



Pre-sweetening of breakfast cereals: does it influence nutrient intake and anthropometric measures in Australian children?

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BACKGROUND

- Epidemiological studies consistently show that children who eat breakfast cereal are more likely to meet their recommended intakes of B vitamins (niacin, thiamin, folate), calcium, iron and fibre¹⁻⁷ and have a lower BMI⁸.
- Research from the USA has shown that children who ate pre-sweetened cereals consumed more cereal, had higher intakes of fibre, vitamins¹¹ and minerals and were no fatter than those that ate minimally sweetened cereals⁹.
- In the UK, children who had the highest intake of pre-sweetened cereals had similar energy intakes to those consuming the least sweet cereals for breakfast¹⁰.
- Is this association true among Australian kids?

AIM

To investigate, in a recent and representative sample of Australian children, the relationship between sugar content of breakfast cereals and:

- Demographic differences
- Total energy and nutrient intake
- Anthropometric measures

METHODS

- Secondary analysis of the 2007 Australian National Children's Nutrition and Physical Activity Survey (n=4487, 2-16y) using both days of recall.
- Breakfast cereal consumption during the breakfast period (0500h to 0930h) was analysed.
- Children were classified into two groups defined by consumption of sugar-sweetened breakfast cereals. (Figure 1)
- Significant differences were set at P<0.01.

Breakfast Cereals

were defined as ready-to-eat cereals; puffed corn, rice, wheat; muesli, biscuits, flakes, porridge, rolled oats, oat bran, semolina.

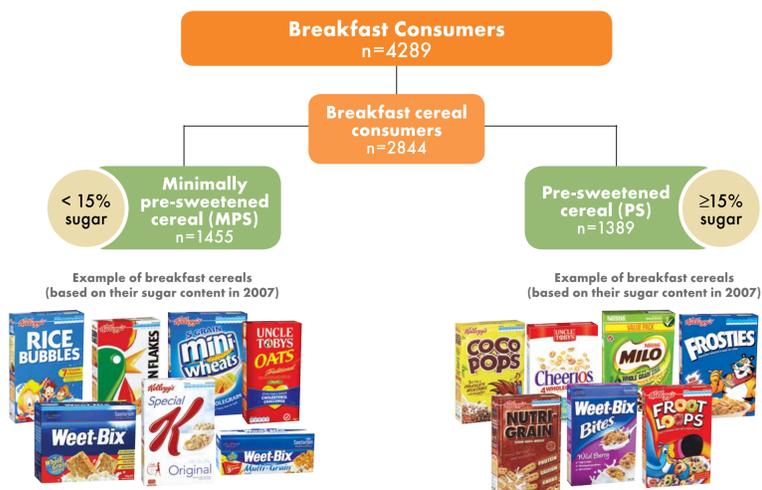
Minimally-presweetened (MPS) cereal consumers=

Kids who exclusively consumed MPS (<15% sugar) breakfast cereal on both days of recall.

Pre-sweetened cereal consumers=

Kids who consumed PS breakfast cereal (≥15% sugar) on any of one of the recall days.

Figure 1: Classification of breakfast cereal consumers

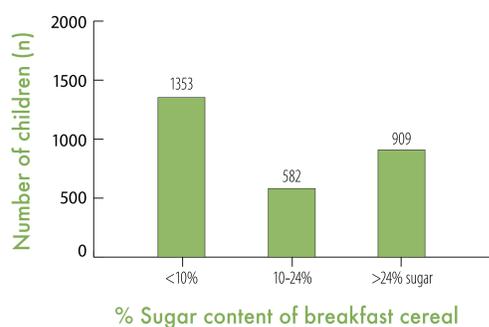


RESULTS

DESCRIPTIVE

- 66% of children were breakfast cereal consumers (n=2844).
- Average sugar content of cereals consumed by MPS consumers was significantly lower than that consumed by PS cereal consumers (24.0±0.02 vs. 3.8±0.1%, P<0.0001).
- PS cereal consumers were significantly older than MPS cereal consumers (8.2±0.1 vs. 7.1±0.1y, respectively).
- The largest proportion of cereal consumers consumed cereal from the lowest tertile of % sugar content of breakfast cereals (<10%, n=1353) (Figure 3).

Figure 3: Number of children in each tertile of % sugar content of breakfast cereal consumed



ENERGY AND NUTRIENT INTAKE

- PS cereal consumers had similar total daily energy, macronutrient (including carbohydrate and sugar) and micronutrient intake as MPS cereal consumers (Table 1).

Table 1: Total daily energy and nutrient intake

Nutrient	MPS Cereal Consumers	PS Cereal Consumers
Energy (MJ)	7.6±0.1	7.5±0.1
Carbohydrate (g)	240±1.1	240±1.1
Sugars (g)	118±1.1	121±1.1
Fibre (g)	20.9±0.2	19.8±0.3
Protein (g)	80.9±0.9	78.5±0.9
Total fat (g)	65.1±0.4	65.6±0.4
Saturated fat (g)	29.7±0.3	30.0±0.3
Sodium (mg)	2285±25	2284±26
Calcium (mg)	904±10	905±10
Iron (mg)	11.6±0.2	11.8±0.2
Folate	507±9.1	499±9.5
Thiamin	2.1±0.2	2.3±0.2
Riboflavin	3.3±0.3	3.1±0.3

P>0.01 for all nutrients between groups
*denotes significance

ANTHROPOMETRIC AND PHYSICAL ACTIVITY MEASURES

- MPS cereal consumers had similar waist circumference, BMI, BMI z-scores, prevalence of overweight and physical activity level as PS cereal consumers (Table 3).

CONCLUSION

- The highest proportion of Australian kids consumed a breakfast cereal with <10% sugar and 51% were consumers of minimally pre-sweetened cereal.
- Children who started their morning with a minimally pre-sweetened breakfast cereal had similar total daily energy and nutrient intake (including total sugar) as well as similar BMI to those who ate a pre-sweetened breakfast cereal.

Figure 2: Percentage of children classified according to sugar content of breakfast cereal consumed

Minimally pre-sweetened cereal consumers :

51.2%



Pre-sweetened cereal consumers :

48.8%



BREAKFAST CEREAL CONSUMPTION

- Pre-sweetened cereal consumers consumed significantly more cereal than minimally pre-sweetened (P<0.001) across all age groups (Table 2).

Table 2: Total grams of breakfast cereal consumed

Age group (years)	Grams of cereal consumed*	
	MPS (<15%)	PS (≥15%)
2-3	25.2±1.5	34.6±1.9
4-8	27.4±1.4	36.5±1.9
9-13	31.8±1.7	43.6±1.6
14-16	29.0±2.3	39.9±2.2

*Adjusted for age, gender, energy, PAL
*denotes significance

GENDER AND AGE DIFFERENCES

- PS cereal consumption significantly declined with age from 23% to 18% among girls only (P<0.0001 for trend).
- MPS cereal consumption significantly declined with age regardless of age and gender (from 32-36% at age 2-3y to 15-19% at age 14-16y for girls and boys respectively).

Table 3: Anthropometric measures

Measures	MPS Cereal Consumers	PS Cereal Consumers
Waist circumference (cm)	60.1±0.3	60.2±0.3
BMI* (kg/m ²)	18.0±0.1	18.0±0.1
BMI z-scores	0.57±0.04	0.62±0.04
% overweight	16.5	15.9
% obese	15.4	15.3
Physical activity level (range) (arbitrary units)	1.66±0.01 (1.14-2.60)	1.65±0.01 (1.17-2.66)

*Adjusted for age, gender, energy intake, physical activity
*denotes significance

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