**Online Supporting Material: Substituting homemade fruit juice for sugar-sweetened beverages is associated with lower odds of metabolic syndrome among Hispanic adults**

Supplemental Table 1: Age-adjusted characteristics by servings of fruit-based juices among Costa Rican adults[1]

| Serving | Homemade fruit juice[2] | | | | Fresco[3] | | | |
|---|---|---|---|---|---|---|---|---|
| | Never[4] | ≤1 /week | 2-6/week | ≥1/day | Never | ≤1 /week | 2-6/week | ≥1/day |
| n, % | 811 (43.3) | 354 (18.9) | 453 (24.2) | 254 (13.6) | 251 (13.4) | 233 (12.5) | 487 (26.0) | 901 (48.1) |
| Socio-demographic | | | | | | | | |
| Age, y | 59.1 ± 10.5 | 54.4 ± 11.7 | 55.7 ± 11.5 | 58.5 ± 11.5 | 59.0 ± 11.0 | 57.5 ± 11.1 | 56.3 ± 11.7 | 57.3 ± 11.2 |
| Sex, % female | 24.2 | 23.5 | 25.4 | 27.0 | 24.2 | 27.8 | 25.4 | 23.7 |
| Area of residence, % rural | 38.0 | 35.2 | 43.6 | 46.4* | 32.9 | 46.8 | 39.3 | 40.5 |
| Income, $/week | 475 ± 15 | 552 ± 22 | 646 ± 19.5 | 828 ± 26* | 557 ± 28 | 539 ± 28 | 578 ± 19 | 599 ± 14* |
| Physical Activity, METs | 37.1 ± 0.6 | 37.0 ± 0.9 | 35.0 ± 0.8 | 33.4 ± 1.0* | 36.9 ± 1.1 | 34.6 ± 1.1 | 34.8 ± 0.8 | 36.9 ± 0.6 |
| Current smoker, % | 26.5 | 20.8 | 20.1 | 16.6* | 31.5 | 20.3 | 21.9 | 20.9* |
| Dietary factors | | | | | | | | |
| Total energy, kcal/d | 2380 ± 27 | 2494 ± 40 | 2553 ± 36 | 2610 ± 47* | 2237 ± 47 | 2311 ± 49 | 2400 ± 34 | 2624 ± 25* |
| Alcohol[8], g/d | 5.7 ± 0.5 | 6.8 ± 0.8 | 6.6 ± 0.7 | 7.0 ± 0.9 | 7.5 ± 0.9 | 5.8 ± 0.9 | 6.9 ± 0.6 | 5.8 ± 0.5 |
| Total carbohydrates[8], g/d | 344 ± 1.6 | 341 ± 2.5 | 339 ± 2.2 | 343 ± 2.9 | 331 ± 2.8 | 332 ± 2.9 | 332 ± 2.0 | 353 ± 1.5* |
| Dietary fiber[8], g/d | 23.4 ± 0.2 | 22.6 ± 0.3 | 22.9 ± 0.3 | 23.1 ± 0.4 | 22.2 ± 0.4 | 22.8 ± 0.4 | 23.0 ± 0.3 | 23.3 ± 0.2* |
| PUFA: SFA ratio | 0.59 ± 0.01 | 0.61 ± 0.02 | 0.60 ± 0.01 | 0.63 ± 0.02 | 0.60 ± 0.02 | 0.56 ± 0.02 | 0.60 ± 0.01 | 0.62 ± 0.01 |
| Caffeine[8], g/d | 355 ± 6.6 | 316 ± 10.0 | 314 ± 8.8 | 264 ± 11.8* | 371 ± 11.9 | 346 ± 12.5 | 320 ± 8.7 | 308 ± 6.3* |
| Fresco, s/d | 0.9 ± 0.04 | 1.1 ± 0.1 | 1.0 ± 0.1 | 1.1 ± 0.1 | - | - | - | - |
| Homemade fruit juice, s/d | - | - | - | - | 0.21 ± 0.03 | 0.29 ± 0.03 | 0.31 ± 0.02 | 0.34 ± 0.02* |
| Instant drinks, s/d | 0.34 ± 0.02 | 0.37 ± 0.03 | 0.27 ± 0.03 | 0.25 ± 0.04* | 0.52 ± 0.04 | 0.47 ± 0.04 | 0.36 ± 0.03 | 0.20 ± 0.02* |
| Regular soda, s/d | 0.14 ± 0.02 | 0.17 ± 0.02 | 0.20 ± 0.02 | 0.17 ± 0.03 | 0.19 ± 0.03 | 0.19 ± 0.03 | 0.16 ± 0.02 | 0.15 ± 0.01 |
| Low-fat milk, s/d | 0.22 ± 0.02 | 0.24 ± 0.04 | 0.29 ± 0.03 | 0.39 ± 0.04* | 0.27 ± 0.04 | 0.21 ± 0.04 | 0.25 ± 0.03 | 0.28 ± 0.02 |
| Water, s/d | 2.7 ± 0.1 | 2.7 ± 0.1 | 2.9 ± 0.1 | 3.2 ± 0.1* | 3.0 ± 0.1 | 2.5 ± 0.1 | 2.7 ± 0.1 | 2.9 ± 0.1 |
| Sugar added[9], tsp/d | 6.8 ± 0.2 | 5.2 ± 0.3 | 5.3 ± 0.2 | 3.6 ± 0.3* | 6.4 ± 0.3 | 6.3 ± 0.4 | 5.8 ± 0.2 | 5.3 ± 0.2* |
| Fruits, s/d | 3.8 ± 0.1 | 3.9 ± 0.2 | 4.1 ± 0.1 | 4.0 ± 0.2 | 3.3 ± 0.2 | 3.2 ± 0.2 | 3.6 ± 0.1 | 4.5 ± 0.1* |
| Biomarkers | | | | | | | | |
| BMI, kg/m² | 26.0 ± 0.1 | 26.1 ± 0.2 | 26.5 ± 0.2 | 26.5 ± 0.3* | 26.1 ± 0.3 | 26.3 ± 0.3 | 26.2 ± 0.2 | 26.2 ± 0.1 |
| Systolic BP, mmHg | 135 ± 0.7 | 136 ± 1.1 | 137 ± 0.9 | 134 ± 1.2 | 136 ± 1.3 | 133 ± 1.3 | 137 ± 0.9 | 135 ± 0.7 |
| Diastolic BP, mmHg | 81.3 ± 0.4 | 81.5 ± 0.6 | 82.4 ± 0.5 | 82.3 ± 0.7 | 81.2 ± 0.7 | 81.0 ± 0.7 | 82.3 ± 0.5 | 81.7 ± 0.4 |
| Waist circumference, cm | 89.7 ± 0.4 | 90.1 ± 0.5 | 91.0 ± 0.5 | 90.7 ± 0.6 | 89.8 ± 0.6 | 89.7 ± 0.7 | 90.0 ± 0.5 | 90.5 ± 0.3 |
| HDL-C, mmol/L | 1.04 ± 0.01 | 1.05 ± 0.01 | 1.08 ± 0.01 | 1.08 ± 0.01* | 1.06 ± 0.01 | 1.05 ± 0.02 | 1.06 ± 0.01 | 1.05 ± 0.01 |
| Plasma triglycerides, mmol/L | 2.36 ± 0.05 | 2.37 ± 0.07 | 2.50 ± 0.07 | 2.52 ± 0.09 | 2.39 ± 0.09 | 2.41 ± 0.09 | 2.42 ± 0.06 | 2.44 ± 0.05 |
| Fasting plasma glucose, mmol/L | 4.24 ± 0.04 | 4.22 ± 0.07 | 4.29 ± 0.06 | 4.15 ± 0.08 | 4.30 ± 0.08 | 4.25 ± 0.08 | 4.22 ± 0.06 | 4.22 ± 0.04 |
| Metabolic Syndrome, % | 29.1 | 26.9 | 32.4 | 26.9 | 31.4 | 30.8 | 28.8 | 28.4 |

