Research article

Relationship of added sugars intakes with physiologic parameters in adults: an analysis of national health and nutrition examination survey 2001–2012

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Supplementary
Supplemental Table 1. Assessment of interaction of added sugars intake and physical activity$^1$.

| Variable                                | $\beta_1$ | SE  | $P^2$ | $\beta_2$ | SE  | $P^2$ | $\beta_3$ | SE  | $P^2$ | $\beta_1 = \beta_2 = \beta_3$ | SE  | $P^2$ | $\beta_1 = \beta_2$ | SE  | $P^2$ | $\beta_1 = \beta_3$ | SE  | $P^2$ | $\beta_2 = \beta_3$ | SE  | $P^2$ |
|-----------------------------------------|-----------|-----|-------|-----------|-----|-------|-----------|-----|-------|-----------------------------|-----|-------|---------------------|-----|-------|---------------------|-----|-------|---------------------|-----|-------|
| BP diastolic elevated (%)               | 0.299     | 0.103 | 0.0047 | -0.056    | 0.102 | 0.5845 | 0.164      | 0.084 | 0.0547 | 0.0201                     | 0.0054 | 0.2791 | 0.1028                     |
| LDL-cholesterol (mg/dL)                 | 0.268     | 0.101 | 0.0095 | 0.033      | 0.116 | 0.7790 | -0.150   | 0.113 | 0.1871 | 0.0362                     | 0.1422 | 0.0106 | 0.2648                     |
| Alkaline phosphatase (U/L)              | -0.111    | 0.044 | 0.0143 | -0.015     | 0.038 | 0.6876 | 0.031      | 0.042 | 0.4687 | 0.0404                     | 0.1010 | 0.0123 | 0.4053                     |
| LDL elevated (%)                        | 0.197     | 0.122 | 0.1096 | -0.173     | 0.127 | 0.1769 | -0.075    | 0.129 | 0.5610 | 0.0730                     | 0.0276 | 0.1316 | 0.5960                     |
| Alkaline phosphatase elevated (%)       | -0.005    | 0.020 | 0.8030 | -0.015     | 0.013 | 0.2663 | 0.014    | 0.011 | 0.1951 | 0.2184                     | 0.6726 | 0.3746 | 0.0881                     |
| ALT elevated (%)                        | 0.005     | 0.072 | 0.9411 | -0.064     | 0.058 | 0.2744 | 0.000             | 0.042 | 0.9960 | 0.6412                     | 0.4591 | 0.9494 | 0.3745                     |
| ALT: SI (U/L)                           | -0.026    | 0.084 | 0.7592 | -0.079     | 0.048 | 0.1017 | 0.018    | 0.033 | 0.5869 | 0.2786                     | 0.5896 | 0.6202 | 0.1157                     |
| AST elevated (%)                        | -0.043    | 0.059 | 0.4674 | -0.098     | 0.051 | 0.0602 | 0.037    | 0.045 | 0.4145 | 0.1312                     | 0.5256 | 0.2239 | 0.0644                     |
| AST: SI (U/L)                           | -0.006    | 0.046 | 0.9003 | -0.023     | 0.029 | 0.4213 | 0.031    | 0.019 | 0.1031 | 0.2507                     | 0.7669 | 0.4310 | 0.1416                     |
| BP diastolic (mean rdg mm hg)           | 0.022     | 0.027 | 0.4073 | -0.029     | 0.025 | 0.2542 | -0.046   | 0.025 | 0.0626 | 0.1571                     | 0.1308 | 0.0704 | 0.6104                     |
| BP elevated (%)                         | 0.120     | 0.105 | 0.2580 | -0.087     | 0.094 | 0.3605 | 0.113    | 0.085 | 0.1893 | 0.1508                     | 0.1237 | 0.9576 | 0.0891                     |
| BP systolic (mean rdg mm hg)            | -0.017    | 0.050 | 0.7258 | 0.000      | 0.033 | 0.9886 | 0.020    | 0.029 | 0.4901 | 0.8025                     | 0.7586 | 0.5330 | 0.6465                     |
| BP systolic elevated (%)                | 0.128     | 0.105 | 0.2248 | -0.005     | 0.094 | 0.9567 | 0.092    | 0.079 | 0.2430 | 0.5440                     | 0.3283 | 0.7965 | 0.3903                     |
| C-reactive protein (mg/dL)              | 0.000     | 0.002 | 0.8291 | 0.001      | 0.002 | 0.5820 | -0.001   | 0.002 | 0.6574 | 0.6904                     | 0.6210 | 0.8706 | 0.3967                     |
| C-reactive protein elevated (%)         | 0.009     | 0.022 | 0.6816 | 0.005      | 0.028 | 0.8563 | -0.008   | 0.014 | 0.5657 | 0.7856                     | 0.8911 | 0.5133 | 0.6436                     |
| GGT elevated (%)                        | 0.009     | 0.045 | 0.8482 | 0.014      | 0.056 | 0.8028 | 0.012    | 0.037 | 0.7445 | 0.9696                     | 0.9438 | 0.9499 | 0.9800                     |
| GGT: SI (U/L)                           | 0.017     | 0.067 | 0.7971 | 0.059      | 0.085 | 0.4877 | -0.051   | 0.064 | 0.4285 | 0.5390                     | 0.6991 | 0.4425 | 0.2922                     |
| Glucose elevated (%)                    | -0.112    | 0.151 | 0.4600 | -0.270     | 0.134 | 0.0461 | -0.167   | 0.122 | 0.1717 | 0.7262                     | 0.4356 | 0.7658 | 0.5747                     |
| Glucose, plasma (mg/dL)                 | -0.193    | 0.082 | 0.0210 | -0.239     | 0.081 | 0.0039 | -0.064   | 0.051 | 0.2116 | 0.1432                     | 0.7028 | 0.1789 | 0.0828                     |
| HDL reduced (%)                         | -0.151    | 0.094 | 0.1125 | -0.145     | 0.098 | 0.1421 | 0.064    | 0.089 | 0.4740 | 0.1680                     | 0.9655 | 0.0818 | 0.1451                     |
| HDL-cholesterol (mg/dL)                 | 0.031     | 0.033 | 0.3592 | 0.027      | 0.030 | 0.3626 | 0.027    | 0.030 | 0.3662 | 0.9952                     | 0.9357 | 0.9311 | 0.9943                     |
| LDH (U/L)                               | -0.001    | 0.059 | 0.9823 | 0.004      | 0.047 | 0.9348 | 0.048    | 0.040 | 0.2311 | 0.6624                     | 0.9439 | 0.4949 | 0.4241                     |

