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Fortified food consumption: impact on micronutrient adequacy and compliance with dietary recommendations in Irish children 1–4 years

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Early childhood is a critical life stage in which optimum nutrient intakes are essential for healthy growth and development. The aim of this study was to evaluate the impact of fortified food (FF) consumption on the prevalence of inadequate micronutrient intake and on compliance with dietary recommendations for macronutrient intake in 500 Irish pre-school children aged 1–4 years. Analysis was based on the National Pre-School Nutrition Survey, which was carried out between 2010 and 2011, to establish a database of habitual food and drink consumption. A 4-day weighed food record was used to collect food intake data. Analysis of dietary intake data was carried out using WISP© (Tinuviel Software, Anglesey, UK) which encompasses McCance and Widdowson's The Composition of Foods[1], Sixth and Fifth editions (including supplemental volumes) and the Irish Food Composition Database[2]. On the basis of median daily energy intake from FFs, children were divided into low (267 kJ/d), medium (611 kJ/d) or high (1181 kJ/d) consumers of FFs, (stratified by age). Under-reporters were identified by an energy intake/basal metabolic rate[3] ratio less than a defined cut-off point[4] and were excluded from the analysis. Adequacy of micronutrient intake across thirds of FF consumption was evaluated against estimated average requirements (EAR)[5,6]. In addition, compliance with European Food Safety Authority and UK Department of Health dietary recommendations for macronutrients[5,7,8] was examined across thirds of FF consumption.

Nutrient	EAR	Low (n = 119)	Medium (n = 122)	High (n = 138)	χ^2
			%<EAR		
Vitamin A	300 µg/d	15	14	11	0.578
Vitamin D	10 µg/d	98	97	86	0.000
	<5 µg/d	95	88	53	0.000
	<1 µg/d	27	21	8	0.000
Iron	5.3 mg (1–3 years) 4.7 mg (4 years)	24	9	2	0.000
Zinc	3.8 mg (1–3 years) 5 mg (4 years)	21	19	14	0.291

Macronutrient	Recommendation	Low (n = 119)	Medium (n = 122)	High (n = 138)	χ^2
			% meeting recommendation		
Total Fat	1–2 y: ⩽40% TE; 3–4 y: ⩽35% TE	68	88	88	0.000
Saturated Fat	⩽11% TE	5	3	13	0.005
Carbohydrate	⩾50% TE	69	85	83	0.003
Dietary Fibre	⩾2 g/MJ/day	69	71	80	0.102

TE = Total Energy.

The findings of our study suggest that higher consumption of FFs was significantly associated with a lower level of inadequacy for vitamin D and iron. These findings also show that higher consumption of FFs was significantly associated with greater compliance with dietary recommendations for total fat, saturated fat and carbohydrate.

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