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NUTRITION AND HEALTH-RELATED INFORMATION DISCLOSURE ON PRE-PACKAGED FOOD PRODUCTS FROM LOCAL RETAIL SHOPS IN ACCRA

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ABSTRACT

The prevalence of obesity and diet related non-communicable diseases (NCDs) are rapidly increasing in Africa. Consumption of pre-packaged foods is one of the main drivers of these NCDs. Pre-packaged foods tend to contain high levels of energy, fat, sugar, and salt, which are known risk factors for NCDs. Food labels can guide consumers to make informed healthy food choices. Therefore, it is important to analyze how health-related information is communicated on food labels. In Ghana, there is paucity of evidence on what health-related information is available to consumers of pre-packaged foods. This study describes health-related information on labelled pre-packaged foods sold in local retail shops in Accra. A cross-sectional survey and quantitative content analysis of food label information were employed in this study. Pre-packaged food labels photograph data were sourced from shops and content analyzed to describe their health-related information. Nutrition and health-related information were classified using the International Network for Food and Obesity/Non-Communicable Diseases Research, Monitoring and Action Support (INFORMAS) system. Three hundred and fifty-one (N=351) pre-packaged foods and non-alcoholic beverages were sampled, out of which 2.3% products were unlabelled. Out of 343 labelled products, 92% disclosed ingredient list information and 68.8% had nutrition declaration. Between the two nutrition labelling formats: Back-of-Pack (BOP) and Front of Pack (FOP), BOP was the dominant (87.3%) format. Various types of FOPs were identified however, Guidelines Daily Allowance (GDA) was the most common format. The study found that 18% of labelled pre-packaged foods carried nutrition claim and about 7% had a health claim. Most of the claims were written and the others were a combination of words, numbers, and pictures/symbols. This study has shown a high disclosure of health-related label information on pre-packaged food but information presentations on labels were not consistent. The insight gained from this study shows that the presentation of health-related label information does not meet the current recommendations of Codex and the benchmarks set out by INFORMAS in promoting a healthy food environment.

Key words: Pre-packaged Foods, Food/Nutrition labels, health-related information, retail shops, Accra

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INTRODUCTION

Obesity and diet-related non communicable diseases (NCDS) are the leading cause of death and disability worldwide [1]. In Ghana, obesity and diet–related NCDs are increasing and have become a major public health problem [2]. Trend analyses of Ghana Demographic Health Survey (GDHS) data from 1993 to 2014, show that prevalence of obesity has increased from 3.4% to 15.3% among adults [3]. In a systematic review and meta-analysis, Ofori-Asenso *et al*, [2] estimated that about 43% of adults in Ghana are either overweight or obese. Concurrently, the food system is changing towards increased consumption of pre-packaged foods due to rapid urbanization and economic prosperity [4]. Additionally, there has been massive infiltration of large supermarkets in the Ghanaian food retail sector often associated with higher consumption of processed foods [5]. Increases in consumption of pre-packaged foods, are driven by their accessibility, convenience, palatability and affordability [6].

Regrettably, pre-packaged foods are vectors of these unhealthy diets [7]. These foods tend to contain high levels of saturated fat, trans fat, added sugar and salt, which are known risk factors of NCDs. Consumption of pre-packaged foods, particularly ultra-processed foods (UPFs), has been linked to increased obesity and a worsening burden of chronic diseases [8], [9]. When dietary quality is assessed, a high proportion of ultra-processed foods in the diet indicates a decrease in overall dietary quality, as they easily replace traditional whole and minimally processed foods consumed by populations [10].

It is critical to provide a supportive environment that promotes healthy food choices for improved nutrition. The promotion of accurate and simple-to-understand nutrition information on food labels empowers and enables consumers to make informed purchasing decisions about healthy food products. As a result, governments, food industry stakeholders, and international organizations are promoting nutrition labeling as a critical preventive measure against the rising burden of obesity and diet-related NCDs [11]. The WHO has recommended front-of-pack (FOP) nutrition labeling in this regard as part of its comprehensive strategy to prevent diet-related NCDs [12]. Thus, there is growing interest in FOP labelling which is being implemented by more countries [13].

