

Assessing the Eligibility for Marketing of Six Different Brands of Cornflakes to Children in Nigeria Using Nutrient Profile Model for the Who African Region

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Abstract

The number of adults with hypertension globally increased from 650 million in 1990 to 1.4 billion in 2024, with the increase seen largely in low- and middle-income countries. In 2019, 19.1 million adults aged 30–79 years were with hypertension in Nigeria. In the same year and country, the mean population salt intake for adults aged 25 + years was 6 g/day, which is greater than the WHO recommended maximum daily intake. Excessive sodium salt and sugar consumption have been associated with hypertension and obesity respectively. Although there are national targets for salt and sugar consumption across food categories, the eligibility of marketing of brands of cornflakes to children has not been assessed. Results from the second Global Nutrition Policy Review (GNPR2, 17) indicated that Nigeria is yet to enforce measures to control the marketing of foods and non-alcoholic beverages to children. The purpose of this study is to assess the eligibility of six different brands of cornflakes for marketing to children in Nigeria by comparing their sodium, total sugar and fat content with the corresponding thresholds in the nutrient profile model for WHO African Region. Data on sodium, total fat, saturated fat and total sugar content were collected from on-pack nutrition labels of six brands of cornflakes available in several open markets and supermarkets in Nigeria, and compared with their corresponding thresholds. The sodium content of Nasco (0.7 g), Pocco (0.5 g) and Klyee (0.5 g) were higher than the sodium threshold (0.35 g), whereas the sugar content of Kellogg's (10 g), Pocco (11.1 g) and Infinity (10.75) brands of cornflakes exceeded the total sugar threshold (9 g) set in the nutrient profile model (on a per 100 g basis). The content of sodium and sugar in the cornflakes appear to be inversely related. Nasco, Pocco and Klyee are excessive in sodium, whereas Kellogg's, Pocco and Infinity are excessive in total sugar. Fun snax is neither excessive in sodium nor in sugar. It demonstrates the feasibility of meeting the marketing criteria. Five (Nasco, Pocco, Klyee, Kellogg's, and Infinity) out of the six brands are not eligible for marketing to children and require reformulation.

Introduction

Hypertension is when the pressure in the blood vessels is too high (140/90 mmHg or higher). The number of adults with hypertension increased globally from 650 million in 1990 to 1.4 billion in 2024, with the increase seen largely in low- and middle-income countries [1]. It is a major cause of premature death globally. One of the global targets for non-communicable diseases is to reduce the prevalence of uncontrolled hypertension by 25% between 2010 and 2025. In 2019, 19.1 million adults aged 30–79 years were with hypertension in Nigeria [2–3]. Excessive sodium salt consumption has been associated with hypertension and decreasing intake may reduce hypertension risk [4]. Recent data on sodium intake show that populations around the world are consuming much more sodium than is physiologically necessary. In many cases, they are consuming much more than the current World Health Organization (WHO) recommendation on sodium consumption for adults, which is 2 g sodium/day (equivalent to 5 g salt/day) [5]. In 2019, the mean population salt intake for adults aged 25 + years in Nigeria was 6 g/day [6]. In 2022, more than 2.5 billion people aged 18 years and older were overweight, and over 890 million adults had obesity. Obesity is (when body mass index, BMI, is $\geq 30\text{kg/m}^2$) a major risk factor for hypertension and Type 2 diabetes which has replaced Type 1 diabetes as the predominant form of this disease among children. Excessive sugar intake has been associated with obesity [7]. Effective ways of reducing dietary sodium and sugar intake (thus, reducing blood pressure, preventing unhealthy weight gain and diet-related non-

