

Changes in the UK baby food market surveyed in 2013 and 2019: the rise of baby snacks and sweet/savoury foods

Ada Lizbeth Garcia ¹, Louise Curtin,¹ José David Ronquillo,¹ Alison Parrett,¹ Charlotte Margaret Wright ²

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¹Human Nutrition, University of Glasgow College of Medical Veterinary and Life Sciences, Glasgow, UK

²Department of Child Health, University of Glasgow College of Medical Veterinary and Life Sciences, Glasgow, UK

Correspondence to

Dr Ada Lizbeth Garcia, Human Nutrition, University of Glasgow College of Medical Veterinary and Life Sciences, Glasgow G3 2ER, UK; Ada.Garcia@glasgow.ac.uk

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ABSTRACT

Objective To assess how the baby food market in the UK has changed between 2013 and 2019.

Setting United Kingdom.

Design A cross-sectional survey of all infant food products available to buy in the UK online and in-store collected in 2019. Nutritional content and product descriptions were recorded and compared with an existing 2013 database.

Main outcome measures Change in the proportion of products marketed to infants aged 4 months, proportion classified as sweet versus savoury, spoonable versus dry (snacks) average sugar content.

Results Fewer products were described as suitable for infants aged 4 months in 2019 (201, 23%) compared with 2013 (178, 43%; $p < 0.001$), while the proportion for children in the 6–7-month age range increased (2013: 135, 33%; 2019: 369, 43%; $p = 0.001$). The proportion of sweet and savoury products was unchanged; sweet spoonable products showed a small but significant decrease in sugar content (6%) between 2013 and 2019, but savoury spoonable products showed a 16% increase. Sweet snacks remained very sweet (~20 g/100 g median sugar at both time points). In the 2019 dataset, concentrated juice was added to 29% ($n = 253$) of products and 18% ($n = 80$) 'savoury' products comprised more than 50% sweet vegetables or fruit. The number and proportion of snacks increased markedly in 2019 (185, 21%) compared with 2013 (42, 10%; $p = 0.001$) while the proportion of wet spoonable foods decreased (2013: 326, 79%; 2019: 611, 71%; $p = 0.001$).

Conclusions Fewer foods are now marketed to infants aged 4 months, but there has been no overall reduction in the sweetness of products and the increase in snack foods and the sweetness of savoury foods is a concern.

INTRODUCTION

The transition from an exclusively milk-based diet to solid foods should be a gradual process whereby suitable and nutritious family foods are introduced to the infant.¹ If done appropriately, this will enable growth and development while promoting future healthy eating habits. Among guidelines on complementary foods, parents are encouraged to offer home-made baby foods,² but 58% of UK babies received commercial baby foods (CBFs) between the ages of 6 and 12 months.^{2–4} The food environment has a prominent influence on parental choice from early in the infants life. Therefore, monitoring the marketing and the nutritional quality of CBFs

What is already known

- In 2013 many commercial baby foods were marketed to infants from age 4 months, despite recommendations to defer solids feeding until 6 months, and nearly half the products were sweet.
- Most of the available products were wet spoonable foods provided in jars.

What this study adds

- In 2019 the proportion of foods marketed to infants from age 4 months had dropped.
- There was no change in the proportion of sweet foods which had a slightly lower sugar content, but the sugar content of savoury products increased.
- Baby snack products are now much more widespread and a majority of wet foods are now supplied in pouches.

is important for promoting infant health,⁴ while an understanding of the types of products available is important for clinicians who are advising individual families.