The FOP labelling scheme is an attempt to improve nutrition information disclosure over the traditional Back-of- Pack (BOP) nutrition labelling, which is difficult for the average consumer to understand [14]. The FOP labelling presents information on the front of food packages in simple and easy-to-understand formats, allowing consumers to make quick decisions about the nutritional content and overall healthiness of food products. There are two main distinct groups of FOP labelling schemes. These are nutrient-specific and summary systems. The nutrient-specific system provides nutritional information for a variety of nutrients in the form of guidelines such as Guideline Daily Amounts (GDA) in the United States, Multiple Traffic Lights (MTL) in the United Kingdom, and warning labels in Chile. Based on a specific nutrition profiling system, the summary system displays information about the overall nutritional

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quality of the food product. The keyhole symbol in Sweden, the choice logo in the Netherlands, the guiding health stars in Australia, and the 5-color nutritional labels (5-CN) in France are some examples [15]. As a result, FOP labels are important public health tools for assisting consumers in making informed decisions when purchasing pre-packaged foods. Even though the MTL system and warning labels have been shown to be preferred by consumers, there is no international agreement on which FOP format would help guide consumers in selecting healthy foods [13].

Health and nutrition claims (HNCs) made on food labels are used by food producers to highlight nutritional or health benefits a product may have [16]. The HNC can influence consumer choice of pre-packaged food at the point of purchase [17]. Research has shown that HNC on labels increases product sales and could lead to consumption of healthy diets [16]. Conversely, they may lead consumers to overrate the healthiness of products and could lead to over consumption. The HNC could also mislead consumers in their food choice by showcasing beneficial aspects of the product while hiding less desirable attributes. The Codex Alimentarius Commission has developed standards and guidelines for labelling of pre-packaged food products. Globally, there are two main regulatory contexts for nutrition labelling on pre-packaged foods; voluntary and mandatory labelling policies [18]. Under the mandatory labelling policy, nutrition information disclosure is compulsory for all or some pre-packaged foods. For, voluntary nutrition labelling policy, disclosure of nutrition information is discretionary except when a claim is made. With Codex's revised position (to recommend mandatory nutrition labelling) [19], there has been a global trend toward mandatory nutrition labelling [20]. However, Ghana operates under the voluntary nutrition labelling regime [21].

Although not all aspects of food labels convey health-related information to guide consumers in their choice of healthy pre-packaged foods, the ingredient list, nutrition information and HNC are all factors to consider when making dietary choices [22]. However, the utility and the benefits of this information will depend on the format, the nature of the message and the nutrition labelling policy context. Therefore, monitoring health-related label information is a vital public health task [22]. The INFORMAS provides a validated set of benchmarks and tools for characterizing the food environment in an effort to monitor and support actions in reducing obesity and NCDs globally [22]. The INFORMAS developed a stepwise approach to assess nutrition and health-related information on pre-packaged food labels [22]. However, in Ghana, labelled information on pre-packaged foods and beverages has never been systematically evaluated to determine health-related information that consumers are exposed to. The goal of this research was to describe health-related information on labelled pre-packaged foods sold in local retail shops in Accra.

MATERIALS AND METHODS

Study design

This study was part of larger study on pre-packaged food labelling and their use in Accra. In this work package, a descriptive cross-sectional quantitative content analysis

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of food label information on pre-packaged foods based on INFORMAS food labelling protocol was employed [23].

Selection of Local retail shops and Pre-packaged food products

This study was carried out in four communities in Accra - East Cantonments, Okaishie, New Fadama and Chorkor. These four communities represented varying socio-economic zones in Accra provided by Accra Metropolitan Authority (AMA), that is from wealthier to poorer neighborhoods- first, second, third, and fourth-class neighborhood communities. Local food retail outlets were classified for this study as pre-packaged food sold by street vendors and traditional non-service shops operating within kiosks or buildings [5]. A cluster sampling design was employed to select pre-packaged foods. In each of the four communities, food retail outlets(clusters) were listed to obtain a sampling frame and a single shop was selected by simple random sampling. In each selected shop, all eligible pre-packaged food products were sampled. This approach allowed for extensive coverage and representativeness of different pre-packaged foods in Accra.