[1]Data shown as mean ± standard deviation, or percent. BP: blood pressure. n=1,872. *P-trend<0.05
[2]Homemade fruit juice: 100% juice from freshly squeezed orange or other fruit, not mixed with other ingredients. Does not include commercial juices.
[3]Fresco: a traditional juice from freshly squeezed fruit diluted in water and mixed with sugar.
[4]Never or less than one serving (s)/month.
[5]Energy adjusted using the residuals method. [6]Sugar added to food or beverages.

**Online Supporting Material: Substituting homemade fruit juice for sugar-sweetened beverages is associated with lower odds of metabolic syndrome among Hispanic adults**

Supplemental Table 2: Age-adjusted characteristics by servings of sugar-sweetened beverages among Costa Rican adults[1]

| Serving | Instant drinks[2] | | | | Regular soda[3] | | | |
|---|---|---|---|---|---|---|---|---|
| | Never[4] | ≤1 /week | 2-6/week | ≥1/day | Never | ≤1 /week | 2-6/week | ≥1/day |
| n, % | 1049 (56.0) | 219 (11.7) | 341 (18.2) | 263 (14.1) | 1131 (60.4) | 383 (20.5) | 271 (14.5) | 87 (4.7) |
| **Socio-demographic** | | | | | | | | |
| Age, y | 58.9 ± 10.7 | 55.9 ± 11.5 | 55.1 ± 12.0 | 55.0 ± 11.4* | 59.7 ± 10.6 | 55.3 ± 11.8 | 51.6 ± 11.7 | 53.0 ± 11.6* |
| Sex, % female | 25.5 | 24.4 | 24.9 | 21.6 | 27.7 | 23.6 | 16.8 | 15.9* |
| Area of residence, % rural | 42.6 | 43.0 | 31.4 | 38.1* | 39.7 | 37.5 | 44.5 | 40.6 |
| Income, $/week | 596 ± 13 | 592 ± 29 | 559 ± 23 | 536 ± 27* | 575 ± 13 | 568 ± 22 | 624 ± 26 | 570 ± 47 |
| Physical Activity, METs | 36.3 ± 0.5 | 35.3 ± 1.1 | 35.3 ± 0.9 | 37.0 ± 1.0 | 35.6 ± 0.7 | 38.1 ± 0.9 | 34.0 ± 1.0 | 37.0 ± 1.8 |
| Current smoker, % | 22.5 | 20.2 | 21.9 | 25.2 | 22.6 | 21.8 | 20.4 | 20.4 |
| **Dietary factors** | | | | | | | | |
| Total energy, kcal/d | 2424 ± 24 | 2451 ± 51 | 2532 ± 41 | 2620 ± 47* | 2376 ± 22 | 2459 ± 38 | 2729 ± 46 | 3049 ± 80** |
| Alcohol[8], g/d | 6.8 ± 0.4 | 6.5 ± 1.0 | 5.8 ± 0.8 | 4.5 ± 0.9* | 6.4 ± 0.4 | 4.6 ± 0.7 | 7.9 ± 0.9 | 6.9 ± 1.5 |
| Total carbohydrates[8], g/d | 343 ± 1.4 | 341 ± 3.1 | 338 ± 2.5 | 346 ± 2.9 | 341 ± 1.4 | 346 ± 2.4 | 337 ± 2.9 | 342 ± 5.0 |
| Dietary fiber[8], g/d | 23.4 ± 0.2 | 23.2 ± 0.4 | 22.9 ± 0.3 | 21.8 ± 0.4* | 23.7 ± 0.2 | 23.5 ± 0.3 | 21.0 ± 0.6 | 18.5 ± 0.6* |
