Reducing food portion sizes in the home to tackle obesity- is it that simple?

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Food portion sizes (FPS) influence energy intake in both an acute and chronic setting and are recognised as a major contributing factor to the 'obesogenic' food environment. The portion sizes of many commercially available foods have increased significantly since the 1970s, a trend which coincides with a rising prevalence of obesity. There has been a call to action for public and commercial sectors to reduce FPS, as a population-based approach to address the growing problem of overweight and obesity (Marteau et al., 2015).

It is currently estimated that on average UK adults are consuming approximately 200-300 kcal above energy requirements daily (PHE, 2018a) and the provision of information on appropriate FPS is undeniably an important public health strategy to help reduce overconsumption of energy. The British Nutrition Foundation (BNF) have recently launched 'Find Your Balance', a comprehensive portion size guide which complements the Government's UK Eatwell Guide (BNF, 2019a; PHE, 2018b), providing guidance on portion sizes for different foods and drinks and the proportions of each food group to aim for each day. This consumer resource estimates FPS using simple household utensils and hand measurements, thereby removing the reliance on food scales, which can be inconvenient. The guide has been developed based on a 2000 kcal per day diet (i.e. estimated energy requirements for an average, healthy weight adult woman). As acknowledged by the BNF, the guide is not a 'one-size-fits-all' approach, and FPS may need to be tailored depending on individual energy requirements. Furthermore, as this guide is designed specifically for adults, it might not help to address issues with deciding on appropriate FPS for children in family meal

planning situations. However, the portion sizes provided could be used as a guide for teenagers, who may have similar energy requirements to adults.

BNF's guide development involved examining the portion sizes of a range of foods reported as being consumed by participants in the UK National Diet and Nutrition Survey (NDNS), portion sizes used in food based dietary guidance in other countries and portion sizes of commercially available foods from major UK retailers, including those suggested on food labels of pre-packaged items and the weights of pre-portioned foods (Benelam and Wiseman, 2019). A series of 7-day test diets were then devised to assess how the obtained portion size data fitted within the context of existing UK dietary recommendations. The BNF chose a pragmatic approach to FPS guidance development that considers foods on an individual basis. Guidance development also incorporated consumer focus group feedback to provide a simple, visually appealing resource. This resource is similar to the portion guidance developed by the British Heart Foundation (BHF) (2014), which provides interactive, visual examples of FPS and how much of each food group to eat daily. It is important to note that BNF have chosen different household portions to those employed by BHF for some food groups (e.g. hands versus tablespoons for rice and pasta), thus these resources could not be used concomitantly by service users and health care professionals. Consistent use of household FPS measures would enhance the implementation of public health messages. However, the measures suggested by the BNF may be more practical for consumers.

A potential limitation of the BNFs approach of reducing FPS is the possibility of compensatory eating behaviour. For instance, the BNF guide suggests that a serving size for plain cooked pasta is 180g (or 2 hands cupped together), whereas NDNS data indicates that the most commonly consumed portion of spaghetti is 230g (BNF, 2019b). Self-reported intended food consumption data suggests that participants would intend to 'compensate' for portions that were considered smaller than the standard non-reduced serving size and may not therefore significantly reduce energy intake (Haynes et al., 2019). However, these findings also suggested that serving reductions, which result in the reduced FPS being perceived as 'normal', might not lead to compensatory food intake. This implies that subtle changes to portion sizes may be more effective than a marked FPS reduction, which may be perceived as too

small by the consumer or trigger the consumer to eat a double portion of a food. Indeed, significant reduction in portion sizes could be achieved through stealth interventions (i.e. systematic reduction in portion sizes), whilst reducing signals that trigger compensatory eating behaviour.

Promising experimental findings by Robinson and Kersbergen (2018) have also suggested that downsizing FPS may help to recalibrate perceptions of a 'normal' amount of food to consume and may decrease how much consumers choose to eat *ad libitum*. Thus, public health strategies such as the BNF portion size guide may help consumers to re-adjust their perceptions of appropriate FPS when preparing and eating food in the home setting. However, addressing the problem of large FPS is complex and requires a multifactorial, holistic approach. Consumer adjustment to normal food portions could be hindered by the availability of larger FPS in the eating out of home sector (including restaurants, cafes, takeaways and delivery services) since visual exposure to larger serving sizes could bias their concept of what is 'normal' (Robinson et al., 2016). Public Health England's 2018 calorie reduction programme challenges the food industry to reduce calories in a wide range of food products commonly consumed by families, with a view to a achieve a 20% reduction in calories by 2024 (PHE, 2018a). It is intended that this programme will positively assist with shifting consumer perceptions of FPS through significant reformulation and/or portion size reduction which will be carried out by retailers, manufacturers and the eating out of home sector.

In summary, BNF's 'Find Your Balance' portion size guide is an easy-to-follow consumer-friendly guide that maps onto the UK Eatwell Guide. Although, in the context of healthy eating, it has been suggested that 'giving people knowledge' and information alone does not influence behaviour (Kelly and Barker, 2016). The addition of food logging pages would have enhanced the guide further providing consumers with a 'tool' for action planning, behaviour change and moderation of FPS (Michie et al., 2011). Future work is needed to see if this educational piece can be used to elicit behaviour change and reduce energy intake at a population level. Additionally, a greater emphasis should be placed on quantifying and investigating FPS in nutrition-related studies.

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