The authors aimed to assess the effect of sugar-sweetened beverages reduction on markers of metabolic syndrome, in obese children.

PATIENTS & METHODS

This was a prospective analysis of the first 200 pre-pubertal patients admitted to our hospital-based obesity clinic, during 2015. To access dietary intake, families were asked to make a three 24h-recall weekly (Tuesdays, Thursdays & Saturdays). Sugar-added beverages were quantified as number of servings (200mL), and sucrose intake was calculated. During the first 4 weeks, patients had their usual diet. For the next 24 weeks, they were asked to restrict sugar-added beverages to one serving a week, keeping everything else as previously.

Evaluated variables: diet composition; anthropometrics; blood pressure; fasting glicose, insulin and lipid profile; OGTT; uric acid and homocysteine; inflammation; alanine aminotransferase.

Collected data was analyzed using SPSS® 16.0 for Windows. Chi-Square test, Student's t-test, covariance and multiple linear regression model were used for statistical analysis. All significance levels were set at $p < 0.05$.

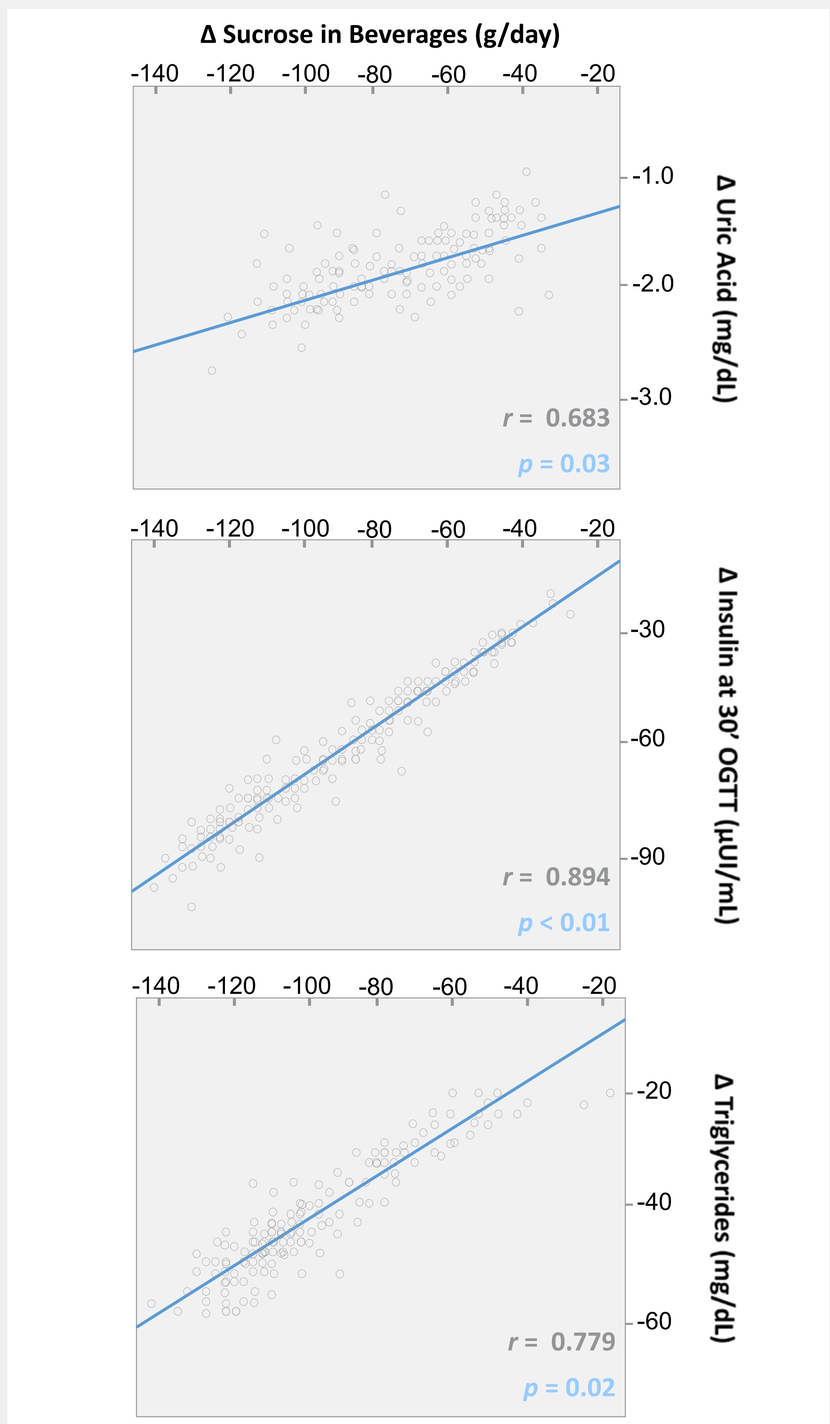
RESULTS

AGE: 6.5 (3 – 9) y | **GIRLS: 62%** | **WHITE: 97%**

		4th WEEK (N=200)	28th WEEK (N=176)*	p
Sugary Beverages (mL/day)	mean (SD)	957 ± 123	48 ± 11	<0.01
Sucrose (g/day)	mean (SD)	219 ± 62	82 ± 5	<0.01
Sucrose in Beverages (g/day)	mean (SD)	144 ± 14 (66% of daily sucrose)	7 ± 2 (9% of daily sucrose)	<0.01
Fat (% Total Daily Intake)	mean (SD)	33.1 ± 7.6	32.7 ± 6.7	0.53
Energy (Kcal/day)	mean (SD)	1993 ± 410	1754 ± 328	0.47
BMI SDS	mean (SD)	3.41 ± 0.54	3.19 ± 0.42	0.37
Waist Circumference SDS	mean (SD)	3.82 ± 0.58	3.67 ± 0.35	0.61
Waist-to-Height Ratio	mean (SD)	0.73 ± 0.11	0.68 ± 0.09	0.49