In 2013 and 2016 we reported concerns on the nutrition quality and recommendations in food labels of CBFs. Major issues were the recommended age of 4 months displayed on packaging, the large proportion of sweet products and the large proportion of smooth purees.^{5,6} Recently, other important surveys of the CBF market have reported similar concerns.^{4,7} In our previous survey few of the products were baby snacks, but high consumption has been reported.⁸ More recently there has been an increase in CBFs packaged in pouches, which are mostly fruit-based and high in sugar and in dry foods, advertised as baby snacks.^{4,5,7,9} Concerns exist on the implications these products might have for the development of feeding skills.^{10,11}

The dynamics of the CBF market are of interest to health practitioners, consumers, industry and public health bodies. In 2019 Public Health England (PHE)⁴ and the World Health Organization (WHO)⁷ called for an improvement in the quality and marketing of CBFs, and WHO drafted a baby food profiling system to guide legislation



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and implementation of their recommendations at the European level.¹² Given the changing nature of the CBF market, increased scrutiny, expansion and presence of CBFs in the food environment, we hypothesised that the CBF market would have evolved after our initial report in 2013.⁵ Therefore, the aim of this study was to describe characteristics of baby food products available within the UK market in 2019 compared with 2013 to establish whether there had been (1) a reduction in the proportion of products marketed to infants below 6 months of age; (2) a reduction in the proportion of sweet-based products and sugar content; (3) an increase in the proportion of snack products.

METHODS

Data collection

Information was gathered on all infant food products available to buy in the UK online and in-store by two researchers at two time points, January 2019 and September 2019. Online searches of baby foods in large UK supermarkets Morrisons, Sainsbury's, ASDA, Tesco and Waitrose were conducted at the two time points. Other online retailers consulted were Ocado and Amazon. Online searches were made using the key word 'baby food' and by consulting the baby food section in the supermarkets and online retailer websites. Data collection was completed with in-store searches of the baby food aisle of each supermarket to corroborate products and for missing items. In-store visits only were used to collect information on products sold in Aldi and Lidl. For in-store visits, the largest supermarkets in Glasgow were selected.

Products assessed included wet and dry foods. Wet were ready-made wet spoonable foods and dry were dry powders, snacks (eg, biscuits, dry fruit, crisps) and dry finger foods. For simplicity, snacks and dry finger foods will be referred to as 'snacks'. Information collected included: product name and brand, product type, packaging, recommended age, portion size and nutritional information per 100 g (energy (kcal), carbohydrates, protein, fat, sugar, salt (g)). Iron content could not be included in the current analysis due to lack of information on the food labels. Milks, formulas, products not for babies but in the baby food section (eg, toddler meals) and products not in English were excluded. Products only available in Amazon were excluded due to incomplete nutritional information (n=48).

The survey methodology used in 2019 was the same as that used in our 2013 survey⁵ except that, in 2019, all baby food brands available in the UK were included.

Data analysis

Products were classified into sweet and savoury as described previously.⁵ In short, taste classification was based on name and ingredients reported in the food packaging. Savoury foods were meals or snacks containing meat, poultry, fish or vegetables, cheese, pulses or carbohydrate-based foods, or a combination of these. Sweet foods were fruit-based meals, desserts, puddings, rusks, dairy products (eg, custard, yoghurt) or fruit-containing foods such as breakfast cereals and dry snacks. Ingredient lists were consulted to confirm classifications, and products which were difficult to classify were also tasted (n=12). Root vegetables are a popular ingredient in CBFs and are mainly sweet⁶ so, in 2019, savoury products were additionally classified by fruit and root vegetable content whereby, if the product contained more than 50% fruit or root vegetable, they were considered sweet/savoury.

The nutritional content of all wet ('spoonable') and dry finger foods ('snacks') available in 2013 and 2019 were compared.

Table 1 General characteristics of 2019 baby food products

General characteristic		N	%
Brands	Same as in 2013	5	16
	Additional	27	84
	Total	32	
Product type	Wet spoonable	611	68
	Purees	495	81*
	Tray meals	116	19*
	Dry	253	28
	Snacks	185	73†
	Powders/cereals	68	27†
	Other	34	4
	Total	898	
Packaging of wet spoonable products	Pouches	329	54*
	Jars	166	27*
	Trays	116	19*
	Total	611	

*Percentage of total wet spoonable products.

†Percentage of total dry products.

