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HIDDEN SALT IN BREADS OF BLANTYRE (MALAWI) AND LABELLING PRACTICES: A NATIONAL WAKE-UP CALL

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ABSTRACT

A study was carried out to the determine amount of salt in breads sold in five major retail shops in Blantyre (Malawi). Determined salt concentrations were compared with declared values on labels. In addition, the study also assessed labelling practices among bread manufacturers to check compliance with labelling regulations in Malawi. Six brands of breads were sampled from the five major retail shops. Twelve samples were collected for each of the six brands of bread herein designated as bread 1, bread 2, bread 3, bread 4, bread 5 and bread 6. The study found that average concentration of sodium in the breads ranged from 1.7 g/100 g to 2.6 g/100 g. Significant differences of sodium content were observed in four brands of bread; bread 1, bread 2, bread 4 and bread 5 ($p<0.05$). No significant difference was observed between bread 3 and bread 6 ($p>0.05$). None of the sampled breads had declared sodium content. All the breads complied with Malawi requirements for general labelling of breads. However, all the breads did not comply with nutrition labelling guidelines. The study reveals policy gap, in Malawi, on salt reduction in foods. The study also reveals regulation and regulation enforcement gaps that need to be urgently addressed to improve the current situation. Considering the results in this study, the authors recommend that Malawi should develop policies to support reduction of salt in food products such as bread to minimise risks associated with high salt intake. The authors also recommend enforcement of Malawi standard for nutrition labelling by the relevant authorities and a complete national survey to assess understanding of nutrition labelling among manufactures. Furthermore, the authors recommend urgent revision of 1985 Malawi standard for common bread, currently in use, to include sodium content limits as one way of initiating a reduction of sodium content in breads being sold on the market.

Key words: salt reduction, bread, labelling, standard, Malawi, hypertension, sodium, consumer

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INTRODUCTION

Sodium chloride (NaCl), herein referred to as salt, is a chemical food ingredient designated as "Generally Recognised As Safe" (GRAS) by US Food and Drug Administration (FDA). As such, its use in food processing is based on Good Manufacturing Practices [1]. The average global intake of salt is estimated to be between 9 g to 12 g/day, and about 80% of total salt intake is from processed foods [2, 3, 4]. Salt has 40% sodium content and is deemed to be the main source of dietary sodium [4].Sodium is one of the essential ions required by the body to maintain extracellular fluid within regulated limits and to aid in nutrient uptake in the small intestines among others [4]. As affirmed in toxicology that the dose defines the poison, many studies have suggested a significant positive correlation between high sodium intake and hypertension which in turn increases the risk of cardiovascular disease [2, 5, 6].

A study on projected effect of dietary salt reduction on future cardiovascular disease estimated that a reduction of dietary salt by 3 g per day would reduce hypertension cases by 16 to 25% in women and by 22 to 34% in men [7]. Significant reduction in new cases of coronary heart disease, stroke and myocardial infection were also suggested. This finding was supported by findings in a study conducted in the United States on potential societal savings from reduced sodium consumption in the U.S. adult population [8].

In view of the above, the World Health Organisation (WHO) has been advocating for a reduction of salt in processed foods in order to achieve a set salt intake target of 6 g/day so as to improve the health of the global population [3, 6]. Governments in developing countries have responded positively and regulations, more especially on labelling, are being put in place. However, there is little advocacy and huge legislation gaps in most developing countries, like Malawi. It is likely therefore that consumers are taking more of the hidden salt thus exceeding the recommended daily intake unknowingly, especially through products that do not taste salty, such as bread.

Salt has many applications in food industry due to its inherent specific properties that are required for the processing of food products including bread. Salt enhances flavour, is a preservative and a processing aid [4, 9]. In breads, it makes wheat gluten less sticky by making it less extensible and reduces gas production to optimum levels by affecting fermentation rate. It also improves bread texture, affects colour development by enhancing Maillard reaction and enhances palatability [10, 11]. The combination of these functions, its relatively low cost and general availability has seen its wide use in breads.