| PUFA: SFA ratio | 0.61 ± 0.01 | 0.61 ± 0.02 | 0.59 ± 0.02 | 0.59 ± 0.02 | 0.60 ± 0.01 | 0.61 ± 0.02 | 0.59 ± 0.02 | 0.60 ± 0.03 |
| Caffeine[8], g/d | 324 ± 5.9 | 305 ± 12.8 | 333 ± 10.3 | 336 ± 12 | 328 ± 5.7 | 334 ± 9.7 | 319 ± 11.7 | 269 ± 20.4* |
| Fresco, s/d | 1.2 ± 0.03 | 1.1 ± 0.1 | 0.75 ± 0.1 | 0.58 ± 0.1* | 1.0 ± 0.03 | 0.94 ± 0.1 | 1.1 ± 0.1 | 0.79 ± 0.1 |
| Homemade fruit juice, s/d | 0.33 ± 0.02 | 0.29 ± 0.03 | 0.28 ± 0.03 | 0.26 ± 0.03* | 0.31 ± 0.01 | 0.27 ± 0.02 | 0.35 ± 0.03 | 0.37 ± 0.05 |
| Instant drinks, s/d | - | - | - | - | 0.28 ± 0.02 | 0.36 ± 0.03 | 0.33 ± 0.04 | 0.48 ± 0.07* |
| Regular soda, s/d | 0.15 ± 0.01 | 0.13 ± 0.03 | 0.18 ± 0.02 | 0.21 ± 0.03* | - | - | - | - |
| Low-fat milk, s/d | 0.31 ± 0.02 | 0.23 ± 0.04 | 0.21 ± 0.04 | 0.18 ± 0.04* | 0.26 ± 0.02 | 0.22 ± 0.03 | 0.33 ± 0.04 | 0.28 ± 0.07 |
| Water, s/d | 2.8 ± 0.1 | 2.9 ± 0.1 | 2.8 ± 0.1 | 2.6 ± 0.1 | 3.0 ± 0.1 | 2.5 ± 0.1 | 2.6 ± 0.1 | 2.6 ± 0.2* |
| Sugar added[9], tsp/d | 5.5 ± 0.2 | 5.7 ± 0.4 | 5.8 ± 0.3 | 6.3 ± 0.3* | 5.6 ± 0.2 | 6.1 ± 0.3 | 5.8 ± 0.3 | 4.5 ± 0.6 |
| Fruits, s/d | 4.1 ± 0.1 | 3.8 ± 0.2 | 3.8 ± 0.2 | 3.5 ± 0.2* | 4.0 ± 0.1 | 3.9 ± 0.2 | 3.5 ± 0.2 | 4.4 ± 0.3 |
| **Biomarkers** | | | | | | | | |
| BMI, kg/m$^2$ | 26.0 ± 0.1 | 26.7 ± 0.3 | 26.1 ± 0.2 | 26.7 ± 0.3 | 26.1 ± 0.1 | 25.9 ± 0.2 | 26.5 ± 0.3 | 27.6 ± 0.4* |
| Systolic BP, mmHg | 135 ± 0.6 | 137 ± 1.4 | 135 ± 1.1 | 135 ± 1.2 | 135 ± 0.6 | 135 ± 1.0 | 137 ± 1.2 | 137 ± 2.2 |
| Diastolic BP, mmHg | 81.5 ± 0.3 | 83.0 ± 0.7 | 81.6 ± 0.6 | 81.7 ± 0.7 | 81.2 ± 0.3 | 82.4 ± 0.6 | 82.4 ± 0.7 | 83.7 ± 1.2* |
| Waist circumference, cm | 89.5 ± 0.3 | 91.4 ± 0.7 | 90.3 ± 0.5 | 91.7 ± 0.6* | 89.7 ± 0.3 | 89.7 ± 0.5 | 91.8 ± 0.6 | 94.8 ± 1.1* |
| HDL-C, mmol/L | 1.06 ± 0.01 | 1.06 ± 0.02 | 1.06 ± 0.01 | 1.04 ± 0.01 | 1.06 ± 0.01 | 1.07 ± 0.01 | 1.05 ± 0.01 | 1.03 ± 0.02 |
| Plasma triglycerides, mmol/L | 2.32 ± 0.04 | 2.46 ± 0.09 | 2.60 ± 0.08 | 2.58 ± 0.09* | 2.37 ± 0.04 | 2.52 ± 0.07 | 2.39 ± 0.09 | 2.67 ± 0.15 |
| Fasting plasma glucose, mmol/L | 4.20 ± 0.04 | 4.26 ± 0.08 | 4.24 ± 0.07 | 4.32 ± 0.07 | 4.19 ± 0.04 | 4.29 ± 0.06 | 4.25 ± 0.08 | 4.44 ± 0.13 |
| Metabolic Syndrome, % | 26.9 | 31.8 | 29.7 | 35.9* | 29.2 | 29.5 | 26.5 | 36.7 |

