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An observational study of practice among food manufacturers in defining serving sizes of chocolate confectionery products sold in UK supermarkets

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Abstract

Objective
To provide data on the consistency of recommended serving sizes of single bars and bags of chocolate confectionery products sold in UK supermarkets, in terms of weight and energy content.

Methods
Data were obtained from supermarket websites on the weight, calorific content and recommended serving size of all products classified as single bars or bags of chocolate confectionery products in at least two of the three supermarkets with the largest share of the grocery market in the United Kingdom.

Results
The number of servings per product varies from 1 to 3. Recommended serving sizes vary widely in terms of weight and energy content (ranges 18-83.4g and 88-265kcal respectively). Recommended serving sizes vary even between identical products sold in different size packages.

Conclusions
There is potential for consumer confusion over a reasonable serving size of chocolate products, especially in the wider nutritional context of well-described portion sizes for food categories such as fruit. Alternatively, the inconsistency may derive from a reasonable attempt to make front-of-pack labelling easy for consumers to understand by using intuitive fractions of the contents.

An observational study of practice among food manufacturers in defining serving sizes of chocolate confectionery products sold in UK supermarkets.

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Short title: Recommended serving size of chocolate confectionery products in the UK

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Introduction

Front-of-pack nutritional labelling of food has long been focus of public health discussion and research in the UK and elsewhere, especially in the context of recent increases in prevalence of obesity in much of the Western world. Consumer preferences for the exact format of front-of-pack labels have been explored in detail elsewhere in the literature. [1,2,3,4]

The system of labelling currently recommended by the UK Department of Health includes showing figures including energy content on the front-of-pack label based on manufacturer-recommended serving sizes.[5] Manufacturers' current practice with regard to defining serving sizes has not previously been explored in published literature, yet under this guidance, serving size has a considerable impact on the front-of-pack nutritional information presented to consumers.

This small study aims to provide some data in this field. Pragmatically, the study was limited to a single food product category. The category was chosen based on the author's personal interest: reflecting on personal consumption habits, the author noted that chocolate bars of similar dimensions have different serving sizes recommended by the manufacturer, despite the author considering and consuming them as single servings. Hence, this study presents systematically collected data on the serving sizes recommended by manufactures of chocolate products in the UK in terms of serving weight and energy content.

Methods

Three supermarkets dominate the UK grocery market with a combined share of 63.2%: Tesco (30.6%), Asda (16.9%), and Sainsbury's (15.7%).[6] The grocery shopping websites of these three supermarkets were accessed, and a list of all products under the "single bars and bags" category within the "chocolate" subsection of the "confectionery" section of the website was obtained. All three supermarkets used this exact classification as part of their product taxonomy, and it seemed reasonable that without further information, consumers may assume that these products are sold as single servings.

As the sample for this study relied upon supermarkets' own classification of food products, any product thus categorised by only a single supermarket was excluded. Hence, each product included in this study was listed in the "single chocolate bars and bags" category by at least two of the three dominant UK supermarkets.

For included products, the weight and energy content of each product as sold and the number of servings per pack were collected from the front-of-pack labelling displayed in product photographs on the supermarket websites. Products without front-of-pack labelling were excluded.

Ethical approval was not required for this study as it includes only publicly-accessible data.

Results

A total of 133 products were listed in the "single bars and bags" category across the three supermarket websites: 91 at Tesco, 63 at Sainsbury's, and 48 at Asda. Of these, 51 appeared in the "single bars and bags" category of at least two of the supermarkets; the remaining 82 were excluded from further consideration. A further 5 products were excluded due to a lack of front-of-pack labelling. Data concerning each of the 46 products included is shown in Table 1.

Of the 46 products considered, 36 were listed as containing a single manufacturer-recommended serving, 9 as containing two manufacturer-recommended servings, and 1 as containing three manufacturer-recommended servings.

The overall mean product size was 43.8g, and the overall mean serving size was 37.3g. Product sizes varied from 18g to 83.4g, and serving sizes varied from 18g to 54.5g.