communicable diseases) involve lowering sodium and sugar content in foods that contribute significantly to total dietary sodium/sugar intake, and restricted marketing to children. Concerns have been raised about the potential impact of increased marketing to children of breakfast cereals, particularly cornflakes, on the risk of excess sodium and sugar consumption. Although there are national targets for salt and sugar consumption, the eligibility of marketing of cornflakes to children has not been assessed [8]. WHO is particularly concerned that the implementation of recommendations on marketing of foods and non-alcoholic beverages to children adopted by the Sixty-third World Assembly in 2010 has been slow globally, especially in the African Region [9]. The results from the second Global Nutrition Policy Review (GNPR2, 2017) indicated that only three countries in the Region (The Gambia, Liberia, and Mali) have implemented measures to regulate the marketing of foods and non-alcoholic beverages to children, implying that Nigeria is yet to enforce these measures. One of the reasons for the slow progress may be linked to difficulties in identifying and classifying foods for which marketing should be restricted, because of the lack of appropriate food classification tools. WHO has adopted nutrient profiling as a useful approach to identifying foods (according to their nutritional composition) whose marketing should be restricted as part of the implementation of the recommendations endorsed by the World Health Assembly (WHA) to control the marketing of foods and nonalcoholic beverages to children [10]. Evidence shows that television advertising is extensive and influences children's food preferences, purchase requests and consumption patterns [11]. The purpose of this study is to assess the eligibility of six different brands of cornflakes, which are highly processed, ready-to-eat breakfast cereals, for marketing to children in Nigeria by comparing their sodium, fat and sugar content with corresponding thresholds in the nutrient profile model for the WHO African Region. It is important to note that most Nigerian children (on a daily basis) eat cornflakes, which are fortified with vitamin A, deficiency of which is seen among 30% of children in Nigeria. The marketing to children of cornflakes with sodium or sugar content that exceeds (on a per 100 g basis) the sodium or sugar thresholds provided in the nutrient profile model should be prohibited. This is key to ensuring that foods high in sodium or sugar are not marketed to children through advertisement or other means of food marketing. Such marketing could lead to excessive consumption associated with diet-related diseases, overweight and obesity, conditions that have increased rapidly in children around the world over recent years.

METHOD

Sodium and total sugar content of cornflakes in Nigeria

Data on sodium, total fat, saturated fat and total sugar content were collected from on-pack nutrition labels of six brands of cornflakes available in several open markets and supermarkets in Nigeria. Brands without these data on their labels were not selected. The data collected were compared with their corresponding thresholds in the nutrient profile model for the WHO African Region.

Definition/explanation of terms used in this study

Children

In this tool, the term “children” refers to persons aged 2 to 19 years.

Marketing

Various practices which constitute a commercial communication or message that is designed to, or has the effect of, increasing the recognition, appeal and/or consumption of particular products and services. It comprises anything that acts to advertise or otherwise promote a product or service, and the action or business of promoting and selling products or services, including market research and advertising.

Nutrient profiling

The science of classifying or ranking foods according to their nutritional composition for reasons related to preventing disease and promoting health.

Sodium thresholds: These are based on the rationale that if the ratio between the amount of sodium (mg) in any quantity of the product and the energy content (kcal) is equal to or higher than 1:1, the product is considered excessive in sodium. The ratio is derived from a maximum recommended daily intake of 2000 mg of sodium (the WHO limit for adults), with an average total daily energy intake of 2000 kcal. The threshold is thus set at 1 mg sodium:1 kcal energy or lower wherever possible.

Sugar threshold

For sugar thresholds, the rationale is that a product has excessive free sugars if their contribution [free sugars (g) x 4 kcal] to the product’s total energy is equal to or higher than 10%. A lower threshold of 5% is used for sugar-sweetened beverages.

Total sugar

refers to all sugars from whatever source in a food, and is defined as ‘all monosaccharides and disaccharides other than polyols’.

RESULT AND INTERPRETATION

Table 1 shows the nutrient contents of the six brands of cornflakes. The sodium and total sugar contents (on a per 100 g basis) range widely from 0.1483 g (Kellogg’s) to 0.7000 g (Nasco), and from 5 g (Nasco) to 11.10 g (Pocco) respectively. Nasco has the highest sodium content, while Pocco has the highest sugar content. The wide variation could be as a result of poor sodium and total sugar content control enforcement or the absence of science-based maximum sodium and total sugar levels for cornflakes at the national level [8].

