

WORKSHOP PAPER

Workshop 3: Novel approaches for estimating portion sizes

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An essential step in measuring energy and nutrient intake is the quantification of the portion size of each food item recorded.

One of the first comments made in this group discussion was that, in comparison with other areas of science, dietary assessment has not progressed much in the last couple of decades. A 'gold standard' method for estimation of portion size is still elusive.

Previously used and established approaches to ascertain portion sizes include:

- Estimates of 'small/medium/large'
- Weighed diaries
- Food portion-size books
- Food portion photographs
- Food models
- Household measures
- PETRA scales

Each method has its advantages and disadvantages, which were discussed in the workshop and are outlined briefly below.

Small/medium/large

Advantage

- Reduces the amount of variation in the number of possible answers.

Disadvantages

- What one respondent considers to be a 'large' portion, may not be large to another; the respondents' reports are based on what is normal for them.

- May be useful to assess variation in portion sizes and intakes in individuals on different days, for example, assessing variation between intake on weekdays and weekends.
- Unlikely to give an accurate assessment of portion size.

Comment

- The method can be improved by giving examples of what is meant by 'small', 'medium' or 'large' using descriptors.

Weighed diaries

Advantage

- Gives accurate portion sizes by their very nature.

Disadvantages

- The method is extremely time-consuming and relies on the respondents to remember to weigh their food before they start eating and after, if they have leftovers.
- Problems can occur if the respondent takes second helpings and forgets to record them.
- There is a high possibility of reactivity with this method, that is, the respondents change how much (and what) they are eating because they are making a record of it.

Books on food portion size

Advantage

- The current booklet on portion size used in the UK is based on data from the National Diet and Nutrition Survey and is therefore representative of the British population.

Disadvantages

- Owing to the time lag between data collection for the survey and publication of the results, these data may not be contemporary.
- Small, medium and large portions are not stated for every food.

Food portion photographs

Advantage

- Photographs can help the respondents visualize how much they ate by comparing the amount of food eaten with portions presented in a number of photographs.

Disadvantages

- Photographs tend to guide choices regarding portion size and the data are then categorized into only those portions given in the photographs.
- They are more difficult to use for meals when the respondent did not prepare the food, and when the food items are mixed or cover each other, for example, a chicken curry—the curry sauce covers and ‘hides’ the chicken and some of the rice.

Food models

Advantages

- Similar to photographs, they can assist respondents in visualizing their portion sizes.
- It can be easier to estimate the portion sizes of beverages from models compared with food photographs.

Disadvantages

- Food models may also guide choices regarding portion size subject to the models available.
- Similar to photographs, they may be difficult to use for composite meals.

Household measures

Advantage

- Using standard measures such as cups or tablespoons should mean that more reliable portions are given.

Disadvantage

- There is variation in what people consider a household measure and in whether this is level or heaped.

Comment

- Data can be improved by including pictures of household measures and providing instructions on how to record portion sizes using these measures.

PETRA scales

Advantage

- These voice-recording scales had the benefits of weighed diaries (portions were accurate), with the added advantage that respondents were not required to write anything down.

Disadvantages

- The method relied on people remembering to weigh everything and making a full verbal record of what they ate.
- The method was expensive and required technical expertise to convert the data to a useable format.

Future directions for the estimation of portion sizes

The use of till receipts and digital cameras was identified as offering the potential to improve the estimation of portion sizes.

Till receipt information assists with the coding of single consumption products and ready meals. The advent of the Internet means has brought easier access to product information to check products without necessarily having to buy them, although sometimes this is still necessary.

Digital cameras have become much more affordable in the low product range, and they offer the potential to complement dietary records and assist with the portion-size estimation process if a ruler or any other marker that indicates the scale is included in the photograph. Using respondents’ pictures to code diaries also reduces reliance on an accurate description of the food. The group discussed the need for more research, using comparisons with a number of other currently acceptable methods for estimation of portion size. The disadvantages of using digital cameras are that they require a certain level of dexterity and technical knowledge and thus may be unsuitable in some populations, for example, in older people. The method also relies on people remembering to photograph leftovers and second helpings.

Conclusion

Estimation of portion sizes is a challenging area of dietary assessment. Contemporary information on portion sizes commonly eaten in a population is very valuable, especially given the current hypothesis that portion sizes are increasing. The methods to estimate portion sizes have not advanced in recent years. Manufacturers’ information is now more widely available on the Internet, which can help the estimation of portion size; till receipt information may also be useful for a limited number of foods. Advances in technology, such as digital photography and more sophisticated approaches (such as those discussed in a parallel workshop on technology), have the potential to improve the estimation of portion size in dietary assessment. Young people are likely to respond positively to such technologies.

Disclosure

The authors have declared no financial interests.