

The 13th European Nutrition Conference, FENS 2019, was held at the Dublin Convention Centre, 15–18 October 2019

Daily consumption of 100% orange juice does not increase body weight in adults: a meta-analysis of randomised controlled trials

Carrie Ruxton¹, Graham Horgan² and Johan De Rycker³

¹Nutrition Communications, Cupar, United Kingdom,

²University of Aberdeen, Aberdeen, United Kingdom and

³Université Libre de Bruxelles, Brussels, Belgium

Abstract

There is convincing evidence that sugar-sweetened beverages increase the risk of body weight (BW) gain and higher body mass index. In contrast, observational studies on regular consumption of 100% fruit juice provide conflicting results, with most indicating a neutral impact on BW and body mass index, while others suggest positive or even inverse associations. The lack of agreement may be due to confounding factors, or studies incorrectly grouping sugar-sweetened juice drinks with 100% fruit juice, which by law does not contain added sugars.

Intervention studies provide an opportunity to investigate the short-to-medium term impact of daily 100% orange juice (OJ) on BW. From 17 available studies (none of which individually reported statistically significant BW gain following OJ consumption), 6 randomised controlled trials in adults (n = 236) were selected for a meta-analysis. Inclusion criteria were an OJ intervention group and a non-OJ control group. Comparison with a control group was essential as some were weight loss studies with additional BW loss components, and for consistency this comparison between groups was used for all studies.

The meta-analysis focussed on the differences in BW change between OJ and control arms of each study. Where the standard deviation (SD) or standard error (SE) of the change was not reported and could not be obtained from the authors, it was imputed by using the mean SD from studies where it was available. The combined effect estimate was obtained from a random effects model using the DerSimonian-Laird estimator. Cochran's Q statistic was used to test for study heterogeneity.

The resulting forest plot revealed no statistically significant change in BW following OJ intakes of 250–500 ml per day for 4 to 12 weeks (which would theoretically provide 102–205 kcal on average). The Q statistic was 10.6 ($I^2 = 53%$, $p = 0.059$) while the combined effect estimate was -0.34 kg (95% CI -1.11, 0.43). Interestingly, a similar finding was noted in a meta-analysis (Onakpoya et al. 2017) investigating BW change and daily grapefruit juice consumption from 3 intervention studies (n = 233); mean difference -0.45 kg [95% CI: -1.06 to 0.16; $I^2 = 53%$].

In conclusion, daily consumption of OJ does not appear to have an adverse impact on BW. This may be due to dietary energy compensation (conscious or unconscious) or a satiety effect linked with the low glycemic index of OJ (GI = 50).

Onakpoya I et al. (2017) Crit Rev Food Sci Nutr 57: 602–612.

Conflict of Interest

Dr Ruxton and Prof de Rycker are consultants to AIJN, the European Fruit Juice Association. The meta-analysis was funded by AIJN but undertaken at arms length at the University of Aberdeen.