Table 1
Sodium, Total Sugars, Total Fat, and Saturated Fat content of six brands of cornflakes in Nigeria

S/N	Brand name	Sodium (g/100 g)	Total sugars (g/100 g)	Total fat (g/100 g)	Saturated fat (g/100 g)
1	Nasco	0.7000	5.00	0.80	0.2
2	Kellogg's	0.1483	10.00	0.40	0.2
3	Infinity	0.1500	10.75	1.95	Not available
4	Fun snax	0.2282	5.10	1.02	Not available
5	Klyee	0.5000	8.90	0.70	Not available
6	Pocco	0.5000	11.10	1.80	Not available

The table appears to reveal an inverse relationship between sodium and total sugar content. This nutritional trade-off strategy in product formulation may have been playing a compensatory role in terms of taste and sensory properties, and could support the need to set thresholds for both sodium and total sugars [11]. Brands that reduce sodium content may compensate with higher sugar content, and vice versa. The highest sodium level (0.7000 g) pairs with the lowest sugar level (5.00 g), while the lowest sodium level (0.1483) pairs with a very high sugar level (10.00 g). This suggests high-sodium and high-sugar clusters. In the high-sodium cluster, Nasco and Klyee have low sugar content but excessive sodium levels, relying on high sodium density to enhance product palatability. In the high-sugar cluster, Kellogg's and Infinity have low sodium content but excessive sugar levels, relying on high sugar density to enhance child taste preference.

Most brands have sodium content less than 0.3 g (on a per 100 g basis). This apparently demonstrates the feasibility of adapting the global sodium threshold and setting a lower national threshold at 0.28 g. This is consistent with the recommendation made in the WHO global sodium benchmark for breakfast cereals, which set sodium benchmark at 0.28 g (on a per 100 g basis) [14]. If 0.28 g sodium per 100 g cornflakes is adopted as a national sodium threshold for marketing, sodium content of Nasco (which doubles its corresponding threshold in the nutrient profile model) could reduce by 60%.

Table 2 compares the nutrient contents of the six brands of cornflakes against their corresponding thresholds (for breakfast cereals) from the nutrient profile model for the WHO African Region shown in Table 3.

Table 2

Sodium, total sugars and total fat content of six brands of cornflakes in Nigeria compared with their corresponding thresholds in the nutrient profile model for WHO African Region

S/N	Brand name	Sodium (g/100 g)	Total sugars (g/100 g)	Total fat (g/100g)	Status vs. 0.35 g sodium threshold	Status vs. 9 g total sugars threshold	Status vs. 12 g total fat threshold
1	Nasco	0.7000	5.00	0.80	Exceeds (excessive)	Below (not excessive)	Below (not excessive)
2	Kellogg's	0.1483	10.00	0.40	Below (not excessive)	Exceeds (excessive)	Below (not excessive)
3	Infinity	0.1500	10.75	1.95	Below (not excessive)	Exceeds (excessive)	Below (not excessive)
4	Fun snax	0.2282	5.10	1.02	Below (not excessive)	Below (not excessive)	Below (not excessive)
5	Klyee	0.5000	8.90	0.70	Exceeds (excessive)	Below (not excessive)	Below (not excessive)
6	Pocco	0.5000	11.10	1.80	Exceeds (excessive)	Exceeds (excessive)	Below (not excessive)

