Breakfast cereal consumption is associated with higher micronutrient and milk intake among Australian children

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BACKGROUND

- Breakfast is one of the most important meals of the day, helping to kick start metabolism and re-fuel the body.
- A large body of epidemiological data shows that children who eat breakfast cereal are more likely to meet their recommended intakes of B vitamins (niacin, thiamin, folate), calcium, iron and fibre1-6 and have a lower BMI[7].
- In 1995, Australian cereal consumers were more likely to meet the RDI for these mirconutrients but uniquely, were no heavier than breakfast skippers[8].
- More recent Australian data on these associations are lacking.

AIM

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

1. total nutrient intakes
2. milk consumption
3. anthropometric measures

STUDY DESIGN

- Secondary analysis of the 2007 Australian National Children's Nutrition and Physical Activity Survey (n=4487, 2-16y)
- "Breakfast cereals" were defined as ready-to-eat cereals; puffed corn, rice, wheat; muesli, biscuits, flakes, porridge, rolled oats, oat bran, semolina

Breakfast cereal non-consumers =
Kids who did not consume breakfast cereal on both days of recall

Breakfast cereal consumers =
Kids that consumed breakfast cereal on any of one of the recall days

References

1. Albertson A et al (2009) The relationship of ready-to-eat cereal consumption to nutrient intake, blood lipids and body mass index of children as they age through adolescence. Journal of the American Dietetic Association 109: 1557-1565.
2. Albertson A et al (2003) Ready-to-eat cereal consumption: its relationship with BMI and nutrient intake of children aged 4 to 12y. Journal of the American Dietetic Association 103: 1613-1619.
3. Gibson S (2003) Micronutrient intakes, micronutrient status and lipid profiles among young people consuming different amounts of breakfast cereals: further analysis of data from the National Diet and Nutrition Survey of Young People aged 4 to 18y. Public Health Nutrition 6: 815-820.
4. Preziosi P et al (1999) Breakfast type, daily nutrient intakes and vitamin and mineral status of French children, adolescents and adults. Journal of the American College of Nutrition 18: 171-178.
5. Ruxton CH et al (1996) The contribution of breakfast to the diets of a sample of 136 primary-schoolchildren in Edinburgh. British Journal of Nutrition 75: 419-431.
6. Van den Boom A et al (2006) The contribution of ready-to-eat cereals to daily nutrient intake and breakfast quality in a Mediterranean setting. Journal of the American College of Nutrition 25: 135-143.
7. De la Hunty A and Ashwell M (2007) Are people who regularly eat breakfast cereals slimmer than those who don't? A systematic review of the evidence. Nutr Bulletin 32: 118-128.
8. Williams P (2007) Breakfast and the diets of Australian children and adolescents: an analysis of data from the 1995 National Nutrition Survey, International Journal of Food Sciences and Nutrition 58:3, 201-216

RESULTS

BREAKFAST CEREAL INTAKES

Breakfast cereal consumption

- 69% of children were breakfast cereal consumers on at least 1 of the 2 survey days
- 91% of these children (n=3135) consumed breakfast cereal between 6am and 9am.
- Significantly more boys than girls were breakfast cereal consumers (72% vs. 67% respectively, P<0.0001)

The nutrient contribution of breakfast cereals to the diet

Breakfast cereals (excluding milk):

- were a significant source of B vitamins, iron and fibre
- contributed minor amounts to sodium, sugar and saturated fat intakes
- contributed an average of 5% (6g/day) to total sugar intake

TOTAL DIETARY INTAKES

Nutrient intakes in breakfast cereal consumers vs. non-consumers

Breakfast cereal consumers had:

- Higher energy, sugar, fibre and micronutrient intakes; and
- Lower sodium intakes; and
- Were more likely to meet the EAR for fibre, iron and calcium than non-cereal consumers

No significant age or gender differences were observed

BMI

Breakfast cereal consumers and weight status

- Breakfast cereal consumers had a lower BMI and BMI z-scores than non-cereal consumers (*P<0.0001)

TOTAL MILK CONSUMPTION (All children)

Milk consumption in children

- Over one third of children's daily milk was consumed with breakfast cereal
- 12% of children consumed cereal with milk and some form of sweetener†