Table 1: Data on pack weight, pack energy content, and servings per pack for all included products

Product	Weight (g)	Energy content (kcal)	Servings per pack
Aero Bubbly Peppermint Chocolate Bar	40	221	1
Bounty Milk Chocolate Bar	57	278	2
Cadbury Boost Glucose	48.5	250	1
Cadbury Caramel Bar Single	49	225	1
Cadbury Crunchie Bar	40	187	1
Cadbury Curly Wurly	26	118	1
Cadbury Dairy Milk Buttons Bag	40	210	1
Cadbury Dairy Milk Marvellous Creations Jelly Candy Bar	47	240	1
Cadbury Dairy Milk Oreo	41	225	1
Cadbury Dairy Milk with Lu Bar	35	180	1
Cadbury Dairy Milk with Ritz Bar	35	183	1
Cadbury Double Decker Bar	54.5	250	1
Cadbury Fair Trade Dairy Milk Single	45	260	1
Cadbury Flake Single Bar	34	171	1
Cadbury Freddo	18	95	1
Cadbury Fudge Bar	25.5	114	1
Cadbury Oat Crunch	30	150	1
Cadbury Picnic	48.4	235	1
Cadbury Twirl Bar	43	230	2
Cadbury Wispa Bar	39	215	1
Cadbury Wispa Gold Bar	52	265	1
Caramac Bar	30	174	1
Fry's Turkish Delight Chocolate Bar	51	196	1
Galaxy Milk Chocolate	42	229	1
Galaxy Milk Chocolate Kingsize	75	411	3
Galaxy Minstrels Standard Bag	42	212	1
Galaxy Ripple Bar	33	175	1
Goplana Grzeski Chocolate Wafer	36	190	1
Kinder Bueno Bar	43	244	2
KitKat 4 Finger Milk Chocolate Bar	45	232	1
KitKat Chunky Milk Chocolate Bar	48	207	1
KitKat Chunky Peanut Butter Chocolate Bar	48	226	1
M&M Peanut Peanut Bag	45	230	1
Maltesers Bag	37	187	1
Maltesers Kingsize	58.5	294	2

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recommends a 37g serving on the 37g bag, yet a 29g serving on the 58.5g bag. The manufacturer claims in advertising that a typical Malteser weighs 2.1g, which gives implied serving sizes of approximately 18 and 14 sweets respectively. Similarly, for Galaxy milk chocolate, a serving size of 42g is recommended on the 42g pack, yet a serving size of 25g is recommended on the 75g pack.

Maltesers Teasers Bar	35	187	1
Mars Bar Single	51	230	1
Mars Duo Bars	78.8	354	2
Milky Way Magic Stars	33	184	1
Milky Way Twin Pack	43.8	192	2
Milkybar Medium White Chocolate Bar	25	137	1
Nutella and Go	48	248	1
Smarties Tube	38	176	2
Snickers Duo	83.4	426	2
Snickers Single	48	245	1
Twix Twin	50	248	2

Among single-serving products, the mean product size (and hence the mean servings size) was 40.1g (range 18g to 54.5g). Among the double-serving products, the mean product size was 55.0g (range 38g to 83.4g), and hence the mean serving size was 27.5g (range 19g to 41.7g). For the triple-serving product, the product size was 75g, and the serving size 25g.

The overall mean product energy content was 220kcal, and the overall mean serving energy content was 189kcal. The range for overall product energy content was 95kcal to 426kcal, and the range for overall serving energy content was 88 to 265kcal.

Among single-serving products, the mean energy content per serving was 202kcal, and the mean energy density 5kcal/g. Among double-serving products, the mean energy content per serving was 136kcal, and the mean energy density 5kcal/g. For the triple-serving product, the energy content per serving was 137kcal, and the energy density 5kcal/g.

Some products were identical except for their product size. For example, a bag of Maltesers (37g) contains a different quantity of the same product as a 'Kingsize' bag of Maltesers (58.5g). Curiously, the manufacturer's recommended serving size differed between the different sets of packaging: the manufacturer

This pattern also holds true for products which are similar, but not absolutely identical. Both Mars bars and Snickers bars are sold in both single-serving and double-serving packs, but as the double-serving packs are split into separate bars, there is likely to be a difference in the chocolate to filling ratio between the two packs. However, this is unlikely to reasonably account for a difference in recommended serving size of 11.6g for Mars bars, or 6.3g for Snickers bars.

