

# Improvements in Dietary Quality After Ten Weeks of Consumption of Sugar Sweetened Low Fat Milk

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## Introduction

- Milk is often recommended as part of a healthy diet, especially among children.
- Despite this milk consumption rates are on the decline.
- Flavored and sweetened milk has been suggested as a strategy for encouraging consumption, but concerns arise over the added sugar intake that would arise from such an approach.
- We recently conducted a study that required participants to consume sweetened 1% fat milk at different levels (9% from glucose or fructose or 18% from HFCS or sucrose) of added sugar as part of the usual diet on dietary quality.
- The purpose of this study was to investigate the effect of this regimen on dietary quality.

## Methods

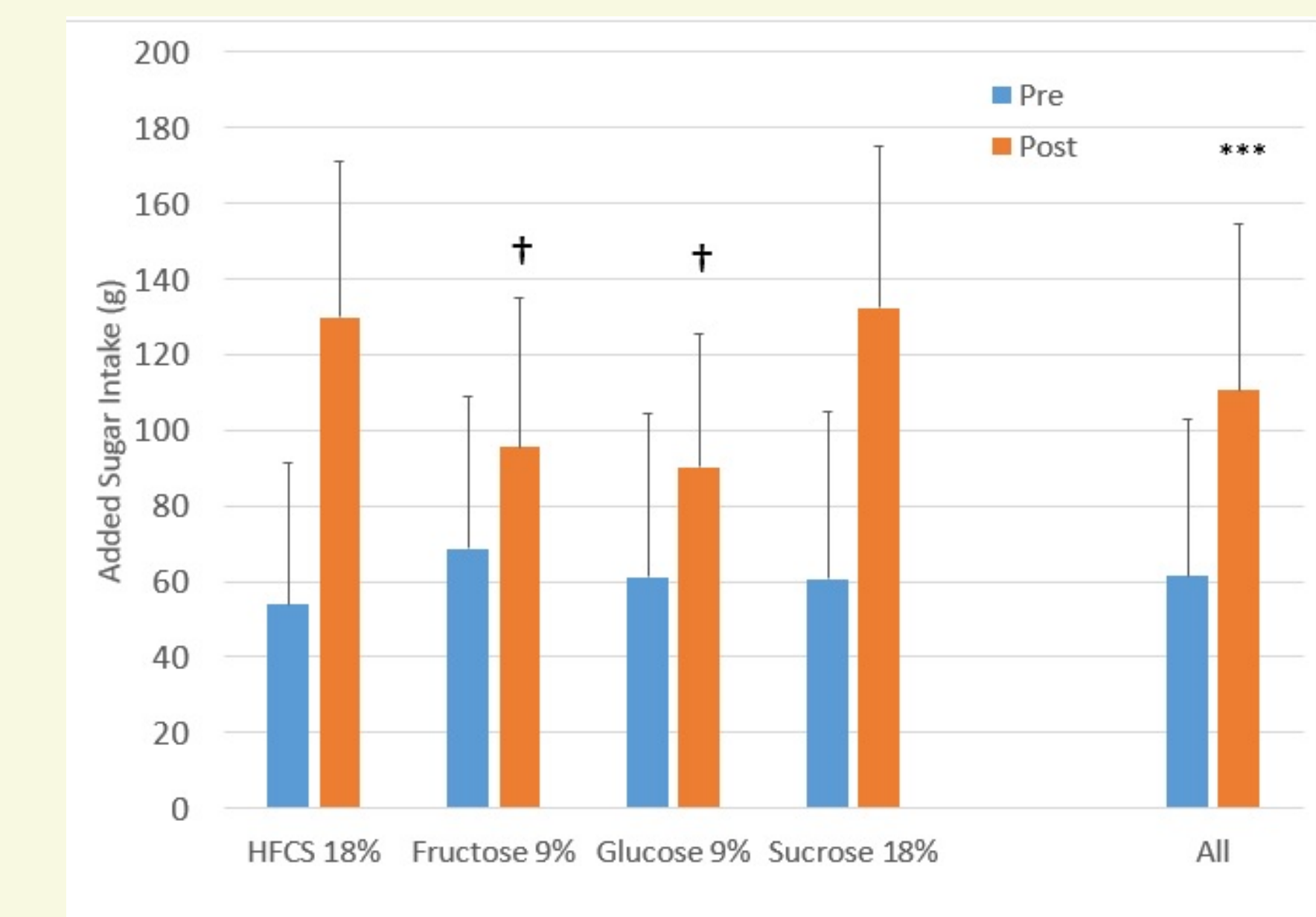
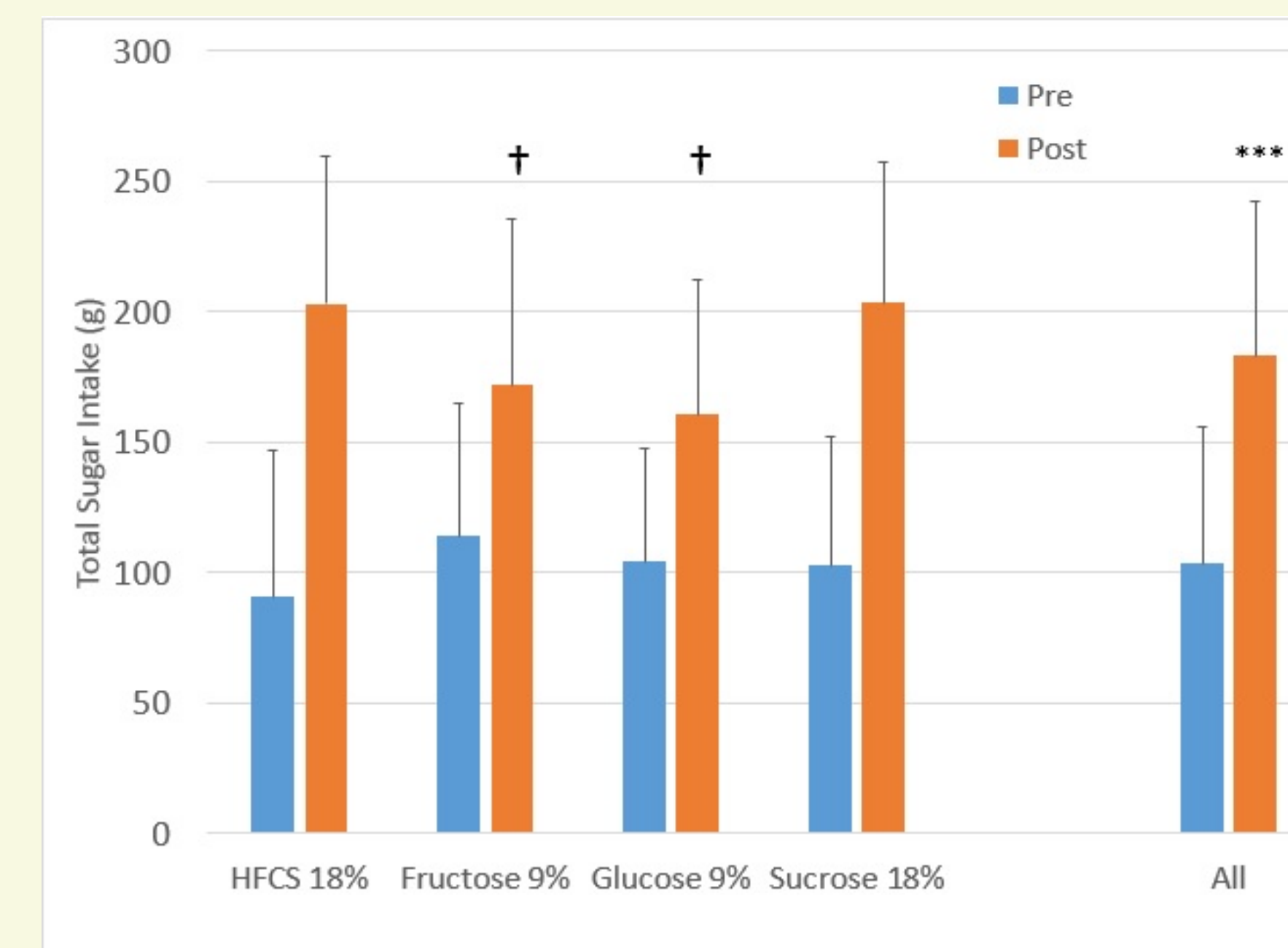
- All participants (n=251) were weight-stable individuals (no change in weight >3% for 3 months) were either normal weight or over weight overweight, normotensive, normoglycemic and with no other overt health problems.
- Individuals were required to consume sugar-sweetened low-fat milk every day for ten weeks as part of their usual diet.
- The added sugar in the milk represented the 50<sup>th</sup> percentile for sugar consumption in the United States:
  - Fructose - added fructose providing 9% of calories required for weight maintenance
  - Glucose - added glucose providing 9% of calories required for weight maintenance
  - HFCS - added HFCS providing 18% of calories required for weight maintenance
  - Sucrose - added sucrose providing 18% of calories required for weight maintenance.
- Energy intake required for weight maintenance was estimated from the Mifflin St Joer prediction including an individualized activity factor based on responses to a physical activity questionnaire.
- Other than milk consumption participants followed no structured dietary program. They were counseled on how to account for the calories in the sweetened milk, but were told to continue to eat to the same level of fullness as prior to enrollment.
- Three-day food diaries and NDSR were used to evaluate dietary intake at baseline and after ten-weeks.
- Subjects and research staff were blinded to which sugar was consumed.

