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Development and validation of an interactive portion size assessment system (IPSAS)

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Traditional dietary assessment methods impose a large participant burden, often resulting in difficulty recruiting representative samples and under-reporting of energy intakes[1]. Methods are required, which can assess the food intake of children of all ages and from all backgrounds. One approach to reducing the burden to the participant is to use portion size assessment tools to obtain an estimate of the amount of food consumed removing the need for the participant to weigh all foods[2].

A computer-based interactive portion size assessment system (IPSAS) was developed for use in assessing children's dietary intakes. The foods selected (*n* 104) and portion sizes depicted (*n* 2050) in the tool were derived from intakes of children aged 1.5 to 16 years that were recorded during the national diet and nutrition surveys carried out in Great Britain[3,4].

Estimates of food portion sizes using IPSAS were validated against 4-d weighed intakes (WI) along with in-school/nursery observations. Interviews were conducted the day after completion of the WI with parents, and for children aged 4 to 16 years, also with the child themselves. Interviews were completed for 84 pre-school children (18 months to 4 years), 90 primary school children (4–11 years) and 88 secondary school children (11 to 16 years).

The ratio of an individual's mean daily energy intake based on the estimated food diary to their mean daily energy intake reported in the concurrent WI diary was calculated. The method of Bland and Altman was used to calculate the limits of agreement of the method[5].

		Ratio			Limits of agreement		% within	
Age Group	Respondent	Estimated : actual	*n*	Mean	Lower	Upper	50%	10%
Preschool	Parent	Wt of food	84	1.02	0.63	1.63	92.9	32.1
		Energy	84	0.97	0.59	1.60	96.4	38.1
Primary	Child	Wt of food	90	1.05	0.63	1.77	92.2	45.6
		Energy	90	1.01	0.59	1.72	93.3	37.8
	Parent	Wt of food	84	1.02	0.66	1.59	92.9	40.5
		Energy	84	0.96	0.67	1.37	97.6	46.4
Secondary	Child	Wt of food	88	1.02	0.66	1.57	96.6	40.9
		Energy	88	0.95	0.63	1.43	98.9	43.2
	Parent	Wt of food	86	1.01	0.66	1.57	96.5	41.9
		Energy	86	0.95	0.60	1.49	97.7	43.0

At the group level, reported intakes based on estimates of portion size using IPSAS were very close to the intakes reported in the WI (within 5% for all groups). The limits of agreement are quite narrow, ranging from an underestimate of 41% of energy intake to an overestimate of 72% and an underestimate of 47% of weight of food consumed to an overestimate of 77%. The vast majority of estimates were within 50% of the value reported using the WI and over a third were within 10%. IPSAS is accurate, practical, easy to use and provides an excellent alternative to the weighed food diary.

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