

Prevalence and Validity of Sugar and High-Intensity Sweeteners Consumption Assessed by a General FFQ, Multiple 24-H Recalls, and Urinary Biomarkers – The SWEET Project

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Objectives: Inconsistencies in prospective studies investigating sugars and sweeteners with health may be partly due to inaccurate self-reported intake estimates. We compared the relative validity of two self-reported dietary methods and urinary biomarkers to estimate the intake of sugars and sweeteners using data of free-living Dutch adults.

Methods: We included 848 participants with one food frequency questionnaire (FFQ) and ≥ 3 24-h recalls from the NQplus study. Intakes of sugars (mono and disaccharides, sucrose, fructose, free sugars, and added sugars), sugary foods, and sweetened beverages (sugar-sweetened beverages (SSB), Low/Non-calorie beverages (LNCB), and fruit juice) were estimated by using the Dutch food composition table. A sub-sample of 288 participants provided 3 repeated urine samples to

measure the urinary sugar and sweetener concentrations. Measurement error models were used to calculate, ICCs, proportional scaling bias (βx), validity coefficients (VC), and attenuation factors (AF).

Results: According to 24 h-recall data, most sugars and sweet foods/beverages had a high day-to-day variation ($ICC \leq 0.56$). Under-reporting ($\beta x < 1$) between the FFQ and the multiple recalls was highest for sugary foods and beverages (0.57 to 0.66), and lowest for sugars (0.68 to 0.81). VCs ranged from 0.49 (sugary foods) to 0.74 (SSB), suggesting a moderate to good agreement between the methods for most sugars and for sweet beverages. AFs ranged from 0.42 (sugary foods) to 0.96 (SSB), indicating that the FFQ tends to underestimate the associations between sugars or sweet foods and disease compared to the recalls. The high AFs for LNCB (0.93) and SSB (0.96) suggested that the under-estimation of the diet-disease association was minimal for these beverages when using the FFQ instead of recalls. Compared to men, women showed more day-to-day variation, more under-reporting, and lower VC and AF, except with LNCB. In general, only slight differences between BMI categories were observed. Results of the biomarkers are expected in April.

Conclusions: Overall, the FFQ showed moderate to good ranking performance compared to multiple 24 h-recalls for sugars and sweet foods.

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