[1]Data shown as mean ± standard deviation, or percent. BP: blood pressure. n=1,872. *P-trend<0.05
[2]Instant drink: instant sugary powder mix prepared with water, or a juice box.
[3]Regular soda: non-diet, carbonated beverages with or without caffeine.
[4]Never or less than one serving (s)/month.
[5]Energy adjusted using the residuals method. [6]Sugar added to food or beverages.

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Supplemental Table 3: Age-adjusted characteristics by serving of combined SSB among Costa Rican adults[1]

| | SSB (instant drink and regular soda)[2] | | | |
|---|---|---|---|---|
| Serving | Never[3] | ≤1 /week | 2-6/week | ≥1/day |
| n, % | 705 (37.7) | 289 (15.4) | 533 (28.5) | 345 (18.4) |
| **Socio-demographic** | | | | |
| Age, y | 60.7 ± 10.0 | 57.2 ± 10.6 | 54.6 ± 12.0 | 54.6 ± 11.4* |
| Sex, % female | 29.6 | 21.6 | 22.6 | 20.8* |
| Area of residence, % rural | 43.2 | 40.8 | 34.6 | 40.9 |
| Income, $/week | 584 ± 17 | 605 ± 25 | 578 ± 19 | 555 ± 24 |
| Physical Activity, METs | 35.7 ± 0.6 | 36.2 ± 1.0 | 35.9 ± 0.7 | 37.1 ± 0.9 |
| Current smoker, % | 20.5 | 24.5 | 22.1 | 25.7 |
| **Dietary factors** | | | | |
| Total energy, kcal/d | 2318 ± 29 | 2460 ± 44 | 2541 ± 33 | 2705 ± 40* |
| Alcohol[8], g/d | 6.6 ± 0.5 | 5.5 ± 0.8 | 6.7 ± 0.6 | 5.7 ± 0.8 |
| Total carbohydrates[8], g/d | 342 ± 1.8 | 347 ± 2.7 | 338 ± 2.0 | 344 ± 2.5 |
| Dietary fiber[8], g/d | 24.0 ± 0.2 | 23.8 ± 0.3 | 22.6 ± 0.3 | 21.0 ± 0.3* |
| PUFA: SFA ratio | 0.60 ± 0.01 | 0.62 ± 0.02 | 0.60 ± 0.01 | 0.59 ± 0.02 |
| Caffeine[8], g/d | 323 ± 7.3 | 322 ± 11.2 | 330 ± 8.3 | 325 ± 10.3 |
| Fresco, s/d | 1.1 ± 0.04 | 1.02 ± 0.1 | 0.094 ± 0.04 | 0.63 ± 0.1* |
| Homemade fruit juice, s/d | 0.33 ± 0.02 | 0.32 ± 0.03 | 0.29 ± 0.02 | 0.29 ± 0.03 |
| SSB, s/d | - | - | - | - |
| Low-fat milk, s/d | 0.30 ± 0.03 | 0.24 ± 0.04 | 0.28 ± 0.03 | 0.20 ± 0.04 |
| Water, s/d | 3.0 ± 0.1 | 2.7 ± 0.1 | 2.7 ± 0.1 | 2.6 ± 0.1* |
| Sugar added[9], tsp/d | 5.4 ± 0.2 | 5.9 ± 0.3 | 5.8 ± 0.2 | 5.9 ± 0.3 |
| Fruits, s/d | 4.2 ± 0.1 | 4.0 ± 0.2 | 3.7 ± 0.1 | 3.7 ± 0.2* |
| **Biomarkers** | | | | |
| BMI, kg/m$^2$ | 25.9 ± 0.2 | 26.2 ± 0.2 | 26.2 ± 0.2 | 26.6 ± 0.2* |
| Systolic BP, mmHg | 135 ± 0.8 | 136 ± 1.2 | 136 ± 0.9 | 135 ± 1.1 |
| Diastolic BP, mmHg | 80.8 ± 0.4 | 82.9 ± 0.6 | 82.2 ± 0.5 | 81.8 ± 0.6 |
| Waist circumference, cm | 88.9 ± 0.4 | 90.4 ± 0.6 | 90.8 ± 0.4 | 91.9 ± 0.5* |
| HDL-C, mmol/L | 1.06 ± 0.01 | 1.07 ± 0.01 | 1.05 ± 0.01 | 1.04 ± 0.01 |
| Plasma triglycerides, mmol/L | 2.25 ± 0.05 | 2.43 ± 0.08 | 2.52 ± 0.06 | 2.60 ± 0.07* |
| Fasting plasma glucose, mmol/L | 4.18 ± 0.05 | 4.18 ± 0.07 | 4.26 ± 0.05 | 4.35 ± 0.07* |
| Metabolic Syndrome, % | 26.9 | 27.1 | 30.4 | 34.0 |