Differences between 2013 and 2019 values were analysed by the Mann-Whitney test. Brands identified in 2019 were divided into two categories: those also present in the 2013 dataset and additional brands only available in the 2019 dataset. A χ^2 test was used to examine if there were differences between 2013 and 2019 in the proportion of products in the same and additional brand categories. Significance was determined at a level of 0.05. All analysis was conducted using SPSS V.26 data software.

RESULTS

General characteristics

Thirty-two brands selling baby foods were identified including 27 brands not included in 2013 (referred to as 'additional brands'). In 2019 a total of 898 CBFs were identified. Of these, 611 (68%) were spoonable products, mostly packed in pouches (54%), while 253 (28%) were dry products. The types of products are shown in table 1. Other products were miscellaneous items such as drinks (1.8%), sauces (0.7%), stock cubes (0.7%) and dry pasta (0.3%). In line with our 2013 survey, pasta sauce, dry pasta, drinks and stock cubes were excluded from all analyses, leaving 865 products in the 2019 dataset. Furthermore, dry powders and breakfast cereals were excluded from nutritional analysis only because the total nutrient content when adding liquid cannot be estimated.

Combining the 2013 and 2019 databases resulted in 1327 products. The general characteristics of the 2013 database have been reported elsewhere.⁵ Five brands in 2013⁵ are still available to purchase in the UK, constituting 55.7% of the total 2019 dataset; these are presented in the results as 'same brands'. Portion sizes for spoonable foods ranged from 120 g to 250 g in 2013 compared with 50 g to 250 g in 2019. Snack serving sizes ranged from 5 g to 50 g in 2013 compared with 3 g to 55 g in 2019.

Age recommendations

The proportion of CBFs marketed to infants aged 4 months in 2019, both in the same brands as surveyed previously and in the new ones, was lower than for products in 2013, but a larger number of CBFs were marketed at 6–7 months in 2019 (table 2).

Table 2 Number and proportion of total products per same brands (2013 and 2019) and additional brands (2019) according to age group

Age group	Same brands (n=5)				Additional brands (n=27)		Combined (n=32)		P value (χ^2 test)
	2013		2019		2019		2019		
	N	% (CI)	N	% (CI)	N	% (CI)	N	% (CI)	
4+ months	178	43.2 (36 to 51)	146	30.3 (23 to 38)	55	14.4 (5.1 to 24)	201	23.2 (17 to 29)	<0.001*
6–7+ months	135	32.8 (25 to 41)	208	43.2 (37 to 50)	161	42 (34 to 50)	369	42.7 (38 to 48)	
10+ months	52	12.6 (3.6 to 22)	50	10.4 (1.9 to 10)	47	12.3 (2.9 to 22)	97	11.2 (4.9 to 18)	<0.001†
12+ months	47	11.4 (2.3 to 21)	78	16.2 (8.0 to 24)	120	31.3 (23 to 40)	198	22.9 (17 to 29)	
Total	412	100	482	100	383	100	865	100	

Proportions indicate the percentage (95% CI) of products within each dataset.

Bold type indicates a significant difference between 2013 and all 2019 products.

*Same brands.

†2013 brands vs 'combined' 2019 brands.

Sweet versus savoury products

There was no change in the proportion of sweet and savoury products over time (table 3). In the 2019 dataset concentrated juice was added to 29% (n=253) of products. In 2019 we identified 72 (16%) savoury products which contained more than 50% sweet root vegetables, as well as eight (2%) which contained more than 50% fruit in addition to vegetables. This resulted in 80 'sweet/savoury' products, representing 18% of all savoury products.

Nutrient content

For all sweet spoonable products there was a small but significant decrease in sugar content (6%) between 2013 and 2019 and a more substantial relative reduction in salt (60%) (table 4), but savoury spoonable products showed a 16% increase in sugar and only a 30% reduction in salt.

The sweet products contained a median (Q1, Q3) of 10.5 g sugar/100 g (8.5, 18) compared with 2.2 g/100 g (1.6, 2.1) in the wholly savoury products, but the sweet/savoury products contained a median 5 g sugar/100 g (3.5, 7.5); (maximum 11.2 g/100 g).

