



Sodium Intake Risk Assessment of Some Bouillon Cubes and Adoption of the WHO Sodium Benchmark in Nigeria



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Submission: October 03, 2024; Published: October 15, 2024

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Abstract

Background: The World Health Organization has developed global benchmarks for sodium levels in foods across different food categories and subcategories including the subcategory description of Bouillon cubes. Nigeria is yet to establish sodium benchmarks across food categories. High sodium intakes, which correlate with high blood pressure, are responsible for 3 million of the estimated 11 million deaths globally associated with poor diet. Studies have showed that bouillon cubes contribute significantly to total dietary sodium intake in Nigeria. Concerns have been raised about the potential impact of the consumption of bouillon cubes on the risk of high blood pressure in Nigeria and adopting the WHO global sodium benchmark for bouillon cubes on dietary sodium intake in Nigeria.

Aim: To assess the potential impact on risk of high blood pressure and dietary sodium intake in Nigeria of consumption of bouillon cubes and whether adopting the WHO global sodium benchmark is needed.

Methods: The level of sodium in bouillon cubes in Nigeria was estimated from on-pack sodium data and consumption from the GEMS/Food Cluster Diets. These calculations were done to estimate dietary sodium intake from bouillon cubes using the method stipulated in the Codex Food Safety Risk Analysis Manual. Comparison of the estimated dietary intake was made with the Nutrient Reference Value - Noncommunicable Disease (NRV-NCD) for Sodium from Codex Guidelines on Nutrition Labelling. Also, a comparison of the estimated sodium content in bouillon cubes was made with the WHO global sodium benchmark for sodium in the cubes.

Results: The estimated dietary sodium intake from bouillon cubes was 1.1 g/kg body weight/day for a lifetime and 55% of the NRV-NCD for sodium without national benchmark. The estimated contribution of bouillon to overall mean sodium intake per day, which was estimated to be 4 g in 2018 by the Nigerian Government, is about 29%. The estimated dietary sodium intake if the WHO benchmark was adopted was 0.7 g/kg body weight/day for a lifetime and 35% of the NRV-NCD for sodium. Sodium content of bouillon cubes in Nigeria ranges from 24.3 to 20.6 g per 100 g with an average content of 22.8 g per 100 g.

Conclusion: Consumption of bouillon cubes in Nigeria poses a significant risk of excessive sodium intake, high blood pressure and the adoption of the WHO global sodium benchmark may contribute to reducing dietary sodium intake from bouillon cubes and the associated risk.

Keywords: World Health Organization; Sodium benchmark; Bouillon cubes; High blood pressure; Noncommunicable Disease

Introduction

The World Health Organization has developed global benchmarks for sodium levels in foods across different food categories and subcategories including the subcategory description of Bouillon cubes [1]. Nigeria is yet to establish sodium benchmarks across food categories. High sodium intakes, which increase blood pressure and the risk of cardiovascular diseases, are responsible for 3 million of the estimated 11 million deaths globally associated with poor diet [2,3]. Cardiovascular

diseases are the leading cause of noncommunicable diseases globally, responsible for 32% of all deaths [2]. In 2019, 19.1 million adults aged 30-79 years were with hypertension in Nigeria and the mean population dietary sodium intake for adults aged 25+ years was estimated to be 2.4 g/day [4,5]. An effective way of reducing dietary sodium intake (lowering blood pressure and reducing noncommunicable diseases) is by lowering sodium content in foods that contribute significantly to increased total dietary sodium intake [2,6-8]. Studies have showed that bouillon

cubes, which are classified as excessive in sodium, contribute significantly to total dietary sodium intake in Nigeria. This may be due to lack of reformulation targets for sodium levels. Studies have shown that global sodium benchmarks are useful in setting national sodium targets which is a key step towards reducing population sodium intake [1]. Concerns have been raised about the potential impact of the consumption of bouillon cubes on the risk of high blood pressure in Nigeria and adopting the WHO global sodium benchmark for bouillon cubes on dietary sodium intake in Nigeria. The importance of addressing these concerns is stressed in the recently published national policy on food safety and quality and its implementation plan.

This study assessed the potential impact on risk of high blood pressure and dietary sodium intake in Nigeria of consumption of bouillon cubes and adopting the WHO global sodium benchmark.

Methods

Sodium content of bouillon cubes in Nigeria

Data on sodium content of representative bouillon cubes in Nigeria were obtained as stated on the nutrition facts panels on the packs of the cubes (on-pack product-level market data analysis) (as shown in Table 1). Data were drawn only from packs of bouillon cubes with NAFDAC registration numbers, brand names and manufacturers' details were obtained from open markets where sellers displayed products in open shops.

Consumption of bouillon cubes in Nigeria

Data on consumption was estimated from the GEMS/Food Cluster Diets (as shown in Table 2). This global data by WHO is based on FAO Supply Utilization Account data and represent average per capita food consumption for 17 groups of countries in the world, where the amount of food available for consumption

in each group of countries is divided by total population numbers (weighted to take account of individual country populations in each region). A cluster analysis approach is used, where countries with similar patterns of food consumption are grouped together, resulting in 17 cluster diets [9,10].

Estimation of Dietary Sodium Intake (EDI)

Using the information on sodium content and consumption level, dietary sodium intake was estimated.

Calculation:

Estimated Dietary Sodium Intake (g/kg body weight/day for a lifetime) = the sodium level in bouillon cubes (g) x the amount of bouillon cubes consumed (g/day for a lifetime) / 60 (kg body weight).