[1]Data shown as mean ± standard deviation, or percent. BP: blood pressure. SSB: Sugar-sweetened beverages. n=1,872.*P-trend<0.05

[2]SSB: combined instant drink and regular soda. Instant drink: instant sugary powder mix prepared with water, or a juice box. Regular soda: non-diet, carbonated beverages with or without caffeine.

[3]Never or less than one serving (s)/month.

[4]Energy adjusted using the residuals method.

[5]Sugar added to food or beverages.

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Supplemental Table 4: Multivariate adjusted means for metabolic factors by servings of fruit-based beverages in Costa Ricans[1]

| | Homemade fruit juice[2] | | | | | Fresco[3] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Never[4] | ≤1 /week | 2-6/week | ≥1/day | *P*-trend | Never | ≤1 /week | 2-6/week | ≥1/day | *P*-trend |
| **Waist circumference, *cm*** | | | | | | | | | | |
| Model 1 | 87.2 ± 0.4 | 87.1 ± 0.6 | 88.1 ± 0.5 | 87.4 ± 0.7 | 0.467 | 87.1 ± 0.7 | 87.2 ± 0.7 | 87.2 ± 0.5 | 87.7 ± 0.4 | 0.247 |
| Model 2 | 87.5 ± 0.4 | 87.1 ± 0.6 | 88.1 ± 0.5 | 87.3 ± 0.7 | 0.826 | 87.4 ± 0.7 | 87.7 ± 0.7 | 87.4 ± 0.5 | 87.6 ± 0.4 | 0.804 |
| Model 3 | 87.6 ± 0.4 | 87.1 ± 0.6 | 88.1 ± 0.5 | 87.3 ± 0.7 | 0.935 | 87.0 ± 0.7 | 87.6 ± 0.7 | 87.4 ± 0.5 | 87.9 ± 0.4 | 0.231 |
| **Systolic BP, *mmHg*** | | | | | | | | | | |
| Model 1 | 132 ± 0.9 | 133 ± 1.2 | 133 ± 1.1 | 131 ± 1.4 | 0.651 | 133 ± 1.4 | 130 ± 1.5 | 134 ± 1.1 | 132 ± 0.9 | 0.665 |
| Model 2 | 132 ± 0.9 | 133 ± 1.2 | 134 ± 1.2 | 131 ± 1.5 | 0.509 | 133 ± 1.4 | 131 ± 1.5 | 134 ± 1.1 | 132 ± 0.9 | 0.449 |
| Model 3 | 132 ± 0.9 | 133 ± 1.2 | 134 ± 1.2 | 131 ± 1.5 | 0.436 | 133 ± 1.4 | 131 ± 1.5 | 134 ± 1.1 | 132 ± 0.9 | 0.480 |
| **Diastolic BP, *mmHg*** | | | | | | | | | | |
| Model 1 | 79.1 ± 0.5 | 79.0 ± 0.7 | 79.8 ± 0.6 | 79.4 ± 0.8 | 0.472 | 79.0 ± 0.7 | 78.4 ± 0.8 | 79.8 ± 0.6 | 79.3 ± 0.5 | 0.557 |
| Model 2 | 79.2 ± 0.5 | 79.1 ± 0.7 | 79.8 ± 0.6 | 79.4 ± 0.8 | 0.553 | 79.0 ± 0.7 | 78.6 ± 0.8 | 79.9 ± 0.6 | 79.3 ± 0.5 | 0.812 |
| Model 3 | 79.2 ± 0.5 | 79.1 ± 0.7 | 79.8 ± 0.6 | 79.4 ± 0.8 | 0.584 | 78.9 ± 0.7 | 78.6 ± 0.8 | 79.9 ± 0.6 | 79.3 ± 0.5 | 0.716 |
| **HDL-C, *mmol/L*** | | | | | | | | | | |
| Model 1 | 1.07 ± 0.01 | 1.08 ± 0.01 | 1.10 ± 0.01 | 1.10 ± 0.02 | 0.035 | 1.08 ± 0.02 | 1.08 ± 0.02 | 1.09 ± 0.01 | 1.08 ± 0.01 | 0.999 |
| Model 2 | 1.07 ± 0.01 | 1.08 ± 0.01 | 1.10 ± 0.01 | 1.10 ± 0.02 | 0.024 | 1.08 ± 0.02 | 1.08 ± 0.02 | 1.09 ± 0.01 | 1.08 ± 0.01 | 0.987 |
| Model 3 | 1.07 ± 0.01 | 1.08 ± 0.01 | 1.10 ± 0.01 | 1.10 ± 0.02 | 0.033 | 1.08 ± 0.02 | 1.08 ± 0.02 | 1.09 ± 0.01 | 1.08 ± 0.01 | 0.812 |
| **Plasma triglycerides, *mmol/L*** | | | | | | | | | | |
| Model 1 | 2.10 (2.01, 2.21) | 2.08 (1.95, 2.20) | 2.18 (2.09, 2.39) | 2.15 (2.01, 2.29) | 0.266 | 2.08 (1.95, 2.21) | 2.08 (1.93, 2.22) | 2.11 (2.01, 2.22) | 2.16 (2.07, 2.25) | 0.181 |
| Model 2 | 2.10 (2.01, 2.19) | 2.08 (1.95, 2.20) | 2.19 (2.08, 2.36) | 2.15 (2.01, 2.29) | 0.261 | 2.08 (1.94, 2.21) | 2.08(1.94, 2.24) | 2.11 (2.01, 2.22 | 2.15 (2.06, 2.25) | 0.247 |
| Model 3 | 2.09 (2.00, 2.19) | 2.07 (1.94, 2.19) | 2.20 (2.09, 2.33) | 2.15(2.00, 2.29) | 0.229 | 2.04 (1.91, 2.18) | 2.06 (1.92, 2.20) | 2.11 (2.00, 2.22) | 2.17 (2.08, 2.26) | 0.052 |
| **Fasting plasma glucose, *mmol/L*** | | | | | | | | | | |
| Model 1 | 4.05 (3.97, 4.14) | 4.02 (3.91, 4.13) | 4.04 (3.94, 4.14) | 3.94 (3.81, 4.06) | 0.128 | 4.09 (3.97, 4.22) | 4.07 (3.94, 4.21) | 4.02 (3.93, 4.13) | 3.99 (3.91, 4.07) | 0.086 |
| Model 2 | 4.06 (3.98, 4.15) | 4.02 (3.91, 4.15) | 4.05 (3.94, 4.15) | 3.95 (3.82, 4.07) | 0.121 | 4.07 (4.00, 4.26) | 4.06 (3.98, 4.25) | 4.04 (3.94, 4.14) | 3.99 (3.90, 4.07) | 0.016 |
| Model 3 | 4.06 (3.98, 4.15) | 4.02 (3.90, 4.13) | 4.05 (3.94, 4.15) | 3.95 (3.83, 4.08) | 0.152 | 4.11 (3.98, 4.24) | 4.10 (3.97, 4.24) | 4.04 (3.94, 4.14) | 3.99 (3.91, 4.08) | 0.052 |