Sweet snacks were very similar in nutrient composition between 2013 and 2019, remaining very sweet (table 5).

We conducted a separate nutrient content analysis for same brands for both wet and dry foods (online supplementary tables 1 and 2) and compared them against the 2013 dataset. Compared with the 2013 database, nutrient content in 2019 has

not changed except for very small reductions (<1 g) in sugar and salt content in wet foods.

Product types

Compared with 2013, the number and proportion of snacks increased markedly, particularly in the additional brands, while the proportion of spoonables decreased (table 3). In 2013 pouch use was not recorded, but in 2019 this is the most common way to sell wet baby food (54%).

Snack products were made up of dry corn snacks flavoured with fruit or vegetables (40.5%, 12.3% fruit flavoured), dried fruit only (14.8%), fruit or vegetable mixed with cereals (22.3%, 88.1% fruit-based), biscuits (18.4%) and rice cakes flavoured with fruit or vegetables (8.1%).

DISCUSSION

Scrutiny of the baby food environment is important to invoke changes in policy. An example has been the progress made on the discrepancy between the WHO recommended age for introduction of solid food¹³ versus the current European food labelling directive, Commission 2006/125/EC.¹⁴ Following an expert report from the European Food Safety Authority, a change in the recommended age from 4 to 6 months is expected. This change is to ensure a unified message to promote breastfeeding recommendations and avoid confusion.¹⁵

Table 3 Number and proportion of total products per same brands (2013 and 2019) and additional brands (2019) according to flavour profile and product type

	Same brands (n=5)				Additional brands (n=27)		Combined total (n=32)		P value (χ^2 test)
	2013		2019		2019		2019		
	N	% (CI)	N	% (CI)	N	% (CI)	N	% (CI)	
Flavour profile									
Sweet	195	47.3 (40 to 54)	245	50.8 (45 to 57)	165	43.1 (36 to 51)	410	47.4 (43 to 52)	NS*
Savoury	217	52.7 (46 to 59)	237	49.2 (43 to 56)	218	56.9 (50 to 64)	455	52.6 (48 to 57)	NS†
Total	412	100	482	100	383	100	865	100	
Product type									
Spoonable	326	79.1 (75 to 84)	350	72.6 (68 to 77)	261	68.1 (62 to 74)	611	70.6 (67 to 74)	0.0012*
Dry snacks	42	10.2 (1.0 to 19)	84	17.4 (9.3 to 26)	101	26.4 (18 to 35)	185	21.4 (16 to 27)	
Other	44	10.7 (1.6 to 20)	48	10.0 (1.5 to 19)	21	5.5 (–4.3 to 15)	69	8.0 (1.6 to 14)	<0.001†
Total products	412	100	482	100	383	100	865	100	

Proportions indicate the percentage (95% CI) of products within each dataset.

Bold type indicates a significant difference between 2013 and all 2019 products.

*Same brands.

†2013 brands vs 'combined' 2019 brands.

Table 4 Nutrient content for all sweet and savoury spoonable products in 2013 and 2019

Spoonable	Sweet			Savoury		
	2013	2019	MedD	2013	2019	MedD
Energy (kcal)	67.0 (56.3, 79)	64.0 (54, 77)	-3, p=0.2	66.0 (61, 70)	67.0 (56, 75)	1, p=0.9
Protein (g)	0.9 (0.5, 1.7)	0.8 (0.4, 1.5)	-0.1, p=0.1	2.9 (2.6, 3.4)	3.0 (2.3, 3.5)	0.1, p=0.7
Carbohydrate (g)	13.9 (12.2, 15.5)	12.6 (11.1, 14.1)	-1.3, p<0.001	8.8 (8, 9.9)	8.5 (7, 9.8)	-0.3, p=0.05
Sugar (g)	10.4 (9, 12.1)	9.8 (8.2, 11.3)	-0.6, p=0.006	2.0 (1.5, 2.7)	2.4 (1.7, 3.3)	0.4, p=0
Fat (g)	0.4 (0.1, 1.4)	0.4 (0.14, 1.4)	0.05, p=0.9	2.0 (1.6, 2.5)	1.9 (1.1, 2.5)	-0.1, p=0.1
Saturated fat (g)	0.1 (0, 1.4)	0.1 (0.01, 0.8)	0, p=0.4	0.5 (0.3, 0.8)	0.5 (0.2, 1)	0, p=0.4
Salt (g)	0.05 (0.03, 0.1)	0.02 (0.009, 0.045)	-0.03, p=0	0.1 (0.05, 0.2)	0.07 (0.04, 0.1)	-0.03, p=0