Nutrient Reference Value - Noncommunicable Disease for Sodium: The value was obtained from the Codex Guidelines on Nutrition Labelling (as shown in Table 3): nutrient intake levels not to exceed and nutrient intake levels to achieve [11].

Global Sodium Benchmark: Value of the global sodium benchmark was obtained from the WHO Global Sodium Benchmarks for Different Food Categories (as shown in Table 4).

Risk Characterization: The risk was characterized by comparing the estimated dietary sodium intake with the nutrient reference value – noncommunicable disease for sodium.

Relative Risk: Dietary intake when there is benchmark (experimental event rate) /Dietary intake (control event rate) when there is no benchmark.

Relative Risk Reduction: (Control Event Rate – Experimental Event Rate / Control Event Rate) x 100.

Table 1: Sodium content of bouillon cubes in Nigeria.

S/N	Brand name	Sodium content (g per 100 g)
1	Maggi chicken flavor	23.9
2	Knorr seasoning cubes	22
3	Maggi star crayfish seasoning cubes	20.6
4	Maggi star seasoning cubes	24.3
5	Terra chicken flavor	23.2
6	Ami tomato flavor	22
7	Gino max chicken flavor	24.1
8	Ami chicken flavor	23
9	Terra gold	24.01
10	Royco beef flavor	24
11	Adja tomato flavor	21
12	Doli tomato flavor	22

Table 2: Consumption of bouillon cubes in Nigeria.

Food category	Cluster	Consumption (g/day)
Herbs (seasoning and herbal tea), spices, condiments and sauces	G13	2.76

Table 3: Nutrient Reference Value - Noncommunicable Disease for Sodium.

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

Table 4: Global Sodium Benchmark.

Main food category	Subcategory	Subcategory description	Global benchmark (g per 100 g)	Lowest maximum target on which the benchmark is based
Sauces, dips and dressings	Bouillon and soup stock (concentrated)	Bouillon cubes and soup stock powders. Includes gravy stocks. Excludes concentrated, dry soups.	15	South Africa: Stock cubes, stock powders, stock granules, stock emulsions, stock pastes or stock jellies, 15 g

Results and Discussion

The sodium content of representative bouillon cubes is shown in (Table 1). The sodium content ranged from 20.6 g to 24.3 g in 100 g bouillon cubes according to their nutrition facts panels. The mean content was 22.84 g per 100 g which exceeds the WHO global sodium benchmark of 15 g per 100 g for bouillon cubes [1].

The estimated dietary sodium intake from bouillon cubes is 1.1 g/kg body weight/day for a lifetime which is 55% of the nutrient reference value - noncommunicable disease for sodium and the WHO recommended sodium intake of less than 2 g per day [12]. The estimated contribution of bouillon to overall mean sodium intake per day, which was estimated to be 4 g in 2018 by the Nigerian Government, is about 29% [4]. This suggests that bouillon cubes could be highest contributors for sodium in the Nigeria diet and a high risk of consumers exceeding the recommended intake level which poses sodium-related health hazards and high risk of diet-related noncommunicable diseases such as, high blood pressure. Hence, there is urgent need to set national sodium benchmark for bouillon cubes to promote reformulation and lower sodium concentrations in this food subcategory, and also to establish guideline on the consumption of bouillon cubes.

The estimated dietary sodium intake if the WHO global sodium benchmark for bouillon cubes is adopted is 0.7 g/kg body weight/day for a lifetime which is 35% of the nutrient reference value - noncommunicable disease for sodium and the WHO recommended sodium intake of less than 2 g per day. This implies that adopting the global benchmark would have positive impact on the dietary sodium intake from bouillon cubes and its associated NCD risk. The estimated 36% intake reduction in dietary sodium intake from bouillon cubes if the WHO global sodium target is

adopted would contribute significantly to national efforts to reduce population sodium intake and achieve the target of a 30% reduction in mean population sodium intake by 2030.

The relative risk is estimated to be 0.64 which suggests that the likelihood of excess dietary intake from bouillon cubes is lower if the global benchmark is adopted than if there is no benchmark set for the bouillon cubes. The relative risk reduction with global sodium benchmark is estimated to be 36% corresponding to a relative risk of 0.64. This suggests that a 36% reduction in dietary sodium intake could be achieved if the global benchmark is adopted. The contributions of bouillon cubes to the total dietary sodium intake in the absence and presence of a WHO global sodium benchmark are estimated to be 46% and 29% respectively. This suggests a possible association between sodium levels in bouillon cubes and the occurrence of hypertension and demonstrates a positive impact of adopting the WHO global benchmark for bouillon cubes and provides information needed for the setting of priorities for the risk management of bouillon cubes [13].

This study assessed the potential contribution of bouillon cubes to the consumption of excess sodium and provided scientific insight on the likelihood that the consumer in Nigeria is exposed to high levels of sodium in bouillon cubes. It shows that a significant proportion of sodium in the diet comes from bouillon cubes and the cubes contribute to increased sodium intake. It concludes that there is high risk of excessive sodium intake through the consumption of bouillon cubes, which have been shown to be highest contributors and contribute significantly to dietary sodium intake. Consumption of bouillon cubes makes it more likely for the diet to exceed the WHO recommendation of not more than 2 g/day sodium intake. Consumers may not be

adequately protected if sodium benchmark is not set for bouillon cubes in Nigeria. Hence, the need to set sodium benchmark for bouillon cubes to mitigate nutritional risks to public health and help achieve correct sodium intake levels. A more accurate dietary intake estimate would have been made if available national bouillon consumption data were used.

Acknowledgement

I acknowledge Professor Dan Ramdath for his help with the manuscript review.

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DOI: 10.19080/NFSIJ.2024.13.555864

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