Prior to data collection, using the Cochrane formula, a prevalence rate for health and nutrition claims of 20%, obtained from a similar study in Malawi [24], and confidence interval of 95% gave a sample size of 246 which aligned with samples reported in previous studies [25][26]. However, a total of 351 pre-packaged foods were sampled across ten food groups.

Pre-packaged Food Products Inclusion/Exclusion Criteria

This study focused on pre-packaged foods and non-alcoholic beverages that are consumed by adults and children that are linked to increasing or decreasing rate of obesity and diet related NCDs. Pre-packaged food was defined according to Ghana's Food and Drugs Authority (FDA) regulations and by extension Codex standards [19]; 'any food item for presentation to the consumer made in advance in a container including wrappers such that packaging completely or partially encloses the food item in such a way that the contents cannot be altered without opening or changing the packaging. Ten categories with sub-categorizations of pre-packaged foods were identified for this study. The main groups include Beverages (non-alcoholic beverages), bread and bakery products, breakfast cereal, cereal products, dairy products, confectionaries, sauces, spreads and oils, meat products and fish products, fruit and vegetables and snacks. These categorizations were adapted from the INFORMAS food classification system based on the Global Food Monitoring Group coordinated by the George Institute for Global Health [22]. Baby foods, infant formulas, dietary supplements, special teas, coffees and alcoholic beverages with alcohol content of 0.5% and above were excluded because regulations regarding these products are different [26].

Data Collection procedure

Data collection occurred over a five-day period in March 2020. With permission from the retailers, trained research assistants photographed the front, back, and sides (complete images) of pre-packaged foods available in the stores. Samsung Galaxy 8 tablets were used to capture the images. Unintentional product image repetition was

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avoided by ensuring that products sampled in previous shops were not sampled again. In all, four shops were sampled. Prior to data collection, four research assistants were trained on understanding food labelling based on the INFORMAS module, photography and data entry. The photographic data collection method was pre-tested to ascertain the validity and reliability of the procedure.

Ethical Considerations

This study was approved ethically as part of a larger project. The Noguchi Memorial Institute for Medicinal Research's Institutional Review Board (IRB) approved the study (Ref. No:IRB/081/18-19). Permission was obtained verbally from shop owners for data collection in this work package. It is critical to note that about 40% of shops sampled, owners refused to allow the research team to collect data.

Data Entry, Processing and Management

The product images were organized into a photo database along with the product's unique name and food category. The photo database was managed daily to ensure a clean database by deleting entries of the same products, blurred and incomplete photos of pre-packaged food products. Product photos that were unclear or incomplete were retaken. The photo data were uploaded onto a laptop (Lenovo V330-151KB) in order to view the specifics of each pre-packaged food's photo. The data were then entered into the CSentry system using details of label information as pictures on the laptop and a structured questionnaire programmed on tablets. Label information such as the product name, manufacturer information, the presence of an ingredient list, the type of nutrition labelling (BOP/FOP), the types of FOP schemes (GDA, MTL, Health logo/symbol or 5CN), the contents of the nutrition label such as the presence of the Big 4 (calorie value, fat, carbohydrate, and protein) or the Big 8 (Big 4 plus sugar, sodium, fiber, and saturated fat) and the types of claims as defined by INFORMAS). Two different research assistants entered the same data. After that, the Data Entry database was exported into a Stata data file for cleaning and analysis.

Data Analysis

All the analyses of label characteristics were executed using Stata version MP 16.0 statistical software. A single unique brand of pre-packaged food served as the unit of analysis. Univariate and bivariate data analyses of label characteristics were presented as frequencies and percentages in tables and charts. These were used to describe the health-related label information on pre-packaged foods.

RESULTS

Overview of Pre-packaged Food Products sampled

A higher proportion of the products sampled were beverages (26.5%), closely followed by bakery products including bread (17.9%). However, fruits and vegetables and confectionaries were the least sampled.