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| Variable                        | β1^1 | SE  | β1 = 0 | β2   | SE  | β2 = 0 | β3   | SE  | β3 = 0 | P^3 | β1 = β2 = β3 | P | β1 = β2 | P | β1 = β3 | P | β2 = β3 |
|-------------------------------|------|-----|--------|------|-----|--------|------|-----|--------|-----|--------------|--|---------|--|---------|--|---------|
| LDH elevated (%)              | −0.003 | 0.009 | 0.7739 | −0.004 | 0.003 | 0.2019 | 0.002 | 0.003 | 0.4160 | 0.1996 | 0.8523 | 0.6019 | 0.0754 |
| Metabolic syndrome (%)        | −0.084 | 0.102 | 0.4105 | −0.143 | 0.096 | 0.1394 | 0.061 | 0.095 | 0.5194 | 0.3276 | 0.6554 | 0.3188 | 0.1393 |
| Triglycerides (mg/dL)         | −0.461 | 0.372 | 0.2190 | −0.359 | 0.307 | 0.2447 | 0.553 | 0.415 | 0.1861 | 0.1266 | 0.8400 | 0.0655 | 0.0822 |
| Triglycerides elevated (%)    | −0.160 | 0.135 | 0.2394 | −0.090 | 0.153 | 0.5553 | 0.044 | 0.140 | 0.7515 | 0.5688 | 0.7123 | 0.2895 | 0.5360 |
| Uric acid elevated (%)        | −0.009 | 0.084 | 0.9110 | 0.094 | 0.066 | 0.1601 | 0.129 | 0.082 | 0.1172 | 0.5082 | 0.3708 | 0.2631 | 0.7489 |
| Uric acid reduced (%)         | −0.023 | 0.018 | 0.2040 | −0.023 | 0.019 | 0.2295 | −0.024 | 0.015 | 0.1298 | 0.9999 | 0.9938 | 0.9937 | 0.9881 |
| Waist circum elevated (%)     | 0.017 | 0.086 | 0.8434 | −0.121 | 0.087 | 0.1678 | −0.111 | 0.080 | 0.1681 | 0.4769 | 0.2689 | 0.3144 | 0.9370 |
| Waist Circumference (cm)      | −0.007 | 0.012 | 0.5718 | −0.007 | 0.014 | 0.6299 | −0.014 | 0.011 | 0.2258 | 0.8971 | 0.9901 | 0.6796 | 0.7089 |

Note: 1 SAS PROC SURVEYREG was used with strata and primary sampling units to assess interaction of added sugars intake with physical activity level (1 = sedentary, 2 = moderate, 3 = vigorous). β1, β2, β3 represent the beta coefficient for added sugars intake for each respective level of physical activity. Contrast statements are used to test hypotheses involving linear combinations of β1, β2, β3; 2 Beta coefficient for added sugars intake in those sedentary (physical activity level = 1); β2 and β3 are beta coefficient for added sugars intake in those with moderate (physical activity level = 2) and vigorous physical activity (physical activity level = 3), respectively; 3 P-value for testing hypothesis β1 = 0; other p-values provided for testing whether β2 = 0 and whether β3 = 0; 4 β1 = β2 = β3 = 0 tests the hypothesis that there is no linear trend across added sugars intake for any of the physical activity levels; p < 0.10 was used as an indication of a possible interaction of added sugars intake and physical activity; 5 P-value for testing hypothesis that beta coefficients are equal.