Values are median (Q1, Q3) and median difference (MedD). P values were calculated using the Mann-Whitney test for mean differences.

In this study we set out to analyse what changes have occurred in the UK CBF market in the past 7 years. The current study shows an increase in CBF products with 84% more brands and double the products compared with 2013.

Both the WHO¹⁶ and a UK expert committee¹ recommend that the initiation of complementary feeding should not begin until 6 months, as did a recent European report,¹⁵ although reluctant to specify an exact minimum age for starting solid foods. In our 2013 survey, a major concern was that 44% of CBFs⁵ were targeted at infants below 6 months. In 2019 the proportion of CBFs targeted at this age had substantially reduced. Similar proportions were also recently observed by PHE (36%).⁴ This is a positive development, but efforts to formally change the labelling regulations are still needed.

Excess sugar intake in infancy may disrupt taste preferences in the future and contribute to higher energy consumption and poor dental health.⁴ Most evidence on the health effects of CBF consumption is observational, but a longitudinal study comparing growth and development of infants aged 6–36 months (n=132) consuming commercial or homemade baby foods found that infants consuming homemade products had reduced adiposity at 12 months which persisted to 3 years.¹⁷ Even though concern has been expressed over the past decade about sugar consumption in general¹⁸ and the sugar content of CBF in particular,^{4,7} we found no difference in the proportion of sweet products between the two time points. A small reduction (<1 g) in sugar content was observed in sweet products between 2013 and 2019, but a similar increase was observed in savoury products. This suggests that companies are not consistently reformulating to reduce sugar content, as has also been found in the USA.¹⁹ Thus, new regulations and enforcement to achieve the suggested thresholds for sugar content in baby foods as proposed by the WHO baby food nutrient profiling system¹² will be needed to see an effective change in the sugar content of CBFs.

The use of sweet vegetables and fruit juice in savoury foods is a concern in the USA and Europe.^{20,21} In 2016 our study on fruit and vegetables in baby foods found that those savoury CBFs with a higher fruit and vegetable content had a significantly higher sugar content.⁶ In this survey in 2019, 18% of 'savoury' products contained more than 50% fruit or sweet vegetables. In addition, 29% of all products had added fruit juice concentrate. This is higher than we reported in 2016 (18%),⁶ although then we only examined products with fruits and vegetables mentioned in the name. In the current study, if we reclassified 'sweet/savoury' foods as 'sweet', the proportion of sweet products in the 2019 database would be 57%.

An important finding in this survey is the growth in availability of commercial baby snacks.¹³ Infants under 12 months do not need snacks,¹ but consumer research has indicated that most parents use ready-made snacks, viewing them as acceptable or desirable.⁴ Recent surveys found that 30% of mothers of infants aged 8–12 months were giving 'treats' that include corn snacks and confectionery,⁸ and 60% of infants aged 7–11 months were reported to have eaten snacks.³ There have been few studies of snack intake in infants, but a US study, using 24-hour recall, found that snacking frequency was positively associated with energy intake and this association became stronger with age.²² It is thus concerning that highly processed snacks are now an emerging feature of the baby food market. The PHE report found that snacks made up 22% of infant products, but 35% of sales spend and 59% of portions purchased.⁴ It is not clear whether this shift is simply meeting—or actually driving—demand.

