Examining the Accuracy and Use of Portion Size Estimation Aids in Parents of Children With Obesity: A Randomized Controlled Trial

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ABSTRACT

Objective: To determine parents' (1) accuracy in using portion size estimation aids (PSEAs) to estimate portion sizes and (2) use of PSEAs at home.

Methods: Parents (n = 37) of children in a pediatric weight management clinic were recruited, enrolled in a parallel-design, randomized, controlled trial, and assigned to receive a 2-dimensional (2D) or 3D PSEA. Percent absolute estimation accuracy was examined across groups and food types. Survey responses were organized according to frequencies and percentages were calculated.

Results: Main effects of group, food type, and group × food type interaction were significant (all $P < .05$). The 2D PSEAs yielded more accurate estimates of portion sizes for amorphous foods. Overall, parents' estimation accuracy was poor. Participants were satisfied and found the PSEAs to be useful.

Conclusions and Implications: The 2D PSEAs led to greater accuracy in estimating portions of amorphous foods. Parents showed poor accuracy in estimating portion sizes. This study highlights the role of dietitians and nutrition educators in enhancing portion estimation accuracy.

Key Words: child, nutrition assessment, obesity, parents, portion size (*J Nutr Educ Behav.* 2018; 50:918−923.)

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INTRODUCTION

Overweight and obesity are common in Canadian[1] and US children.[2] Family-based weight management programs are increasingly being implemented and can lead to improvements in children's weight status and weight-related health risks.[3] A major focus of these programs is helping families incorporate appropriate portion sizes into their diets.

Portion sizes of nearly all foods and beverages that are readily available (eg, prepackaged meals, fast-food meals) have increased over past years.[4,5] In addition, the public perception of the quantity of food that represents a correct portion has changed.[6,7] Inaccurate beliefs about appropriate portion sizes can have important implications for families that are working on modifying their dietary habits and improving their children's weight and health. For instance, inaccurate portion size estimation can lead parents to serve their children more food, which can increase food intake.[8,9]

In an effort to enhance portion size estimation accuracy, families involved in weight management services are often advised by clinical dietitians to use portion size estimation aids (PSEAs).[6,10] The PSEAs come in many formats, including 2-dimensional (2D) images (eg, photographs of 3D visual aids or portioned food) and 3D objects (eg, household items [9-V battery], sports-related items [tennis ball]).[10,11]

Some evidence suggests that using PSEAs can help to increase portion size estimation accuracy.[12,13] However, evidence is lacking regarding the accuracy of estimating portion sizes using different types of PSEAs (ie, 2D vs 3D). Researchers postulated that differences may exist in estimation accuracy between flat 2D foods and 3D foods[14] but more research is needed, especially in the context of obesity, because the amount of food consumed can affect weight management success.[15] Thus, the primary objective of this parallel, randomized,

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controlled trial was to determine whether food portion size estimation accuracy differed by PSEA type (2D vs 3D) among parents of children enrolled in a pediatric weight management clinic. To gain insights into real-world applications, there is also value in understanding whether and how PSEAs are used beyond clinical settings, so the secondary objective was to investigate families' use of and satisfaction with the 2D and 3D PSEAs in their homes. Results from this study may lead to improvements in these clinical services to best meet the needs of families seeking care.

METHODS

From 2010 to 2013, primary caregivers of children (aged 2–17 years; body mass index, ≥85th percentile[16]) enrolled in a pediatric weight management clinic in Edmonton, Alberta, Canada were recruited (see Figure 1 for the Consolidated Standards of Reporting Trials flow diagram). Parents were ineligible to participate if they had been previously educated about food portion sizes at the clinic. Because families presenting to weight management clinics look for help and support to make dietary changes, learning about their portion size estimation accuracy and using PSEAs at home is important.

