A Novel Method to Assess Dietary Intake and Obtain Real-Time Dietary Adherence Data: A Pilot Study

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Objectives: We developed the PortionSize™ app (PS) to estimate food intake and dietary adherence based on images of meals captured before and after eating occurs. The PS app provides real-time feedback to users about their dietary intake (energy, nutrients, and food groups) and adherence to specific diets. This pilot study provided initial tests of the validity of the PS app at assessing energy and nutrient intake from simulated meals in a laboratory setting. We also explored participants' satisfaction with the PS app.

Methods: Fifteen adult participants (aged 18–65 years) were trained to use the app. Participants then used the app to estimate food intake during simulated meals, where participants were provided with a plate of food to represent food provision as well as a plate of leftovers. The amount of food provided as food provision and waste was covertly weighed. Participants completed a six-point user satisfaction survey ranked from 1 ('extremely dissatisfied') to six 'very much satisfied'. Dependent t-tests were performed to compare intake of energy, macronutrients, and food groups (fruits, vegetables, grain, dairy, and protein) from the 15 meals, where intake was estimated with the PS app and compared to directly weighed food. Alpha was set at 0.05.

Results: Of the 15 participants, 73.3% (11) were female, and the mean ($\pm$ SD) age and body mass index of the participants was 28.0 ± 12.2 years and 24.1 ± 6.6 kg/m^2, respectively. Energy intake estimated by PS at the meal level (742.9 ± 328.2 kcal) was similar to directly weighed values (659.3 ± 190.7 kcal) and the difference (83.5 ± 287.5 kcal) was not significant ($P > .05$). No significant differences were found between the two methods (PS and weigh back) for macronutrients (protein, total fat, and carbohydrate), and four food group servings (all P *values* $> .05$) except total grains (P *value* $< .05$). About 71% of the participants rated the app as a five or six in terms of satisfaction and ease of using the PS app.

Conclusions: Results from this pilot provide preliminary support for the validity of, and user satisfaction with, the PS app. The pilot study identified ways to improve PS. Larger validation studies and further app refinement are ongoing.