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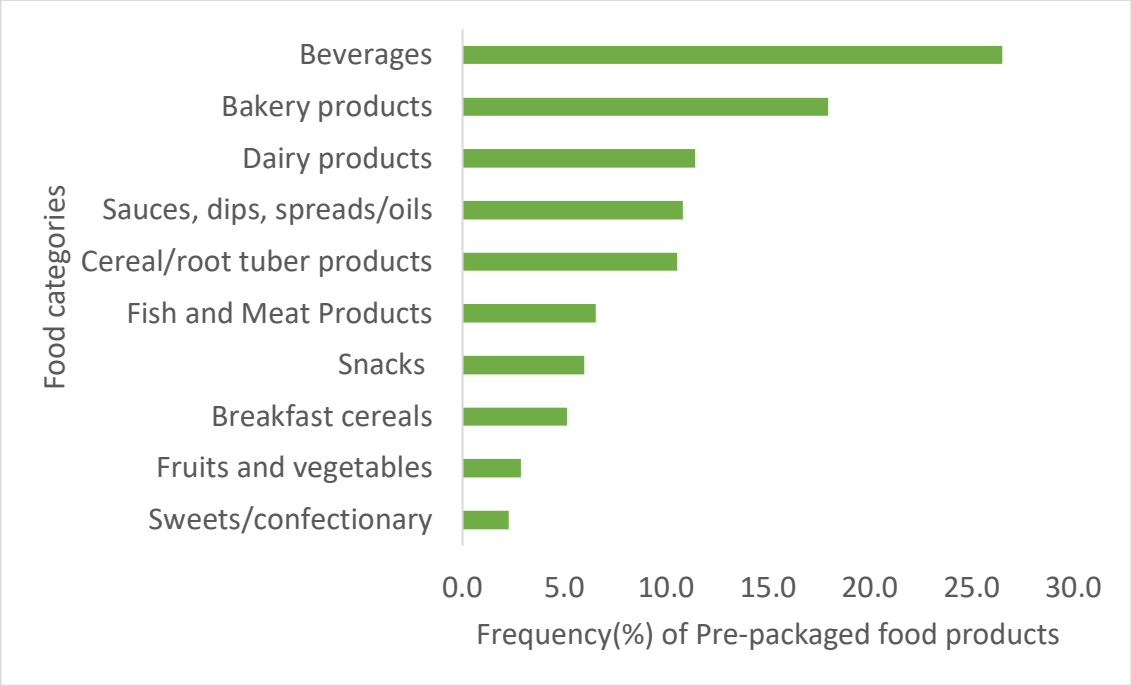

Figure 1: Sampled Pre-packaged Food Products

Nutrition and Health-related Label Information on Pre-packaged Foods

Only 2.3 % of pre-packaged foods examined lacked any kind of label. There was ingredient information on 92% of the 343 labelled products, nutrition declarations on 68.8%, nutrition claims on 17.8%, and health claims on 6.7% (Table 1). When it came to products with nutrition statements, BOP labeling was more common (87.3%) than FOP. On the pre-packaged food products sampled, health and nutrition claims were found. Nutrition claims were found on 17.8% of labelled pre-packaged foods, while health claims were found on 6.7%.

Nutrition Label Information

BOP nutrition labelling profile of the food products are depicted in figure 2. Labels displaying "*greater than Big 4 but less than Big 8"* BoP nutrition information were dominant across most of the food product categories, except for confectionaries. Apart from "*greater than Big 4 but less than Big 8",* "*Big 4" labels* were displayed more frequently on bakery products; "*greater than Big 8"* labels were displayed more frequently on dairy categories. Among the confectioneries, *"Big 8"* was the most dominant category. However, at an α-level of 0.05, a chi-square test showed that there were no statistically significant differences (p=0.06) among the various food categories nutrition labels.