## Results

There was a 1.9lbs increase in body weight among all sweetened milk drinkers (p<0.001), but this increase was consistent among all groups (interaction p>0.05).

		HFCS 18%	Fructose 9%	Glucose 9%	Sucrose 18%	All	Time p	Interaction p
Energy Intake (Kcal)	Pre	1929.4 ± 733.7	2065.8 ± 722.9	1978.6 ± 644.3	2069.51 ± 711.63	2011.8 ± 708.2	<0.001	0.053
	Post	2390.1 ± 700.7	2195.4 ± 581.7	2182.2 ± 636.6	2277.5 ± 668.8	2254.6 ± 647.6		
Fat (g)	Pre	72.0 ± 29.9	76.6 ± 34.4	77.6 ± 35.6	80.2 ± 32.3	76.8 ± 32.3	0.008	0.210
	Post	72.3 ± 29.0	71.3 ± 25.1	73.3 ± 29.1	67.9 ± 28.2	71.2 ± 27.8		
Carbohydrate (g)	Pre	232.9 ± 111.1	261.0 ± 96.0	239.9 ± 87.2	253.7 ± 92.5	247.0 ± 96.1	<0.001	<0.001
	Post	334.8 ± 100.2	293.9 ± 89.8†	286.0 ± 87.6†	328.4 ± 90.8	309.1 ± 93.7		
Protein (g)	Pre	88.9 ± 55.2	88.9 ± 31.2	83.5 ± 31.4	84.5 ± 30.5	86.2 ± 37.6	<0.001	0.310
	Post	105.7 ± 36.2	99.2 ± 28.2	100.5 ± 31.8	92.7 ± 26.3	99.4 ± 30.9		

		HFCS 18%	Fructose 9%	Glucose 9%	Sucrose 18%	All	Time p	Interaction p
Vitamin D (µg)	Pre	5.0 ± 3.9	5.7 ± 3.3	5.1 ± 3.9	5.9 ± 8.4	5.4 ± 5.3	<0.001	0.104
	Post	14.5 ± 6.4	12.9 ± 3.4	13.1 ± 5.0	12.6 ± 3.8	13.2 ± 4.8		
Calcium (mg)	Pre	816.4 ± 467.5	974.7 ± 421.6	800.0 ± 374.1	810.6 ± 366.1	849.3 ± 403.9	<0.001	0.248
	Post	1633.6 ± 430.9	1651.1 ± 377.1	1615.4 ± 420.0	1555.2 ± 399.4	1613.3 ± 406.3		
Potassium (mg)	Pre	2382.7 ± 1092.6	2577.0 ± 952.7	2508.7 ± 986.4	2465.2 ± 827.4	2487.2 ± 963.1	<0.001	0.419
	Post	3258.4 ± 922.0	3193.8 ± 854.5	3188.0 ± 949.5	3099.0 ± 733.3	3182.9 ± 867.2		
Sodium (mg)	Pre	3161.2 ± 971.8	3698.2 ± 1734.9	3254.3 ± 1180.7	3393.8 ± 1170.4	3378.0 ± 1307.2	0.424	0.084
	Post	3318.3 ± 1189.5	3311.6 ± 1014.2	3385.6 ± 1082.4	3212.2 ± 1143.0	3309.7 ± 1101.0		



Significantly different from baseline, p<0.001  
Change from baseline different than in HFCS and Sucrose, p<0.05 †

## Discussion & Conclusion

- These data show that despite increases in sugar consumption improvements in macro and micronutrient profiles can be achieved with the simple incorporation of low-fat, sweetened milk into the usual diet.