[1]Shown as adjusted mean ± SEM, or adjusted geometric mean (95%CI) for back-transformed values of triglycerides and glucose. Model 1: Adjusted for age, sex, area of residence, income, alcohol intake, smoking, physical activity. Model 2: Model 1 + dietary fiber (quintiles), PUFA:SFA ratio (quintiles), sugar added to food or beverages (quintiles), caffeine (quintiles), low fat milk (servings per day) and fruit consumption (servings/day). Model 3: Model 2 + other beverages depending on the model (fresco, homemade fruit juice, instant drinks, regular soda, water). BP: blood pressure. *n*=1,872

[2]Homemade fruit juice: 100% juice from freshly squeezed orange or other fruit, not mixed with other ingredients. Does not include commercial juices.

[3]Fresco: a traditional juice from freshly squeezed fruit diluted in water and mixed with sugar. [4]Never or less than one serving (s)/month.

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Supplemental Table 5: Multivariate adjusted means for metabolic factors by servings of sugar-sweetened beverages in Costa Ricans[1]

| | Instant drinks[2] | | | | | Regular soda[3] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Never[4] | ≤1 /week | 2-6/week | ≥1/day | P-trend | Never | ≤1 /week | 2-6/week | ≥1/day | P-trend |
| **Waist circumference,** *cm* | | | | | | | | | | |
| Model 1 | 86.8 ± 0.4 | 88.5 ± 0.7 | 87.4 ± 0.6 | 88.9 ± 0.7* | 0.004 | 87.1 ± 0.4 | 87.0 ± 0.6 | 88.3 ± 0.7 | 91.5 ± 1.1* | <0.0001 |
| Model 2 | 86.9 ± 0.4 | 88.9 ± 0.7* | 87.6 ± 0.6 | 89.0 ± 0.7* | 0.005 | 87.3 ± 0.4 | 87.3 ± 0.6 | 88.4 ± 0.7 | 90.8 ± 1.1* | 0.001 |
| Model 3 | 86.8 ± 0.4 | 88.9 ± 0.7* | 87.7 ± 0.6 | 89.3 ± 0.7* | 0.001 | 87.2 ± 0.4 | 87.4 ± 0.6 | 88.5 ± 0.7 | 90.9 ± 1.1* | 0.0004 |
| **Systolic BP,** *mmHg* | | | | | | | | | | |
| Model 1 | 132 ± 0.9 | 133 ± 1.5 | 133 ± 1.2 | 132 ± 1.4 | 0.752 | 132 ± 0.8 | 132 ± 1.2 | 134 ± 1.4 | 134 ± 2.3 | 0.148 |
| Model 2 | 133 ± 0.9 | 133 ± 1.5 | 133 ± 1.3 | 132 ± 1.4 | 0.724 | 132 ± 0.9 | 132 ± 1.2 | 134 ± 1.4 | 134 ± 2.3 | 0.225 |
| Model 3 | 133 ± 0.9 | 133 ± 1.5 | 133 ± 1.3 | 132 ± 1.4 | 0.636 | 132 ± 0.9 | 132 ± 1.2 | 134 ± 1.4 | 134 ± 2.3 | 0.207 |
| **Diastolic BP,** *mmHg* | | | | | | | | | | |
| Model 1 | 79.1 ± 0.5 | 80.2 ± 0.8 | 79.2 ± 0.7 | 79.3 ± 0.7 | 0.970 | 78.9 ± 0.4 | 80.2 ± 0.6 | 79.4 ± 0.7 | 80.9 ± 1.2 | 0.119 |
| Model 2 | 79.1 ± 0.5 | 80.3 ± 0.8 | 79.3 ± 0.7 | 79.3 ± 0.7 | 0.966 | 78.9 ± 0.5 | 80.2 ± 0.6 | 79.4 ± 0.8 | 80.8 ± 1.2 | 0.189 |
| Model 3 | 79.1 ± 0.5 | 80.3 ± 0.8 | 79.3 ± 0.7 | 79.4 ± 0.7 | 0.852 | 78.9 ± 0.5 | 80.2 ± 0.6 | 79.5 ± 0.8 | 80.7 ± 1.2 | 0.156 |
