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Research Article

The Likely Intake of Sodium and Impact of WHO Global Sodium Benchmark from Some Fat Spread in Nigeria

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Abstract

In 2019, 19.1 million adults aged 30-79 years were with hypertension and the average sodium consumption among Nigerian adults has been estimated to be 2.8g per day, which exceeds the WHO's daily recommendation. An effective way of reducing dietary sodium intake is by establishing sodium benchmarks for major food categories. Fat spread is believed to be a major source of sodium in the diet. This study assesses the likely intakes of sodium and impact of adopting the WHO global sodium benchmark from fat spread. The level of sodium and serving size of fat spread were estimated from on-pack nutrition labels of six (6) brands available in the open markets and supermarkets in Nigeria. Comparison of the estimated dietary intake was made with the Nutrient Reference Value - Noncommunicable Disease (NRV-NCD) for Sodium. The average sodium content of per 100g of fat spread was 0.9g, estimated dietary sodium intakes for consumption levels of 10g, 20g, 30g, 40g, 50g and 60g per day were 0.09g, 0.18g, 0.27g, 0.36g, 0.44g and 0.54g per day. There was a 56% sodium intake reduction if the WHO global sodium benchmark were adopted. These findings suggest that fat spread is high in sodium and contributes significantly to total daily intake of sodium. The adoption of the WHO global sodium benchmark, as well as regulation of marketing and low-fat claim could serve as additional policy measure to reduce sodium intake from the spread.

Keywords: *WHO Global Sodium Benchmarks; Nutrient Profile Model; Fat Spread; Sodium Intake Assessment*

Introduction

Hypertension, defined as systolic blood pressure equal to or greater than 140 mmHg and/or diastolic blood pressure equal to or greater than 90 mmHg is epidemic in both developed and developing countries. Recent FAO/WHO data on hypertension in Nigeria indicates high prevalence, with estimates ranging from 22% to 44%, varying by region. Although a 2019 study indicates a prevalence among adults at approximately 31%, the overall age-standardized prevalence is estimated to be 38.1% [1]. The Global Nutrition Report

shows that Nigeria is off course with regards to meeting established targets in the area of reducing the prevalence of hypertension among its population [2]. Thus, there is a large burden of hypertension in Nigeria. The average sodium consumption among Nigerian adults has been estimated to be 2.8g per day, exceeding the WHO's maximum daily recommendation of not more than 2g per day [3]. This significant deviation underscores the potential for elevated health risks related to hypertension and cardiovascular diseases within the population.

Fat spread is widely consumed in Nigeria. It is used on bread, which is a major source of sodium in the Nigeria diet [4]. This dietary pattern may prove to contribute significantly to total sodium intake in the population. Its major ingredient is palm olein, which is high in saturated fat [5]. Although focus has been on addressing health concerns associated with fat, there is increasing awareness about the potential health risks associated with sodium, which can also be found in the spread. The World Health Organization (WHO) has developed global sodium benchmarks different food categories [6]. These benchmarks are set in the form of maximum limits and serve as a guide for countries in setting national policies and strategies. This global sodium reduction strategy is in alignment with the National Policy on Food Safety and Quality and its Implementation Plan 2022, and the Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020 [7,8]. However, Nigeria is yet to implement national sodium benchmarks across food categories. High dietary sodium intake (intake of more than 2g sodium per day), which increases blood pressure and the risk of cardiovascular diseases, is responsible for about 3 million of the estimated yearly 11 million deaths globally associated with poor diet. An effective way of reducing dietary sodium intake (thus, reducing blood pressure and diet-related non-communicable diseases) is by lowering sodium content in foods that contribute significantly to total dietary sodium intake [6].

The concerns raised about the sodium content, potential impact of the consumption of fat spread on the risk of hypertension and adopting the corresponding WHO global sodium benchmark on dietary sodium intake in Nigeria will be addressed in this study. The importance of addressing these concerns is stressed in the recently published national policy on food safety and quality and its implementation plan [9].

Methodology

Sodium content of fat spread in Nigeria

Data on sodium content and serving size were estimated from on-pack nutrition and food labels of randomly selected and most commonly available brands of fat spread in open markets and supermarkets in Nigeria (As shown in table 1). A total of six (6) brands, commonly available in almost all the States of the Federation, were included.

