

Citation:

Ruxton CH, Gardner EJ, McNulty HM. Is sugar consumption detrimental to health? A review of the evidence 1995-2006. *Crit Rev Food Sci Nutr.* 2010 Jan; 50 (1): 1-19.

PubMed ID: [20047137](#)

Study Design:

Meta-analysis or Systematic Review

Class:

M - [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 if current intakes of added sugars are harmful to health, and to evaluate published literature examining the relationship between sucrose and health from 1995-2006.

Inclusion Criteria:

- English-language
- Human studies of sugar and sugar-containing foods and beverages
- Published from January 1995 to March 2006.

Exclusion Criteria:

- Studies on total sugars
- Studies failing to differentiate added sugars or sugar-containing foods or drinks from other dietary variables
- Studies on dental erosion
- Dental studies involving subjects with medical conditions that could effect carries risk.

Description of Study Protocol:**Recruitment**

Not applicable.

Design

- The Cochrane Library and MEDLINE were searched for epidemiologic studies, clinical trials, meta-analyses, and systematic reviews. The search terms were “sugar (sucrose)” and various outcomes including “obesity” and “body weight.” This process was supplemented

with a hand-search and a check of reference lists from pertinent reviews

- Articles were ranked according to study methodology using a condensed version of guidelines published by the Scottish Intercollegiate Guidelines Network (SIGN). The highest quality studies scored 1 or 2 on the SIGN criteria and were classified as “primary studies.” These studies had the greatest impact on conclusions. "Tertiary" studies had the weakest methodology and were not considered in formulating the conclusions; however, their references were provided in the review. All studies were ranked separately by two reviewers with the higher ranking prevailing in the case of disagreement.

Dietary Intake/Dietary Assessment Methodology

Not summarized overall.

Blinding Used

Not applicable.

Intervention

Varied throughout.

Statistical Analysis

None performed.

Data Collection Summary:

Timing of Measurements

Not applicable.

Dependent Variables

- Body weight/obesity
- Diet quality
- Selected health outcomes (i.e., metabolic syndrome, dental caries, cancer)
- Other outcomes [i.e., attention-deficit hyperactivity disorder (ADHD), mental health, cognitive function].

Independent Variables

"Sugar (sucrose)" was the search term used to search for literature on added sugars. There was not a specific search for high-fructose corn syrup, but papers on SSBs were included.

Control Variables

None described.

Description of Actual Data Sample:

- *Initial N:*
 - Nine studies examining sugar and body weight
 - Eight studies on sugar-sweetened beverages (SSB) and body weight
 - 17 studies on sugar and metabolic syndrome

- 16 studies on sugar and diet quality
- 47 studies on sugar and dental caries
- 18 studies on sugar and cancer
- Few studies met inclusion criteria for mental health outcomes
- *Attrition (final N)*: Not applicable
- *Age*: Varied (children to adults)
- *Ethnicity*: Not specified
- *Other relevant demographics*: Not specified
- *Anthropometrics*: Varied
- *Location*: Authors from United Kingdom; location of studies reviewed varied.

Summary of Results:

- Results from included studies on obesity did not suggest a positive association between body mass index and sugar intake. Some studies, specifically on sweetened beverages, highlighted a potential concern in relation to obesity risk, although these were limited by methodological issues
- Diet adequacy appeared to be achieved across sugar intakes of 6% to 20% energy, depending on subject age
- Studies on metabolic syndrome reported no adverse effects of sugar in the long-term, even at intakes of 40-50% energy
- The evidence for colorectal cancer suggested an association with sugar, but this appeared to have been confounded by energy intake and glycemic load
- There was no credible evidence linking sugar with attention-deficit, dementia or depression
- Regarding dental caries, combinations of sugar amount or frequency, fluoride exposure, and food adhesiveness were more reliable predictors of caries risk than the amount of sugar alone.

Author Conclusion:

The authors concluded that the available evidence does not support a single quantitative sugar guideline covering all health issues.

Reviewer Comments:

Limitations

- *Use of "sugar (sucrose)" as only search term for added sugars*
- *Did not provide information on quantity of articles retrieved in searches and excluded as a result of exclusion criteria.*

Research Design and Implementation Criteria Checklist: Review Articles

Relevance Questions

1. Will the answer if true, have a direct bearing on the health of patients?

Yes

2.	Is the outcome or topic something that patients/clients/population groups would care about?	Yes
3.	Is the problem addressed in the review one that is relevant to nutrition or dietetics practice?	Yes
4.	Will the information, if true, require a change in practice?	N/A

Validity Questions

1.	Was the question for the review clearly focused and appropriate?	Yes
2.	Was the search strategy used to locate relevant studies comprehensive? Were the databases searched and the search terms used described?	No
3.	Were explicit methods used to select studies to include in the review? Were inclusion/exclusion criteria specified and appropriate? Were selection methods unbiased?	Yes
4.	Was there an appraisal of the quality and validity of studies included in the review? Were appraisal methods specified, appropriate, and reproducible?	Yes
5.	Were specific treatments/interventions/exposures described? Were treatments similar enough to be combined?	Yes
6.	Was the outcome of interest clearly indicated? Were other potential harms and benefits considered?	Yes
7.	Were processes for data abstraction, synthesis, and analysis described? Were they applied consistently across studies and groups? Was there appropriate use of qualitative and/or quantitative synthesis? Was variation in findings among studies analyzed? Were heterogeneity issues considered? If data from studies were aggregated for meta-analysis, was the procedure described?	Yes
8.	Are the results clearly presented in narrative and/or quantitative terms? If summary statistics are used, are levels of significance and/or confidence intervals included?	Yes
9.	Are conclusions supported by results with biases and limitations taken into consideration? Are limitations of the review identified and discussed?	Yes
10.	Was bias due to the review's funding or sponsorship unlikely?	???