Systolic BP SDS / Dyastolic BP SDS	mean (SD)	1.8 ± 0.6 / 1.7 ± 0.4	1.3 ± 0.3 / 1.3 ± 0.1	0.03
Uric Acid (mg/dL)	mean (SD)	4.1 ± 1.9	2.4 ± 0.7	0.02
Homocysteine (µmol/L)	median (range)	7.83 (5.49 – 10.45)	4.32 (3.50 - 5.27)	<0.01#
Triglycerides (mg/dL)	median (range)	132 (72 - 201)	88 (63 - 112)	<0.01#
LDL-c / HDL-c (mg/dL)	mean (SD)	117 ± 41 / 38 ± 12	114 ± 32 /59 ± 18	0.36/ 0.03
Apolipoprotein B (mg/dL)	mean (SD)	102 ± 13	83 ± 11	<0.01
Lipoprotein a (mg/dL)	median (range)	53 (47 – 63)	38 (12 – 49)	<0.01#
Leptin (ng/mL)	median (range)	8.84 (7.93 – 10.62)	6.65 (3.93 – 7.51)	<0.01#
Insulin at 30' OGTT (µUI/mL)	median (range)	87.9 (37.1 - 130.4)	46.0 (17.1 - 56.9)	<0.01#
HOMA-IR	median (range)	3.57 (1.34 - 6.43)	3.25 (1.28 - 4.22)	0.24#
ALT (U/L)	median (range)	23 (14 - 61)	17 (12 - 25)	0.02#

* 12% drop out, without statistical significance

After Log transformation

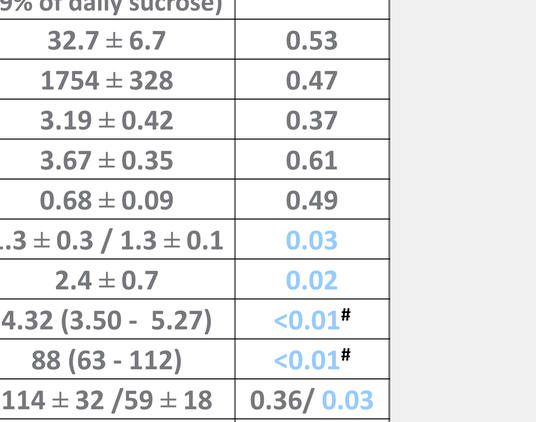


DISCUSSION

Our results provide additional evidence supporting a positive relationship between sugar-sweetened beverages reduction and the improvement of important markers of metabolic syndrome, namely: blood pressure, insulin secretion, lipid profile, liver inflammation and uric acid.

It also seems to promote leptin sensitivity, increasing satiety.

BMI and waist circumference did not change significantly, but this could be explained by the study short duration: it would be necessary to prolong it in order to access it.



Adapted from *Nature Rev Gastro Hepatol* 2010

In conclusion, controlling sugar-sweetened beverages in children seems to be an efficient and inexpensive intervention to reduce the risk of cardiometabolic disease lifelong.

For this reason, it is an urgent measure of public health to be taken worldwide.

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