† defined as milk plus sugar, syrups or powdered flavourings (excludes added fruit or yogurt)

Figure 1: Contribution of breakfast cereals to total nutrient intakes in Australian children

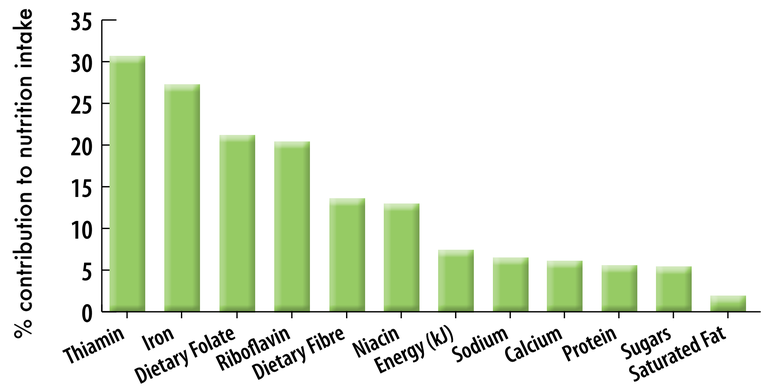


Table 1: Nutrient intakes in breakfast cereal consumers vs. non-consumers

*P<0.05

Nutrient	Non breakfast cereal (NBC) consumers	Breakfast cereal (BC) consumers	Difference (%) (BC vs. NBC)
Macronutrients			
Energy (kJ)	7600	7700*	3
Sugars (g)	110	118*	9
Fibre (g)	18.8	20.3*	3
Micronutrients			
Calcium (mg)	721	890*	25
Iron (mg)	9.6	11.6*	22
Thiamin (mg)	1.8	2.1*	9
Niacin (mg)	40	43*	10
Folate (mg)	370	418*	15
Sodium (mg)	2500	2300*	-5.5

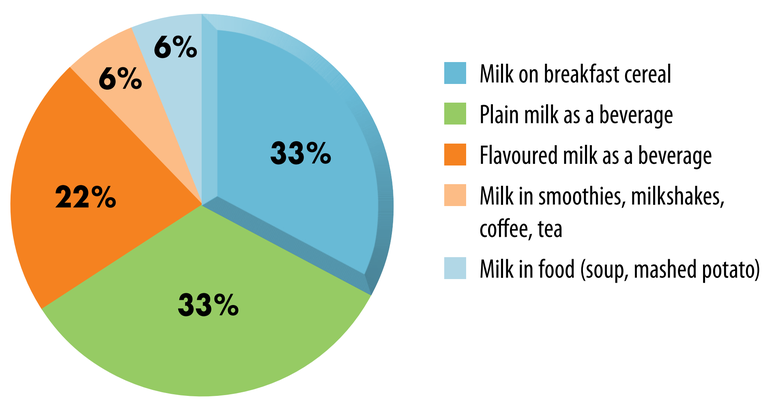
Table 2: % meeting EAR for calcium, fibre & iron in breakfast cereal consumers vs. non-consumers

% meeting EAR (or AI for fibre)	Breakfast cereal (BC) consumers	Non breakfast cereal (NBC) consumer
Calcium	59%	42%
Fibre	49%	40%
Iron	93%	81%

Table 3: Body mass index (BMI) and z-scores for cereal and non-cereal consumers

	Non breakfast cereal (NBC) consumers		Breakfast cereal (BC) consumers	
	Mean	S.D.	Mean	S.D.
BMI	19.2	4.1	18.5*	3.6
BMI z-scores	0.13	1.1	-0.06*	1.0

Figure 2: Fluid milk consumption in Australian children in the National Nutrition Survey (2007)



SUMMARY

- Breakfast cereals make a significant contribution to children's nutrient intakes, contributing >20% of their daily intakes of thiamin, folate, riboflavin and iron and 13% of their daily fibre.
- Children who have breakfast cereal are more likely to meet the daily recommended intakes for fibre, iron and calcium
- >30% of daily milk intake is consumed with breakfast cereals
- Breakfast cereal consumers have a lower BMI than non-cereal consumers
- In line with previous research, the most recent Australian data showed breakfast cereals consumption was associated with higher nutrient intakes and lower BMI in children

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