It has been observed that creating supportive environments that help people to make healthy choices is an important underlying principle in promoting health. One of such supportive approaches is nutrition labelling. It is aimed at helping consumers when buying by providing them with information about the nutrient content of a food thus making the food selection environment more conducive to healthy choices [12]. The nutrition information provided, coupled with knowledge of basic nutrition principles

and determination in adopting a healthy diet is intended to promote informed food purchase decisions. Besides promoting informed purchase decisions, nutrition information also protects the consumer from exploitation. This is because each nutritional claim is supposed to be substantiated with evidence which can be verified if need be. However, in Malawi nutrition labelling is voluntary unless a nutritional claim has been made, and enforcement of nutrition labelling has been found to be a challenge [13].

A survey by Campaign for Action of Salt and Health (CASH) in 2011, on UK breads, revealed that breads were contributing about 18% of total salt intake with levels in some bread brands reaching up to 2.83 g/100 g [14]. Recently, breads and cereal products have been found to contribute 36% of total salt intake in teenagers in South London [15]. However, literature reveals no documented study findings on levels of salt in breads in Malawi; a food product consumed by the majority of urban dwellers. This is a concern considering that a recent study on the burden of selected chronic non-communicable diseases and their risk factors in Malawi found that 32.9% of adults in Malawi had hypertension [16].

This study was therefore carried out in the city of Blantyre in Malawi, targeting breads produced by major bakeries to reveal the amounts of salt hidden in the breads, to compare the salt concentrations with the declared values on their respective labels and to assess the current bread labelling practices with respect to labelling regulations in Malawi. The study provides opportunities for regulators, healthcare professionals and policy makers to make informed decisions and improvements and also for the consumers to be informed about salt content of breads on the market.

MATERIALS AND METHODS

Sample selection and procedure

The study was done in Blantyre City, Malawi, targeting white breads found in five major shops namely Shoprite, Chipiku stores, Peoples, Chitawira Shopping Centre and Sana. Six bread brands, bread 1, 2, 3, 4, 5 and 6, were sampled from these five major shops. Sampling was done every Monday from shop shelves, for four consecutive weeks. The six bread brands were selected due to their high production volumes and distribution in Blantyre City.

Sodium analysis

A total of seventy two samples were analysed. Three samples of each of the six bread brands were analysed each week for sodium content at Malawi Bureau of Standards (MBS) Laboratories using Association of Official Analytical Chemists (AOAC), Flame Atomic Absorption Spectrophotometric methods 9.1.09 and 50.1.14 [17]. One gram of bread was weighed and dry ashed in a furnace at 500 ^{0}C after which the samples were cooled in a desiccators. Concentrated hydrochloric acid was used to dissolve the ash and then diluted accordingly using de-ionised water. The de-ionised water was also used for washing all glassware used in the analysis to minimise errors. Sodium standard solutions of 1, 2, 3, 4 and 5 μgcm^{-3} were prepared and used in coming up with a calibration curve. All sodium determinations were done using NOV AA 350 AAS

manufactured by Analytic Jena in Germany. The respective sodium contents for the samples were multiplied by a 2.5 conversion factor. This was done to convert the results to salt content equivalent thus assuming that almost all the sodium was from added salt.

Assessment of labels

The general labelling assessment was based on MS 31:1985, Malawi Standard for common bread [18]. The labels' Nutrition Information Panels (NIPs) were assessed based on MS 624: 2001 [19]. This is a Malawi standard for nutrition labelling guidelines which is an adoption of CAC/GL 2-1985, Codex Alimentarius Guidelines on nutrition labelling [20].

The comparison between the label claim for sodium and the measured concentration was assessed by checking whether the label claim was falling within the 95% confidence limits of the measured sample mean. Any sample whose label claim was outside of the confidence limits, the percent overage or underage was calculated using the following formula.

% overage or underage = [(mean concentration - label claim) / label claim] x 100

Data analysis

The mean, standard deviation and 95% confidence intervals (CI) of the mean were calculated using SPSS version 16.0. Single factor Analysis of Variance (ANOVA) and Tukey Honest Significant Difference (HSD) post hoc tests were also done using SPSS version 16.0.

RESULTS

Salt concentration

As shown in Figure 1 below, average salt concentration ranged from 1.7 to 2.6 g/100 g of bread with an overall mean of 2.0 g/100 g (SD = 0.3) for all the six brands of bread analysed.

