

Citation:

Tam CS, Garnett SP, Cowell CT, Campbell K, Cabrera G, Baur LA. Soft drink consumption and excess weight gain in Australian school students: Results from the Nepean study. *Int J Obes* (Lond). 2006 Jul; 30(7): 1,091-1,093.

PubMed ID: [16801946](#)

Study Design:

Prospective Cohort Study

Class:

B - [Click here](#) for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To determine:

- The relation between soft drink/cordial and fruit juice/drink consumption in mid-childhood and body mass index (BMI) status in early adolescence
- Whether sweetened beverage intake displaces milk intake, in a cohort of Australian children.

Inclusion Criteria:

- Subjects included in this study were part of the "Nepean Study," which included children born at Nepean Hospital in Sydney, Australia between August 1989 and April 1990
- The sample in this study completed food records as baseline and participated in the follow-up approximately five years later
- Additional inclusion criteria for the Nepean Study is published elsewhere.

Exclusion Criteria:

- Exclusion criteria for the Nepean Study is published elsewhere
- Exclusion criteria for this study was not described.

Description of Study Protocol:**Design**

Prospective cohort study.

Dietary Intake/Dietary Assessment Methodology

Dietary intake data was collected using three-day food records.

Statistical Analysis

- Data were analyzed and assessed for normality using the Statistical Package for Social Sciences (SPSS)
- Differences between groups were assessed by analysis of variance if data were normally distributed; otherwise, a Kruskal-Wallis test was used.

Data Collection Summary:

Timing of Measurements

- In 1996 to 1997, 436 children were recruited and followed up four years later
- Three-day food records were collected at baseline, and height and weight measurements were taken at baseline and at five-year follow-up.

Dependent Variables

- Weight status: Weight status was determined using measured height and weight. BMI and BMI Z-scores were calculated from age and sex-specific reference values. Weight status was determined using the International Obesity Task Force BMI criteria
- Participants were categorized into groups based on BMI:
 - Acceptable BMI at baseline and follow-up
 - BMI gainers: Acceptable BMI at baseline and overweight/obese at follow-up
 - BMI losers: Overweight/obese at baseline, but acceptable BMI at follow-up
 - Overweight/obese at both baseline and follow-up.

Independent Variables

- Beverage intake and carbohydrate (CHO) intake from sweetened beverages were determined using three-day food record data
- Beverage categories included:
 - Soft drink/cordial (sugar-sweetened)
 - Fruit juice/drink
 - Milk
- Non-nutritively sweetened beverages were not included.

Description of Actual Data Sample:

- *Initial N*: 436
- *Attrition (final N)*: 281 (141 boys and 140 girls)
- *Mean age*:
 - At baseline 7.7±0.6 years
 - At follow-up 13.0±0.2 years
- *Anthropometrics*:
 - 195 children had acceptable BMI
 - 32 were BMI gainers
 - 13 were BMI losers
 - 41 were overweight or obese

• Location: Australia.

Summary of Results:

Body Mass Index and Beverages Consumed

	Acceptable BMI (N=195)	BMI Gainers (N=32)	BMI Losers (N=13)	Overweight/Obese (N=41)	P-value
BMI Z-score at baseline	-0.3±0.8	0.5±0.5	1.5±0.3	1.6±0.4	<0.0001
BMI Z-score at follow-up	-0.2±0.8	1.5±0.3	0.8±0.3	1.7±0.4	<0.0001
Fruit juice/drink consumption (CHO grams per day)	14 (0-48)	8.6 (0 to 59)	13 (0 to 41.4)	14 (0 to 44)	0.734
Soft drink/cordial consumption (CHO grams per day)	20 (0-71)	29 (0 to 92)	6.5 (0 to 170)	30 (0 to 108)	0.005
Milk (ml per day)	242 (0-645)	218 (0 to 657)	193.5 (0 to 645)	243 (3 to 683)	0.995

- Mean CHO intake from soft drink/cordial was 10g higher (P=0.002) per day in children who were overweight or obese at follow-up compared to those who had acceptable BMI and 23g higher than those who were BMI losers (P=0.019)
- There were no associations between BMI status and CHO consumed from fruit juice/drink or milk intake.

Author Conclusion:

Intake of soft drink/cordial in mid-childhood, but not fruit juice/drink, were associated with excess weight gain in early adolescence.

Reviewer Comments:

- Analyses were run using "grams of carbohydrate consumed" from the sweetened beverages, rather than using the actual amount of beverage consumed
- The subgroups analyzed had small sample sizes and the subject population was not well-described
- Inclusion and exclusion criteria were not described and subject withdrawal was not described
- BMI was used as a surrogate measure of adiposity

- *The authors did not describe results related to whether sweetened beverage intake displaces milk intake.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

- | | | |
|----|---|-----|
| 1. | Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies) | Yes |
| 2. | Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about? | Yes |
| 3. | Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice? | Yes |
| 4. | Is the intervention or procedure feasible? (NA for some epidemiological studies) | Yes |

Validity Questions

- | | | |
|------|---|-----|
| 1. | Was the research question clearly stated? | Yes |
| 1.1. | Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified? | Yes |
| 1.2. | Was (were) the outcome(s) [dependent variable(s)] clearly indicated? | Yes |
| 1.3. | Were the target population and setting specified? | Yes |
| 2. | Was the selection of study subjects/patients free from bias? | Yes |
| 2.1. | Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study? | Yes |
| 2.2. | Were criteria applied equally to all study groups? | Yes |
| 2.3. | Were health, demographics, and other characteristics of subjects described? | No |
| 2.4. | Were the subjects/patients a representative sample of the relevant population? | ??? |
| 3. | Were study groups comparable? | ??? |
| 3.1. | Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT) | N/A |
| 3.2. | Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline? | N/A |

3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	???
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	Was method of handling withdrawals described?	No
4.1.	Were follow-up methods described and the same for all groups?	No
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	No
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	No
4.4.	Were reasons for withdrawals similar across groups?	???
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	Was blinding used to prevent introduction of bias?	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were intervening factors described?	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A

6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	No
6.6.	Were extra or unplanned treatments described?	No
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	Were outcomes clearly defined and the measurements valid and reliable?	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	N/A
7.6.	Were other factors accounted for (measured) that could affect outcomes?	No
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	Was the statistical analysis appropriate for the study design and type of outcome indicators?	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	No

8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	No
9.	Are conclusions supported by results with biases and limitations taken into consideration?	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	No
10.	Is bias due to study's funding or sponsorship unlikely?	???
10.1.	Were sources of funding and investigators' affiliations described?	No
10.2.	Was the study free from apparent conflict of interest?	???