S/N	Brand name	Energy kcal	Sodium content (g per 100g)
1	Blue Band low fat spread	182	0.985
2	Mamador low fat spread	180	0.600
3	Golden Penny spread	224	1.870
4	Devon King's	180	0.600
5	Blue Band medium fat spread	631	0.420
6	Vitali bread spread	360	0.985
	Mean ± Margin of Error (Confidence Interval) Confidence Level, Standard Error of Mean	292.8 ± 143.7 (±49.09%) Confidence Level 95%, $1.960s_{\bar{x}}$	0.91 ± 0.418 (±45.95%) Confidence Level 95%, $1.960s_{\bar{x}}$

Table 1: *Sodium content of fat spread in Nigeria (serving size: 30g).*

Using the information on sodium content and different serving sizes, dietary sodium intakes from fat spread were estimated according to a methodology developed by Joint Expert Committee on Food Additives as stated below [10].

Here are explanations of some of the terms and methods used in this paper:

- Sodium intake was calculated according to the formula:
- (Mean sodium content in g per 100g of the fat spread x serving size of the fat spread in g per day/100).
- The sodium intake goal was obtained from the WHO Population Intake Goals for preventing diet-related chronic diseases (As shown in table 2) [WHO, 2003] and the Nutrient Reference Value - NonCommunicable Diseases (NRV-NCD) [11].
- The dietary risk was characterized by expressing the estimated dietary intake as a percentage of the WHO population intake goal or NRV-NCD for sodium.
- Relative [Intake] Risk Reduction formula (proposed) = (Dietary [intake] risk in the absence of a sodium benchmark - Dietary [intake] risk when there is a sodium benchmark/Dietary [intake] risk in the absence of a sodium benchmark) x 100.
- 4.184 Kilojoule = 1 Kilocalorie.

Nutrient	Levels not to exceed	Levels to achieve
Saturated fatty acids	20g	
Sodium	2g	
Potassium		3.5g

Table 2: *Nutrient reference value - Noncommunicable disease for sodium [FAO and WHO, 2021].*

Result and Discussion

Table 1 shows the sodium content of fat spread in Nigeria. It ranges from 0.42g to 1.87g. This large variation clearly shows that the content is poorly regulated and largely subject to the discretion of food manufacturers. This statistic is similar to the study of Webster, which showed that spreads were among the food groups highest in sodium in the Australian diet (1283 mg/100g) [12]. Therefore, limiting sodium by setting benchmarks/thresholds based on the WHO guidance would help to achieve its correct intake levels [13].

The estimated mean sodium content was 0.9g per 100g, which is 45% of the WHO population sodium intake goal or NRV-NCD for sodium. This is significantly higher than the WHO global sodium benchmark for fat spread, which is 0.4g per 100g as shown in table 3. The Nutrient Profile Model for the WHO African Region classifies a fat as high in sodium if it contains more than 0.1g sodium per 100g [13]. Hence, fat spread is high in sodium and its consumption makes it more likely for the diet to exceed the recommended maximum sodium goals. For this reason, the marketing of fat spread to children should be prohibited.

	Sodium content per 100g fat spread
Nigeria	0.9
WHO global benchmark	0.4

Table 3: *Comparison of the sodium content of fat spread in Nigeria and the WHO global sodium benchmark for fat spread.*

The ratio between the amount of sodium (mg) in 100g of the fat spread and the energy content (kcal) is equal to 3:1. This exceeds the threshold set at 1 mg sodium: 1 kcal energy in the Nutrient Profile Model for the WHO African Region [13]. This further supports that the fat spread has excessive sodium.

The estimated dietary sodium intakes for consumption levels of 10g, 20g, 30g, 40g, 50g and 60g per day were 0.09g, 0.18g, 0.27g, 0.36g, 0.44g and 0.54g per day. Table 1 shows that one serving of fat spread is 30g. The estimated sodium intake from this serving was approximately 0.3g. This serving contributes about 15% of the Nutrient Reference Value - NonCommunicable Diseases (NRV-NCD), which helps you see easily whether a food contributes "a little" or "a lot" of a nutrient. According to the Nutrient Profile Model, a fat that contains more than 5% of the Nutrient Reference Value - NonCommunicable Diseases (NRV-NCD) for sodium in 100g contributes significantly or "a lot" of sodium to a day's intake [11,13,14]. Hence, fat spread could be one of the biggest contributors to sodium intake in the population and there could be a considerable risk of excessive intake of sodium from one serving. The study of Ni showed that spreads were among the largest contributors to sodium purchases in the United Kingdom [15].

