

Variation in perceptions of a 'medium' food portion: Implications for dietary guidance

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The prevalence of overweight is increasing among US adults (1,2) and adolescents (3). As many as 44 million persons aged 25 years or older report that they are attempting to lose weight (4), mainly through energy restriction (5,6). This method is rarely effective, however, and maintaining a healthful weight remains a lifelong challenge for many persons (5). Dietary restriction requires people to know the energy content and portion sizes of the foods they are consuming. Research indicates that most people cannot accurately estimate portion sizes of commonly consumed foods (7-12), and therefore, cannot accurately estimate energy intake (13,14). Thus, they might have difficulty controlling energy intake and maintaining a healthful weight.

A related problem is that standard portions, as defined by the federal government for the Food Guide Pyramid (15) and the Dietary Guidelines for Americans (16), are considerably smaller than portions typically consumed by the public (7,17,18). This discrepancy might make it difficult for people to relate the amounts they actually eat to recommended amounts. Many restaurant meals, snacks, and takeout food portions are larger than reference standards, and appear to be increasing in size, and there-

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fore, in energy content (17). Typical bagels, for example, now weigh 4 to 7 oz; guidance materials, however, define a bagel as 2 oz and 2 grain servings (15).

Dietary guidance materials sometimes designate portion sizes by unit (eg, 1 potato, 2 cookies) or by relative size (ie, small, medium, large). These designations assume that people interpret the terms similarly. These materials may also refer to food items by number of servings rather than indicating actual weights. For example, the US Department of Agriculture (USDA) materials designate a small muffin or 2 medium cookies as 1 grain serving, a medium muffin as 1½ grain servings, and a medium apple as 1 fruit serving (15,19,20), even though actual weights can differ widely, and people may interpret these terms differently.

Thus, it would be useful to know how people view standard portions defined in qualitative terms such as "small," "medium," and "large." Of the studies that have systematically explored this question for dietary assessment purposes, I suggested that people generally ignore actual amounts associated with the term "medium" on food frequency questionnaires, but view any portion they eat as medium, regardless of its actual size (21). Another study found that respondents ignore amounts stated as medium portions on food frequency questionnaires because the sizes do not correspond to their idea of medium (22). We are unaware of any more recent studies investigating how persons perceive qualitative terms used in guidance materials as applied to standard portions.

As part of a large study on portion sizes in US diets, we designed a pilot study to obtain quantitative information on the sizes of portions that people might consider medium. We focused on medium because the term is often used as a reference standard on food frequency questionnaires (21-23), and this size can be compared to the terms "small" and "large."

METHODS

We asked students in 2 introductory nutrition classes in a large urban university to participate in a class project on dietary guidance on which they would not be graded. The classes comprised approximately 100 undergraduate and graduate students of which most (>90%) were women aged 18 to 30 years, and the majority (90%) were undergraduates. Only 15% of the students were nutrition majors; the rest were a mix of nursing, psychology, music, education, and communication majors.

Table
Weights of food items perceived as "medium" compared to US Dept of Agriculture (USDA) definitions

Weight (oz)	Bagels (n=31)	Muffins (n=25)	Cookies (n=13)	Baked potatoes (n=24)	Apples (n=25)
Range	2.0-5.3	1.9-8.0	0.3-1.8	4.0-9.0	4.0-9.0
Mean weight ± SD*	3.9 ± 0.9	5.2 ± 1.6	0.9 ± 0.4	6.7 ± 1.6	6.6 ± 1.2
Median weight	4.0	5.5	1.0	6.5	6.9
Mode weight(s)	4.0	6.0	0.5	6.0, 9.0	6.0, 7.0
USDA definitions	2.0	1.5 ^b	0.5 ^b	3.9 ^c	6.0

*SD = standard deviation.

^bOunces are derived from USDA definitions of serving size. 1 grain serving is 1 oz; 1 medium muffin is 1½ grain servings, and 2 medium cookies is 1 grain serving.

^cCalculated from information in the Food Guide Pyramid consumer brochure (15) and USDA Handbook No. 8 (24).

After a series of lectures on nutrition standards that included a discussion of the Food Guide Pyramid (15) and US Dietary Guidelines (16), we divided the students into 3 groups according to the first letter of their last names and asked them to bring in at least 1 sample of a bagel, baked potato, muffin, apple, or cookie that they considered medium. Teaching assistants weighed the foods brought in by their groups of students using a calibrated Pelouze Portion Controller food scale (Model Y32R, Evanston, Ill), and recorded weights to the nearest 0.1 of an ounce. We conducted a more detailed lecture on portion sizes after completion of this project.

RESULTS AND DISCUSSION

The students brought in 31 bagels, 25 muffins, 13 cookies, 24 baked potatoes, and 25 apples that they considered medium. The Table presents the range in weights of these items, along with mean, median, and mode weights compared to USDA definitions. The bagels ranged in weight from 2.0 oz to 5.3 oz (mean \pm standard deviation = 3.9 ± 0.9 oz, median = 4.0 oz, mode = 4.0 oz). Only 3 (9.7%) of the 31 bagels weighed the same as the weight used for bagels in the Food Guide Pyramid (2.0 oz); the remaining 90.3% exceeded this amount. Weights of the mean, median, and mode bagels were almost twice as large as the weight used in the Food Guide Pyramid. Muffins ranged from 1.9 oz to 8.0 oz (mean = 5.2 ± 1.6 oz, median = 5.5 oz, mode = 6.0 oz). All of the muffins exceeded the Food Guide Pyramid's definition of medium (1.5 oz); mean, median, and mode weights exceeded this definition by at least threefold. Cookies ranged from 0.3 oz to 1.8 oz (mean = 0.9 ± 0.4 oz, median = 1.0 oz, mode = 0.5 oz). Weights of the mean and median cookie were almost twice as large as the Food Guide Pyramid medium cookie (0.5 oz).

Baked potatoes ranged from 4.0 oz to 9.0 oz (mean = 6.7 ± 1.6 oz, median = 6.5, mode = 6.0, 9.0). All of the potatoes exceeded the amount used in the Food Guide Pyramid (3.9 oz) and the mean and median sizes for potatoes were at least 2.5 oz larger than the Food Guide Pyramid size. Apples ranged from 4.0 oz to 9.0 oz. The Food Guide Pyramid does not specify a weight for a medium apple, but the range was more than twofold.

Thus, a wide variation existed in students' perceptions of medium food portions; the range was at least twofold for all items. Most items were also much larger than portion sizes recommended by USDA, and where defined, to USDA definitions of medium (15,19,20).

APPLICATIONS

Our results suggest that people have different concepts of medium, and the use of qualitative terms such as small, medium, and large is not sufficiently descriptive; the statement, "a medium serving of fruit" means different things to different people. The wide variation in perceptions of the term "medium" implies that perceptions of energy also will vary widely (24).

Our findings suggest that nutrition professionals counseling patients about the relationship of portion sizes to energy intake should define servings of food items by quantitative (weight) rather than qualitative terms. When conducting diet histories, dietitians should probe to determine actual amounts of food consumed if patients or study subjects report food in qualitative terms.

Finally, our results suggest that federal definitions of standard servings may need to be reevaluated. Standards that more closely reflect typical sizes of foods might better help the public understand the relationship between food intake, energy intake, and health. ■

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