Discussion

Statement of main findings

Despite similar energy densities across all products included in the sample, the recommended serving size is extremely variable: the largest recommended serving sizes are three times greater than the smallest sizes.

Variation exists between the recommended serving sizes of identical products presented in different packaging sizes. While there is no formal system for assessment of

clinical or nutritional significance in differing chocolate portion sizes, this author's subjective gustatory experience suggests that a difference of 4 Maltesers or 40% of a bar of Galaxy milk chocolate is likely to be noticeable to the consumer.

Strengths and limitations of the study

This study is the first to present systematically collected data on the portion sizes of chocolate confectionery products on sale in the UK. The UK chocolate confectionery market is sizeable, accounting for around £6.2bn of retail sales annually.[9] Sales of snackfoods including chocolate confectionery products are also a contested area of public health concern: much research has examined the location of display of confectionery products in food[10,11] and even non-food stores.[12] This study provides the first systematic data on another aspect of the place of chocolate confectionery in the nutritional landscape.

This study has a number of substantial limitations. A major limitation of this study is that it only considered only the calorific energy content of products. Energy content is only a single aspect of nutritional value; the quantity of other macro and micronutrients must be considered in order to fully assess the nutritional value of a confectionery product; indeed, front-of-pack labelling under UK Government guidelines[5] includes statements of fat, saturated fat, sugar and salt content in addition to energy content. However, consumers may face similar difficulties in interpreting these quantities in the context of highly variable serving sizes. It is also beyond the scope of this study to consider the effect that these differences have on purchasing or consumption behaviour, or any ultimate health outcomes.

Meaning of the study

The degree to which this study is generalizable to other products or other markets is unclear, and the existence or degree of any consumer confusion regarding manufacturer-specified 'serving sizes' is also unexplored.

The UK Government provides little guidance to manufacturers regarding the portion size of confectionery products. UK Department of Health nutritional labelling guidance[5] requires that 'serving sizes' are easily understood by consumers, but gives no further guidance. Under the Government's "Public Health Responsibility Deal",[6] a number of manufacturers have committed to reducing the energy content of confectionery products to less than 250 kilocalories. It is notable that this agreement refers to "products" as opposed to "servings": as discussed above, a number of "products" contain multiple "servings", and if front-of-pack labelling is misinterpreted as referring to the product as a whole, the energy content of the product will be severely underestimated regardless of its overall calorific content.

This large degree of inconsistency in the weight and calorific content of a manufacturer-recommended serving may plausibly have two negative consequences for consumers. Firstly, it may cause confusion: while there are, for example, nutritional guidelines on what is considered a single portion of fruit, these inconsistencies may make it difficult for consumers to conceive of a single portion of chocolate. Secondly, it may mislead: if consumers are not aware that products presented as "single bars or bags" may in fact contain multiple manufacturer-recommended servings, then the front-of-pack labelling may cause them to underestimate the calorific content they consume. Indeed, such confusion may be exploited by manufacturers of particularly calorific products by specifying a small serving size in comparison to competitors' products.

Conversely, this level of variation may be considered reasonable. Insistence on a single weight or calorific content as a standard 'serving' would lead to labelling which may be more confusing than current labelling practice, as it may include non-intuitive fractions of a

product. Specifying the number of calories per 100g has been shown in research to be a method preferred by consumers,[3] but may be confusing given the substantial variation in product weight demonstrated in Table 1.

Previous studies of front-of-pack labelling practice have highlighted consistency across products as a feature which aids consumer understanding,[3,8] though neither of these studies specifically considered serving sizes. Fuenkes et al[2] suggest that "simpler font-of-pack labelling formats seem more appropriate in a shopping environment where quick decisions are made"; inconsistent serving sizes and inconsistent numbers of servings per package increase the level of complexity in the comparison between products.

Conclusion

There is a wide degree of variability in the package size, serving size and energy content of chocolate confectionery products marketed in the UK as "single chocolate bars or bags". Further research is required to determine whether this is likely to contribute to consumer confusion regarding the energy content of such products, to hinder comparison of front-of-pack nutritional labelling, or to have any influence on consumer purchase or consumption behaviour.

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