The estimated dietary sodium intakes for the consumption levels if the WHO global sodium benchmark was adopted were 0.04g, 0.08g, 0.12g, 0.16g, 0.20g and 0.24g per day. In this instance, one serving of the spread contains 0.1g, which is 5% of the Nutrient Reference Value - NonCommunicable Diseases (NRV-NCD). Consumers of fat spread if the benchmark is implemented would be less likely to exceed the NRV-NCD for sodium than consumers if no benchmark is implemented. The estimated average 56% reduction in the likely intake of sodium from fat spread if the WHO global sodium benchmark is adopted would contribute significantly to national efforts to reduce population sodium intake and achieve the WHO global target of a 30% reduction in mean population sodium intake by 2030 [8].

It is feasible to adopt the benchmark. Table 1 shows that there is already a fat spread brand with approximately 0.4g sodium per 100g in the Nigerian market. This provides considerable evidence that the safety and shelf-life of the spread may not be adversely affected upon the adoption of the benchmark to facilitate reformulation to lower sodium content.

Figure 3 shows that daily sodium intake from one standard serving (30g) as stated on the product label could be as high as 0.6g per day, which is about 30% of the WHO population sodium intake goal and the NRV-NCD for sodium. This clearly suggests that consumers of this brand could be at the most risk of excessive sodium intake and its associated non-communicable disease.

The claim 'low-fat' on fat spread may promote increased consumption and thus, pose a risk to cardiovascular health through increased intake of sodium. This potentially misleading claim should not be allowed on fat spread high in sodium. Figure 1 shows that the intake of sodium increases as the level of spread consumption increases. Promoting spread with fat claims should not deter focus from its sodium content, which is a dietary risk factor for hypertension.

Main food category	Subcategory	Subcategory description	Global benchmark (mg per 100g)	Lowest maximum target on which the benchmark is based
Butter and other fats and oils	Salted butter, butter blends, margarine and oil-based spreads	Flavoured butter, butter blends, ghee and margarine. Includes vegetable oil spreads such as olive oil spreads. Excludes unsalted butter.	400	New Zealand: Edible oil spreads - margarine/ oil-based spreads, 400 mg Denmark: Margarine and blended products, 400 mg

Table 4: *WHO global sodium benchmark [6].*

Source: World Health Organization, 2019. 'World Health Organization, 2021: WHO global sodium benchmarks for different food categories'.

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)
Butter and other fats and oils, and fat emulsions	Vegetable oils and fats, lard, ghee, fish oils and other animal fats, butter, margarine and similar products. Examples: cooking oils from plant and animal sources, fat blends, nuts spread (e.g. peanut butter)	2.1, 2.2	No threshold provided	35.0	No threshold provided	0.0	0.10	No threshold provided

Table 5: *The nutrient profile model for the WHO African region [13].*

NB: Marketing is prohibited if products exceed values in this model per 100g.

Source: World Health Organization, 2019. 'Nutrient Profile Model for the WHO African Region: a tool for implementing WHO recommendations on the marketing of foods and non-alcoholic beverages to children'.

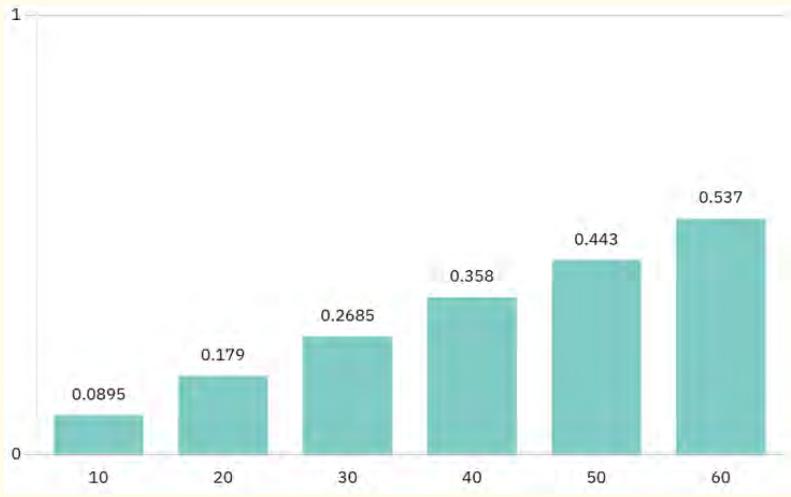

Figure 1: *Estimated sodium intake (g) from various consumption levels of fat spread (g) in Nigeria. The average sodium intake increases as consumption levels increase.*