| **HDL-C,** *mmol/L* | | | | | | | | | | |
| Model 1 | 1.09 ± 0.01 | 1.08 ± 0.02 | 1.09 ± 0.01 | 1.07 ± 0.02 | 0.347 | 1.08 ± 0.01 | 1.10 ± 0.01 | 1.08 ± 0.02 | 1.07 ± 0.03 | 0.300 |
| Model 2 | 1.09 ± 0.01 | 1.08 ± 0.02 | 1.09 ± 0.01 | 1.07 ± 0.02 | 0.335 | 1.08 ± 0.01 | 1.10 ± 0.01 | 1.07 ± 0.02 | 1.06 ± 0.03 | 0.320 |
| Model 3 | 1.09 ± 0.01 | 1.09 ± 0.02 | 1.09 ± 0.01 | 1.07 ± 0.02 | 0.333 | 1.08 ± 0.01 | 1.10 ± 0.01 | 1.08 ± 0.02 | 1.06 ± 0.03 | 0.365 |
| **Plasma triglycerides,** *mmol/L* | | | | | | | | | | |
| Model 1 | 2.06 (1.98, 2.15) | 2.18 (2.01, 2.32) | 2.16 (2.04, 2.29) | 2.28 (2.13, 2.43)* | 0.002 | 2.09 (2.01, 2.17) | 2.20 (2.09, 2.34) | 2.10 (1.97, 2.25) | 2.33 (2.09, 2.59) | 0.143 |
| Model 2 | 2.04 (1.97, 2.13) | 2.16 (2.01, 2.32) | 2.17 (2.04, 2.30) | 2.29 (2.15, 2.45)* | 0.001 | 2.08 (2.00, 2.17) | 2.20 (2.08, 2.29) | 2.11 (1.98, 2.26) | 2.33 (2.09, 2.60) | 0.100 |
| Model 3 | 2.03 (1.95, 2.12) | 2.16 (2.01, 2.32) | 2.19 (2.07, 2.33) | 2.33 (2.18, 2.48)* | 0.0001 | 2.08 (2.00, 2.17) | 2.20 (2.08, 2.33) | 2.11 (1.98, 2.26) | 2.34 (2.10, 2.61) | 0.099 |
| **Fasting plasma glucose,** *mmol/L* | | | | | | | | | | |
| Model 1 | 3.99 (3.91, 4.07) | 4.06 (3.92, 4.20) | 4.03 (3.92, 4.15) | 4.13 (4.01, 4.26) | 0.045 | 4.01 (3.93, 4.09) | 4.07 (3.96, 4.19) | 4.04 (3.91, 4.17) | 4.10 (3.89, 4.31) | 0.431 |
| Model 2 | 3.98 (3.92, 4.08) | 4.07 (3.94, 4.21) | 4.05 (3.94, 4.16) | 4.13 (4.01, 4.26) | 0.059 | 4.02 (3.95, 4.10) | 4.06 (3.97, 4.20) | 4.03 (3.90, 4.16) | 4.06 (3.86, 4.29) | 0.783 |
| Model 3 | 4.00 (3.92, 4.09) | 4.07 (3.94, 4.21) | 4.04 (3.96, 4.15) | 4.12 (3.99, 4.25) | 0.131 | 4.02 (3.83, 4.10) | 4.07 (3.96, 4.19) | 4.03 (3.90, 4.16) | 4.05 (3.85, 4.27) | 0.842 |

[1]Shown as adjusted mean ± SEM, or adjusted geometric mean (95%CI) for back-transformed values of triglycerides and glucose. Model 1: Adjusted for age, sex, area of residence, income, alcohol intake, smoking, physical activity. Model 2: Model 1 + dietary fiber (quintiles), PUFA:SFA ratio (quintiles), sugar added to food or beverages (quintiles), caffeine (quintiles), low fat milk (servings per day) and fruit consumption (servings/day). Model 3: Model 2 + other beverages depending on the model (fresco, homemade fruit juice, instant drinks, regular soda, water). *n*=1,872. *Significantly different from lowest category, *P*<0.05.
[2]Instant drink: instant sugary powder mix prepared with water, or a juice box.
[3]Regular soda: non-diet, carbonated beverages with or without caffeine.
[4]Never or less than one serving (s)/month.