This table shows that all six brands are below the total fat threshold. This suggests that low-fat marketing claims may mask excessive sodium or sugar level in commercial formulations. Nasco, Pocco and Klyee (50% of the sample) exceeded the sodium threshold. Hence, they are classified as excessive in sodium. They are likely to contribute more sodium to the diet than the other brands of cornflakes (in this study). Their consumption makes it more likely for a (2,000 kcal) diet to exceed the WHO recommended maximum daily sodium intake (2 g), increasing the risk of excessive sodium intake [12]. These brands should be subject to restricted marketing to children. Kellogg's, Pocco and Infinity (50% of the sample) exceeded the total sugar threshold. Thus, they are classified as excessive in total sugar. They are likely to contribute more sugar to the diet than other brands. Their consumption makes it more likely for a (2,000 kcal) diet to exceed the WHO recommended maximum daily sugar intake (50 g), increasing the risk of excessive sugar intake [13]. These brands should be subject to restricted marketing to children. Pocco exceeded both the sodium and total sugar thresholds, presenting a dual-critical risk profile. Marketing Kellogg's, Pocco, Infinity, Klyee and Nasco to children could challenge efforts to eat healthily and maintain a healthy weight, particularly in children. This could lead to excessive consumption of sodium and sugars, which has been strongly associated with increased risks of childhood obesity and diet-related diseases. They brands should be key target for reformulation. Fun snax did not exceed any of the aforementioned thresholds, serving as a model that demonstrates industry feasibility in meeting marketing criteria. Hence, it is not classified as excessive in sodium or total sugar. Its consumption makes it less likely for a (2,000 kcal) diet to exceed the WHO recommended maximum daily sodium and sugar intakes. This brand is eligible for marketing [11, 15].

The data provided in Table 2 makes the amounts of sodium, total fat and sugars in the brands of cornflakes meaningful, helping consumers (who are concerned about their sodium or sugar intakes) make informed choices. For example, 0.7000 g of sodium or 11.10 g of sugar per 100 g of cornflakes is excessive, whereas

0.2282 g of sodium or 5 g of sugar per 100 g of cornflakes is not excessive [11]. Table 3 shows the sodium, total fat, total sugars, added sugars, energy and saturated fat thresholds for breakfast cereals in the nutrient profile model.

Table 3
Nutrient Profile Model for the WHO African Region [WHO, 2019]

Food category	Examples of food items	Codex Food Category code	Total fat (g)	Saturated fat (g)	Total sugars (g)	Added sugars (g)	Sodium (g)	Energy (kcal)
Breakfast cereals	Whole, broken or flaked grains of rice and other cereals, rice-based, wheat-based or maize-based breakfast cereals of all flavours, oat meal, mueslis, rice cakes, porridge (dried, as)	6.1, 6.3, 6.7	12.0	No threshold provided	9.0	No threshold provided	0.35	No threshold provided

NB:

Marketing is prohibited if thresholds exceed values per 100 g/ml.

CONCLUSION AND RECOMMENDATION

Only Fun snax brand is eligible for marketing. Five (Nasco, Kellogg’s, Klyee, Pocco and Infinity) out of the six brands failed to meet healthy marketing criteria and are not eligible for marketing to children. Marketing restriction of brands that exceed thresholds for sodium, total sugars or total fat is part of the implementation of the recommendations endorsed by the World Health Assembly (WHA) to protect children from the marketing of unhealthy foods and non-alcoholic beverages, and excessive consumption. It is recommended that the marketing of Nasco, Kellogg’s, Klyee, Pocco and Infinity to children be prohibited.

This could drive reformulation to lower their sodium and total sugar content to less than the corresponding thresholds set in the nutrient profile model.

LIMITATION AND ASSUMPTION

1. The WHO thresholds are adopted as the national thresholds for cornflakes.
2. The on-pack nutrient content data reflect the correct analytical data.
3. Risk is often associated with total intake from all relevant dietary sources.
4. Cornflakes are consumed without the addition of milk or sugar.

Declarations

Ethics Approval and Consent to Participate

Not applicable. This study summarizes aggregate legislative policy models and did not involve human participants, tissues, or animals.

Clinical Trial Number

Not applicable.

Consent for Publication

Not applicable.

Availability of Data and Materials

The programmatic code, spreadsheet modeling maps, and database hit metrics utilized during the execution of this review are fully reproducible and available from the corresponding author upon reasonable academic request.

Competing Interests

The author declares no competing financial, institutional, or corporate interests with the consumer beverage sector or alternative sugar manufacturing supply chains.

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