Snacks are defined by PHE⁴ as 'bite-size, easy-to-eat pieces of food babies can pick up and eat by themselves', and the promotion of baby snacks seems to be linked by manufacturers to the growing popularity of 'baby-led' weaning.²³ From our observations (data not reported here), the CBF manufacturers are tending to market snacks as beneficial to feeding skills and helpful for baby-led

Table 5 Nutrient content for all sweet and savoury dry snacks in 2013 and 2019

Snacks	Sweet			Savoury		
	2013	2019	MedD	2013	2019	MedD
Energy (kcal)	392.5 (361, 418.3)	401 (367, 426)	8.5, p=0.4	434.0 (424, 445.5)	433.5 (422.3, 446.3)	-0.5, p=0.5
Protein (g)	7.0 (5.9, 8.2)	6.9 (5.1, 7.7)	-0.1, p=0.4	8.2 (7.4, 11.2)	8.2 (7.1, 12.4)	0, p=0.7
Carbohydrate (g)	69.5 (66.2, 76.9)	70.5 (62.2, 74.8)	1, p=1	72.7 (69.9, 78.7)	67.1 (61.1, 71.9)	-5.6, p=0.002
Sugar (g)	20.6 (17.9, 28.3)	20.3 (11.9, 29)	-0.3, p=0.4	2.8 (1.2, 6.2)	3.5 (1.9, 5.1)	0.7, p=0.6
Fat (g)	10.8 (7.5, 13.9)	11.0 (1.1, 14)	0.2, p=0.7	11.9 (2.9, 14)	13.6 (11.1, 15.1)	1.7, p=0.04
Saturated fat (g)	4.0 (2.1, 4.5)	1.6 (0.3, 3.7)	-2.4, p=0.002	1.3 (0.9, 4.1)	1.5 (1.1, 2.1)	0.2, p=0.6
Salt (g)	0.2 (0.006, 0.5)	0.05 (0.009, 0.2)	-0.15, p=0.08	0.3 (0.2, 0.6)	0.1 (0.04, 0.3)	-0.2, p=0.1

Values are median (Q1, Q3) and median difference (MedD). P values were calculated using the Mann-Whitney test for mean differences.

complementary feeding. This has also been highlighted in the PHE and WHO Europe¹² reports calling for ethical and responsible marketing. The rise of baby food snacks is a worrying development as it is well established that repeated exposure shapes eating behaviour in early years. Thus, if infants habitually eat ‘crisp’-like foods at an early stage, this behaviour is likely to persist. Snacks in the baby food aisle are visually appealing, and appear to be ‘healthy foods’ as they consist of dried fruit or dry cereals flavoured with fruit or vegetables. Similar confusing ‘healthy halo’ marketing strategies are used in commercial snack foods aimed at toddlers.²⁴ Although clinical evidence is not currently available, the health consequences of snacking for baby feeding skills, liquid/milk intake and continued exposure to sugars in the oral cavity are likely have implications for healthy eating guidelines.²⁵ Further research on the prevalence and extent of these marketing strategies is required, and there may be a need for tighter regulations on packaging to discourage the use of baby snacks.

CONCLUSIONS

The product range of commercial infant foods has expanded dramatically in the last 7 years, both in the number of brands and the types of products. Fewer foods are now marketed to infants aged 4 months, but the increase in snack foods and the sweetness of savoury foods is a concern.

Twitter Ada Lizbeth Garcia @DrAdaGarcia and José David Ronquillo @jdronquillo28

Contributors ALG conceived the study design and supervised data collection and analysis. LC collected data, undertook analyses and produced the first draft of the paper. JDR collected data and undertook initial analysis. AP, CMW and ALG helped plan the study and supervised the analyses and write-up. All authors contributed to successive drafts and have approved the final version.

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ORCID iDs

Ada Lizbeth Garcia <http://orcid.org/0000-0002-3526-2380>
Charlotte Margaret Wright <http://orcid.org/0000-0001-6256-6315>

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