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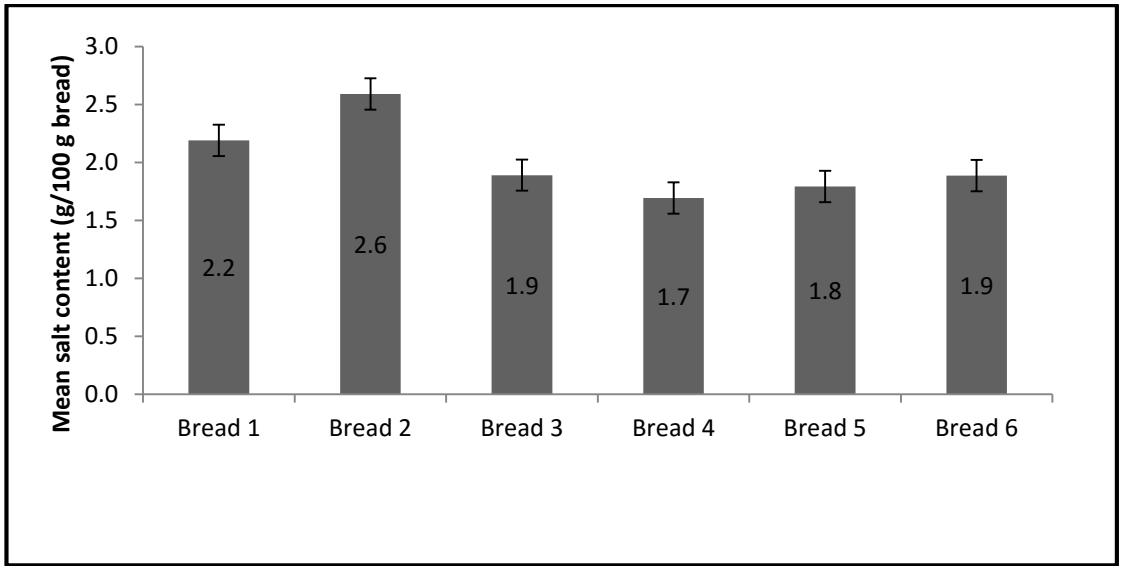

Figure 1: Summary of mean salt content for the six different types of bread

There was a significant difference ($p < 0.05$) in measured salt levels among the different types of bread except for bread 3 and bread 6 whose results showed no significant difference at 5% significance level ($p > 0.05$).

Comparison between the label claim for sodium and the measured concentration
None of the NIPs for the sampled breads had a declared sodium or salt concentration. However, except for bread 3 whose NIP contained no information on minerals, the NIPs for the other bread brands had a declared mineral content of 1.5 g/100 g of bread.

General labelling of the breads
The general labelling of all the breads complied with requirements of MS 31, Malawi standard for common bread. All the labels had the name and business address of the baker, type of bread, net weight of bread and list of ingredients as stipulated in MS 31. The list of ingredients for all the breads included salt as the third largest component. The rest of the ingredients were similar except for bread 3 which did not have soya flour among its ingredients and bread 1 which had 'vitamins' among its ingredients.

Nutrition labelling
The nutrition labelling fell short of the Malawi nutrition labelling guidelines, MS 624 requirements. All the bread labels had a list of ingredients where salt was included, and NIPs too, but sodium content was not declared as stipulated in MS 624. List of ingredients for bread 1 included vitamins but both the specific names and quantities of the vitamins were not included in its NIP contrary to MS 624 requirement. Labels for breads 1, 5 and 6, had nutrition information based on both 100 g serving size and per 2 slices. Labels for breads 2 and 4 had nutrition information based on '1003' serving size and per 2 slices as well. Labels for bread 3 had nutrition information without mentioning the serving size and measurement units for the declared values, rendering the NIP incomprehensible. Specific minerals and their respective concentrations were not mentioned for all the breads. Except for bread 3, the nutrition information on the rest of the bread labels, as well as the NIP format, was similar as illustrated in Table 1.