**Online Supporting Material: Substituting homemade fruit juice for sugar-sweetened beverages is associated with lower odds of metabolic syndrome among Hispanic adults**

Supplemental Table 6: Multivariate adjusted means for metabolic factors by servings of combined SSB in Costa Ricans[1]

| | Never[3] | ≤1 /week | 2-6/week | ≥1/day | P-trend |
|---|---|---|---|---|---|
| | | SSB (instant drinks and regular soda)[2] | | | |
| **Waist circumference, *cm*** | | | | | |
| Model 1 | 86.4 ± 0.5 | 87.4 ± 0.6 | 87.7 ± 0.5 | 88.0 ± 0.6* | <0.0001 |
| Model 2 | 86.5 ± 0.5 | 87.8 ± 0.6 | 87.9 ± 0.5* | 88.9 ± 0.6* | 0.0004 |
| Model 3 | 86.3 ± 0.5 | 87.7 ± 0.6 | 88.0 ± 0.5* | 89.2 ± 0.6* | <0.0001 |
| **Systolic BP, *mmHg*** | | | | | |
| Model 1 | 132 ± 1.0 | 133 ± 1.3 | 133 ± 1.1 | 132 ± 1.2 | 0.906 |
| Model 2 | 132 ± 1.0 | 133 ± 1.3 | 133 ± 1.1 | 132 ± 1.3 | 0.783 |
| Model 3 | 132 ± 1.0 | 133 ± 1.3 | 133 ± 1.1 | 132 ± 1.3 | 0.736 |
| **Diastolic BP, *mmHg*** | | | | | |
| Model 1 | 78.4 ± 0.5 | 80.5 ± 0.7* | 79.6 ± 0.6 | 79.4 ± 0.7 | 0.506 |
| Model 2 | 79.5 ± 0.5 | 80.6 ± 0.7* | 79.6 ± 0.6 | 79.4 ± 0.7 | 0.614 |
| Model 3 | 78.5 ± 0.5 | 80.5 ± 0.7* | 79.7 ± 0.6 | 79.4 ± 0.7 | 0.482 |
| **HDL-C, *mmol/L*** | | | | | |
| Model 1 | 1.09 ± 0.01 | 1.10 ± 0.01 | 1.08 ± 0.01 | 1.07 ± 0.01 | 0.266 |
| Model 2 | 1.08 ± 0.01 | 1.10 ± 0.01 | 1.08 ± 0.01 | 1.07 ± 0.01 | 0.248 |
| Model 3 | 1.08 ± 0.01 | 1.11 ± 0.01 | 1.08 ± 0.01 | 1.07 ± 0.01 | 0.265 |
| **Plasma triglycerides, *mmol/L*** | | | | | |
| Model 1 | 5.18 (5.14, 5.23) | 5.25 (5.19, 5.31) | 5.24 (5.19, 5.29) | 5.31 (5.25, 5.37)* | 0.0006 |
| Model 2 | 5.18 (5.13, 5.23) | 5.25 (5.18, 5.31) | 5.24 (5.19, 5.29) | 5.32 (5.26, 5.38)* | 0.0002 |
| Model 3 | 5.18 (5.13, 5.22) | 5.24 (5.18, 5.30) | 5.25 (5.19, 5.30) | 5.33 (5.27, 5.39)* | <0.0001 |
| **Fasting plasma glucose, *mmol/L*** | | | | | |
| Model 1 | 4.28 (4.25, 4.30) | 4.27 (4.24, 4.30) | 4.29 (4.27, 4.31) | 4.31 (4.28, 4.34) | 0.013 |
| Model 2 | 4.28 (4.26, 4.30) | 4.27 (4.24, 4.30) | 4.29 (4.27, 4.32) | 4.31 (4.28, 4.32) | 0.031 |
| Model 3 | 4.28 (4.26, 4.30) | 4.27 (4.24, 4.30) | 4.29 (4.27, 4.31) | 4.30 (4.28, 4.33) | 0.066 |

[1]Shown as adjusted mean ± SEM, or adjusted geometric mean (95%CI) for back-transformed values of triglycerides and glucose. Model 1: Adjusted for age, sex, area of residence, income, alcohol intake, smoking, physical activity. Model 2: Model 1 + dietary fiber (quintiles), PUFA:SFA ratio (quintiles), sugar added to food or beverages (quintiles), caffeine (quintiles), low fat milk (servings per day) and fruit consumption (servings/day). Model 3: Model 2 + fresco, homemade fruit juice, water. BP: blood pressure. SSB: Sugar-sweetened beverages. *n*=1,872. *Significantly different from lowest category, *P*<0.05.

[2]SSB: combined instant drink and regular soda. Instant drink: instant sugary powder mix prepared with water, or a juice box. Regular soda: non-diet, carbonated beverages with or without caffeine.

[3]Never or less than one serving (s)/month.