Procedure and Data Collection

In this parallel-design, randomized, controlled trial, the researchers used a computer-generated randomization sequence (1:1 ratio) to assign participants to receive either 2D or 3D PSEAs, a process that a research assistant led under the supervision of a senior member of the research team (GDCB). Subsequently, participants in both groups were given standardized instructions by a registered dietitian regarding how to use the PSEAs. The 3D PSEAs included foam rubber replicas of an accurately sized golf ball, hockey puck, tennis ball, and baseball (Figure 2). The 2D PSEAs consisted of photographs of the 3D PSEAs (eg, photograph of a golf ball at a 1:1 scale). To ensure that participants had a satisfactory understanding of the PSEAs, a registered dietitian instructed them to complete a brief practice exercise. Once the exercise was completed, they were presented sequentially with 2 standardized meals composed of foam rubber foods and cups of beverages and instructed to estimate the portion sizes of items representing 4 categories: liquid foods (eg, milk, juice), solid foods (eg, beef, apple, cheese), amorphous pieces of food (eg, baby carrots, almonds), and amorphous masses of food (eg, mashed potatoes, oatmeal) (Table 1). Use of

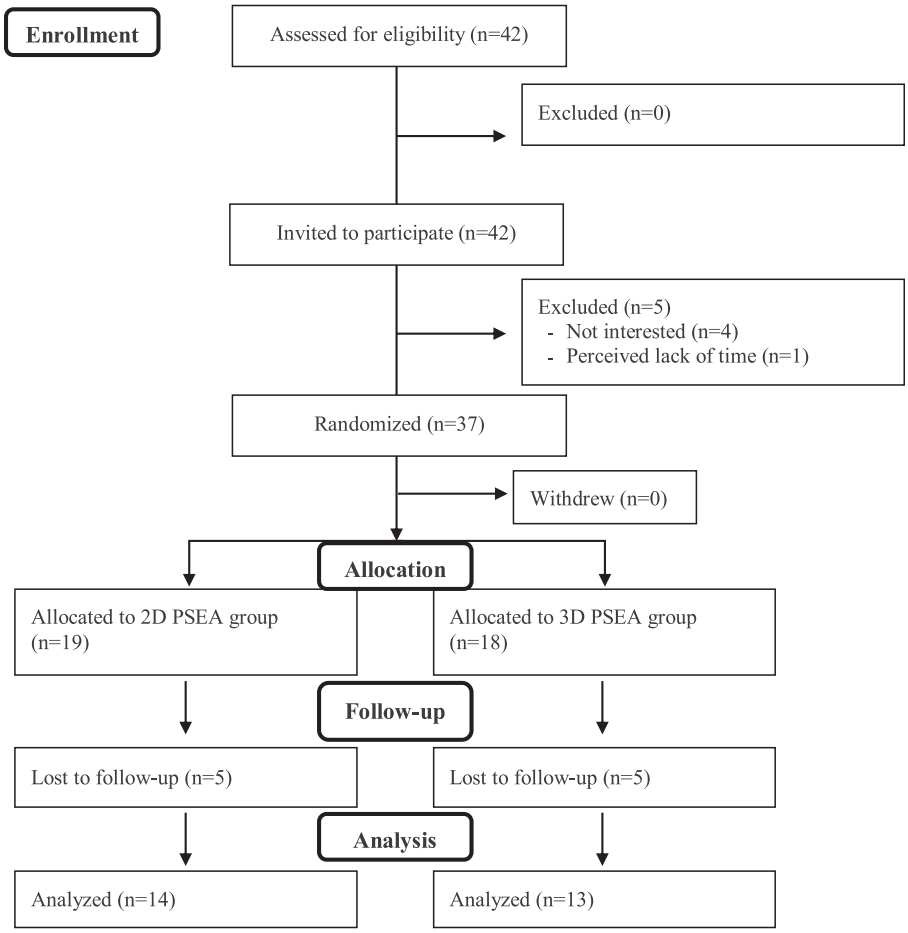

Figure 1. Consolidated Standards of Reporting Trials flow diagram.