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DISCUSSION

The high salt content (overall mean= 2.0 g/ 100 g, SD=0.3) found in the sampled breads and the variations in salt content observed among the breads are likely due to lack of a specification on sodium or salt content for breads in the Malawi standard for common bread [18]. Additionally, there is also no national target for salt content in bread. As such, it is at the discretion of the producers to set salt content limits for their breads.

Compliance with general labelling requirement by all breads sampled is likely due to strict enforcement of mandatory general labelling standards in Malawi. On the other hand, non-compliance with nutrition labelling by all bread samples is indicative of laxity in enforcement. This enforcement laxity is evident because breads, like bread 3, with declared nutrient quantities, without stating the sample mass or serving size on which these are based were found on the market. However, the non-compliance could also be due to knowledge gap on nutrition labelling among the producers as it is done occasionally unlike general labelling. Nutrition labelling is mandatory in Malawi only when a nutritional claim has been made or when a relevant product standard stipulates so [19, 21].

Comparison of determined sodium content with declared sodium content on the labels was not done in this study since all the breads sampled had no declared sodium content. Therefore, accuracy of the declared values could not be determined. Nevertheless, it is suspicious that five out of the six different types of breads sampled had similar nutrition information and that all breads had no sodium declaration. Declaration of sodium content is mandatory according to Malawi nutrition labelling requirements and availability of these breads on the market also confirms laxity in enforcement of standards.

The high salt contents and nutrition labelling gaps identified in this study confirms our initial assumption that consumers in Malawi are consuming more of the hidden salt thus exceeding the recommended daily intake unknowingly. More likely, through products that do not taste salty at all, like bread. The findings of this study also confirm what was found in a study on nutrition labelling of foods sold in Malawi by Kasapira and Shaarani [13]. In their study, food products had several nutritional claims but without corresponding information. High level of non-compliance to nutrition labelling guidelines was observed and lack of proper legislation enforcement was also noted.

Though the sampled breads are produced by large bakeries in terms of production volumes in Blantyre city, we acknowledge the limitation that these were sampled in one location, Blantyre. Other producers in Zomba, Lilongwe and Mzuzu cities, who also serve a large population of the country, were not included. The findings are therefore suggestive of the likely national trend rather than being conclusive. In addition, the research did not engage the manufacturers for reasons of their failure to conform to the labelling standards. For these reasons, the researchers suggest that future studies should include surveys on understanding of labelling standards amongst

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manufactures and also that further research be carried out in other cities in Malawi for conclusive national results.

Despite the limitations highlighted, the study reveals serious issues requiring prompt action. Therefore, it is recommended that MS 31, current Malawi standard for common bread which was developed in 1985, should be revised to be in line with emerging public health concerns such as hypertension. Also, enforcement of nutrition labelling should be strengthened to ensure that bread manufacturers are consistently conforming to the nutrition labelling guidelines especially on declaration of serving size and sodium content which must be verified by the regulators. Furthermore, a national policy on salt reduction in foods should be developed to guide stakeholders in salt reduction initiatives. Correct nutrition information, for all nutrients and salt or sodium content inclusive, with correct serving sizes will offer consumers an opportunity to make informed choices when choosing or planning their diets.

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CONCLUSION

In this study it has been revealed that the amount of salt that is used in bread production is fairly high and varied significantly among bread manufacturers in Blantyre, Malawi. In addition, it has been observed that bread manufacturers are not conforming to the national nutrition labelling standard. It is therefore necessary that Malawi should come up with strategies in terms of regulation as well as advocacy to reduce salt in products, such as bread, which have a potential of contributing to high salt intake by the population. This calls for consolidated efforts by all stakeholders to ensure that the Malawian population is supplied with both safe and nutritious food which is a basic consumer right.

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Table 1: Example of the most common NIP and format for the sampled breads

NUTRTIONAL INFORMATION ENERGY	NUTRITIONAL PER 100g* 2309k Cal 985Kj	PER 2 SLICES Approx 70g 1615k Cal 689.5Kj
PROTEIN	8.5g	5.95g
CARBOHYDRATES	48.9g	34.23g
FAT	1.5g	1.05g
MINERAL CONTENT	1.5g	1.12g

* Labels for breads 2 and 4 had ‘1003’ instead of 100g

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