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Assessing the usefulness of a digital food atlas in estimation of portion size when presented in a smartphone app

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Limitations with traditional dietary assessment methods are well documented. As a result, novel methods of dietary intake assessment and portion size estimation are constantly being developed[(1)]. Food photographs have been shown to help individuals estimate food portion sizes more accurately[(2)]. Therefore the aim of this study is to assess the accuracy of portion size estimation when facilitated by a digital food atlas intended for use in a smartphone app.

Food portion photos were taken according to a standard procedure developed from published literature[(3)] and prepared for presentation on a smartphone. Each food had four portion images accompanied by the portion measure (g) and description. Ten foods from two food groups were selected for testing. Participants were recruited opportunistically at a stand in University College Dublin (UCD) in association with UCD healthy eating week. General demographic information was gathered via an online questionnaire. Participants were presented with a pre-weighed serving of each food and were asked to select the corresponding portion image from a smartphone display. The percentage correctly identifying the portion sizes was assessed across the total population using SPSS© and differences across genders were analysed using a Chi-square test.

Table. Percentage of participant's correctly, under or overestimating, foods based on digital food portions

Foods	Total group (n = 245)			Male (n = 94)			Female (n = 151)		
	Correct	Under	Over	Correct	Under	Over	Correct	Under	Over
Bread rolls	66	33	1	65	34	1	66	32	1
Butter	64	2	34	65	2	34	64	3	34
Cottage Cheese	92	4	4	91	4	2	93	4	5
Mozzarella	82	11	6	78	15	7	85	9	5
Milk	89	2	9	91	1	7	87	3	11
Oat flakes	48	0	51	49	1	50	48	0	52
Pasta	69	23	8	60*	34	6	74	17	9
Potato chips	74	2	24	81*	4	15	70	1	29
Rice	68	29	4	59	36	5	74	24	3
Yogurt	46	1	53	47	1	52	46	1	54

* Significant differences between genders was compared using a chi-squared test; $p < 0{\cdot}05$

In total 245 participants participated in the survey, 151 females and 94 males. The majority (48%) were aged between 18–20 years, 31% were 21–23 years and the remaining 21% >24 years. In the total population, across all foods, 70% of participants selected the correct portion image when guided by a digital food atlas. The food that was guessed correctly by most participants was cottage cheese (92%) and the food that was guessed correctly by the fewest participants was yoghurt (46%). Significantly more males (81%) than females (70%) guessed the correct portion size for potato chips whereas significantly more females (74%) than males (60%) guessed the correct portion size for pasta ($p < 0{\cdot}05$). Where incorrect portion sizes were selected, the tendency was toward overestimation which is in line with other studies[(4)].

In conclusion, this study suggests that the use of a digital food atlas within a smartphone app may help with the estimation of portion size.

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