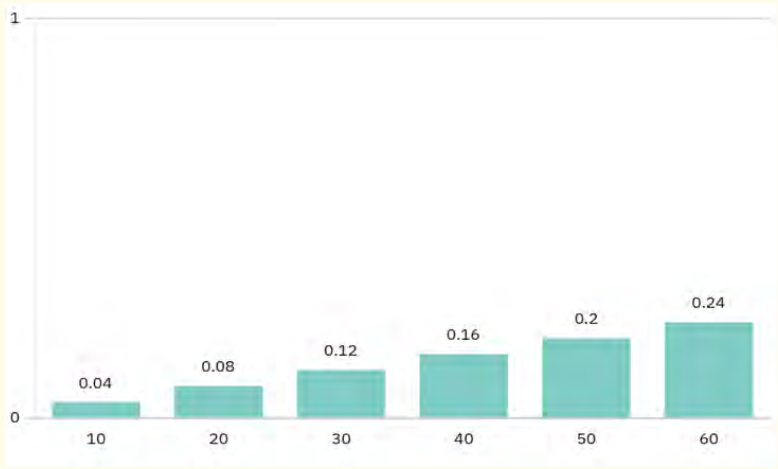

Figure 2: *Estimated sodium intake (g) from various consumption levels of fat spread (g) when the WHO global sodium benchmark is adopted. The adoption of the WHO global sodium benchmark leads to significant reduction in sodium intakes.*

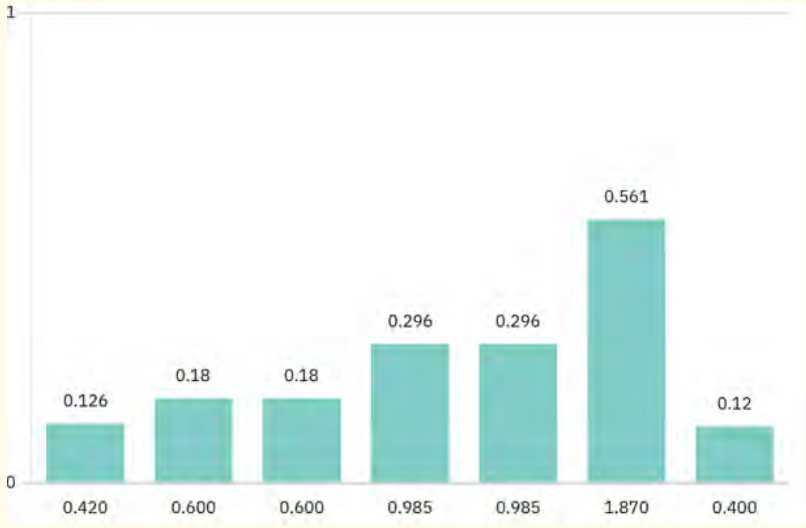

Figure 3: *Estimated sodium intake (g) of one serving from selected brands of fat spread compared with a proposed brand that complies with the WHO global sodium benchmark. Sodium intake from one serving of the brand with highest content (1.870g sodium per 100g fat spread) is about 30% of the NRV-NCD for sodium. Sodium intake from one serving of the proposed brand (0.4g sodium per 100g fat spread) is 5% of the NRV-NCD for sodium.*

Conclusion and Recommendation

The consumption of fat spread increases the risk of excessive sodium intake and could be one of the major factors contributing to high rate of hypertension in Nigeria. Adopting the WHO sodium benchmark and subjecting the spread to restricted marketing to children would reduce the risk and drive the product reformulation. This could lead to incremental sodium reduction without consumer complaint. In addition, low sodium content as a condition for the use of low-fat claim would further drive reformulation.

Limitation and Assumption

1. A more accurate dietary intake estimate could be made with national fat spread consumption data.
2. It is assumed that the on-pack sodium content data reflect correct analytical data.
3. Sodium is examined in isolation.
4. Fat spread is eaten daily.

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