Reviewer’s report

Title: A longitudinal study of fruit juice consumption during preschool years and subsequent diet quality and BMI

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Reviewer: Robert Murray

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The paper is well-written and clear, as are the tables and figure legends.

Comments for the authors:

1. The authors should discuss the time frame encompassed by the study (1987-97). Obesity accelerated rapidly in the 1990s, corresponding with rising consumption of added sugars, which peaked for Americans in 1999. Soft drinks, fruit drinks, high-fructose corn syrup, and 100% fruit juice all were at their peak consumption at that time. In the 20 years since then, all of those beverages as well as added and total sugars have steadily decreased. So, the FCS gathered data at a time when a negative contribution from 100% FJ should have been obvious. That time period also predated the introduction of the cell phone and ubiquitous online apps. So, screen time was actually lower and physical activity less compromised. The O'Neil paper cited as ref 12 was an early systematic review of FJ and weight that more closely corresponded to the FCS study period. It also failed to show a connection. All of this would be helpful context.

2. Surprisingly, the authors cited the AAP Committee on Nutrition's 2001 policy on fruit juice (ref 7), but not the more recent updated version from 2017 (Heyman MB, Abrams SA. Section on gastroenterology, hepatology and nutrition, committee on nutrition: fruit juice in infants, children, and adolescents: current recommendations. Pediatrics. 2017;139(6):e20170967. doi:10.1542/peds.2017-0967).

The new policy statement makes several comments about the potential for detrimental effects of FJ intake and makes recommendations to curb consumption of FJ among children in federal safety net programs. The ramifications of such recommendations are sizable. The study under review directly undermines those conclusions. Even the AAP policy’s updated recommendations for smaller serving sizes is contradicted by the current FCS data, which showed that larger serving sizes had a more beneficial effect on whole and total fruit, as well as diet quality. The authors can make a valuable contribution to the discussion of FJ by addressing points of disparity between their findings and the AAP policy statement (and other recent beverage guidelines for children) in their discussion. A recent commentary in the American Journal of Clinical Nutrition presented similar criticisms (Murray RD. 100% Fruit Juice in Child and Adolescent Dietary Patterns, Journal of the American College of Nutrition, DOI: 10.1080/07315724.2019.1615013).
3. In the Background, paragraph #2, the author's cite ref. 8 as a study, rather than a commentary. That paper by Wojcicki and Heyman advocated for eliminating FJ altogether to address rising obesity rates. Again, the FCS data suggests that this type of recommendation risks doing harm to diet quality without offering any beneficial effect on BMI. (Note: the second author of the paper, Heyman, was the principal author for the AAP 2017 policy statement, as well).

4. Methods: offer more information about the FCS study itself, reference publications that explain its design, demographics of the population, publications derived from the database, etc. In the Discussion, in the paragraphs on the strengths and potential weaknesses of the study, add a comment about the FCS cohort's ability to be representative of children in the U.S. relative to NHANES, which is the source for almost all the other observational data on FJ.

5. Describe why the children were categorized in the 4 age-groups chosen.

6. Table 1. The study showed a correlation between higher maternal education and higher consumption of FJ. Parental education closely corresponds to family socio-economic status. The FCS data differ from the published findings of Drewnowski and Rehm, who found an inverse relationship between SES and FJ consumption. It would be worth commenting on the difference in the discussion. See:

Drewnowski A, Rehm CD. Socioeconomic gradient in consumption of whole fruit and 100% fruit juice among US children and adults. Nutr J. 2015;14:3-12.


7. It is striking that the dose effect of FJ consumption on whole and total fruit and on HEI scores noted among 3-6 years old preschoolers held steady throughout childhood and into adolescence. The authors mention the importance of early childhood eating habits, but it may be worth amplifying that point. The fact that the outcomes track so closely with the child's 3-6 years old eating experiences is what makes the observational data believable and the conclusions valuable.

8. The HEI scores are described in the methods section and mentioned in the discussion, but the reader unfamiliar with the HEI may benefit from some additional perspective. Perhaps a discussion of how the HEI scores of children and teens have or have not changed over time. The difference in scores between FJ consumers and lower or non-consumers in the study is substantial in the FCS study and its importance should be made clear to the reader.

9. The consumption of individual vitamins and minerals at baseline are listed in Table 1. Is there data from subsequent screenings, as well? If so, which micronutrients were major contributors to the HEI scores at different ages among FJ consumers and non-consumers?
10. Discussion paragraph #3 cites another longitudinal 10-year study exists, which found that FJ was associated with overweight. The citation is from Auerbach et al. Cite the original study instead. It would be worth elaborating and discussing how the FCS study compares and contrasts with this other longitudinal study.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

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I have received honoraria on 2 occasions from the Juice Products Association to be a speaker on the subject of 100% FJ and child nutrition. Following my presentation in one of the sessions at the American Society for Nutrition 2018, the JPA asked if I would write up the talk for Journal of the American College of Nutrition, which I did. JPA did not at any time contribute to, edit, or comment on either the talk or the subsequent paper.

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