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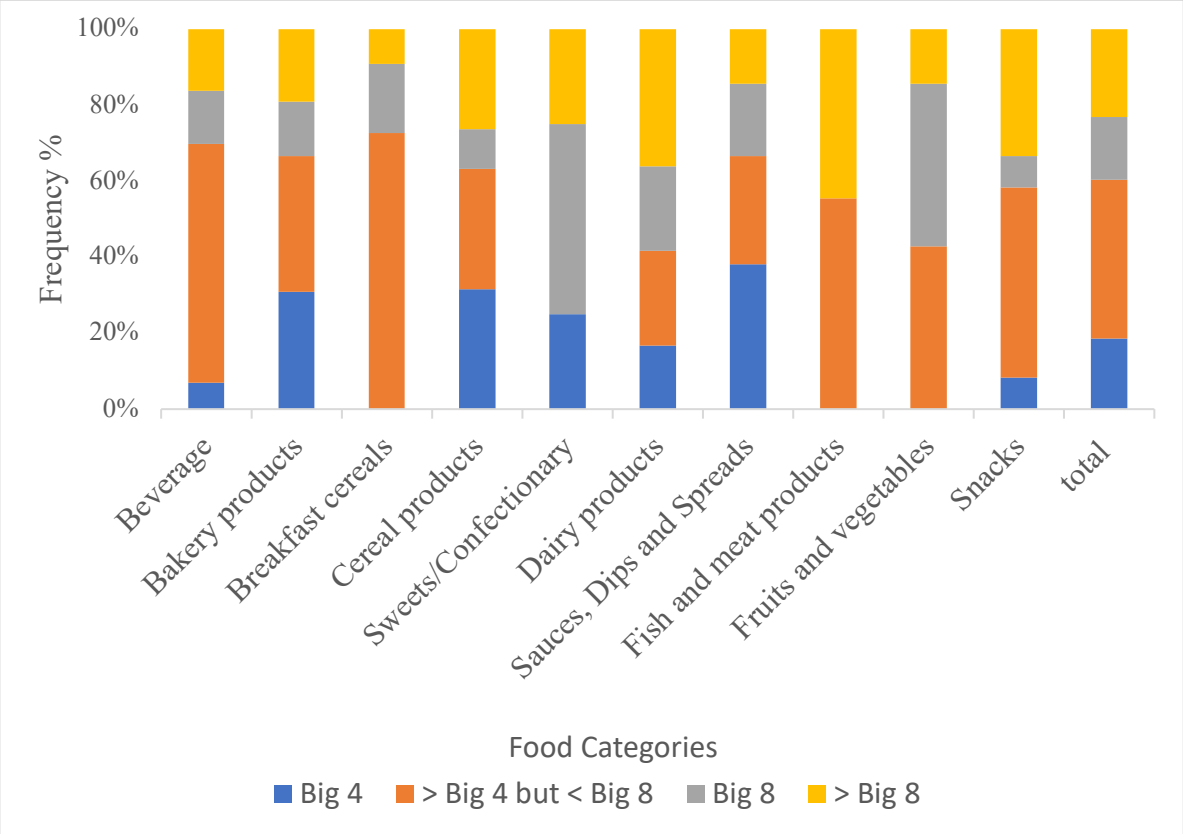

Figure 2: Back of Pack (BOP) Nutrition labels across various pre-packaged food categories:
"Big 4" =energy value, carbohydrates, fat, protein; "Big 8" = "Big 4" plus sugar, saturated fat, sodium and fibre

Types of FOPS schemes present and their country of origin on pre-packaged foods
Four FOP labelling schemes were identified in this study (Table 2); these include MTL, GDA, 5CNS and summary table/logo. All these four types identified Ghana as their country of origin. Majority of the FOPs identified were Guidelines Daily Allowance (GDA). Most of the GDA's country of origin was the US. The only 5-colour nutrient scale identified originated from Ghana.

Distribution of different types of Health-related claims on pre-packaged foods according to food categories
According to INFORMAS taxonomy the types of nutrition claims include health-related ingredient claim, nutrient content claim and nutrient comparative claim. For health claim; general health claim, nutrient and other claim and reduction of disease risk claim (Table 3). In this study, except for reduction of disease risk claim, all other types were found. Nutrient content claim was found across the spectrum of pre-packaged foods sampled (Figure 3). Bakery products carried a larger proportion of Health-related ingredient claims.

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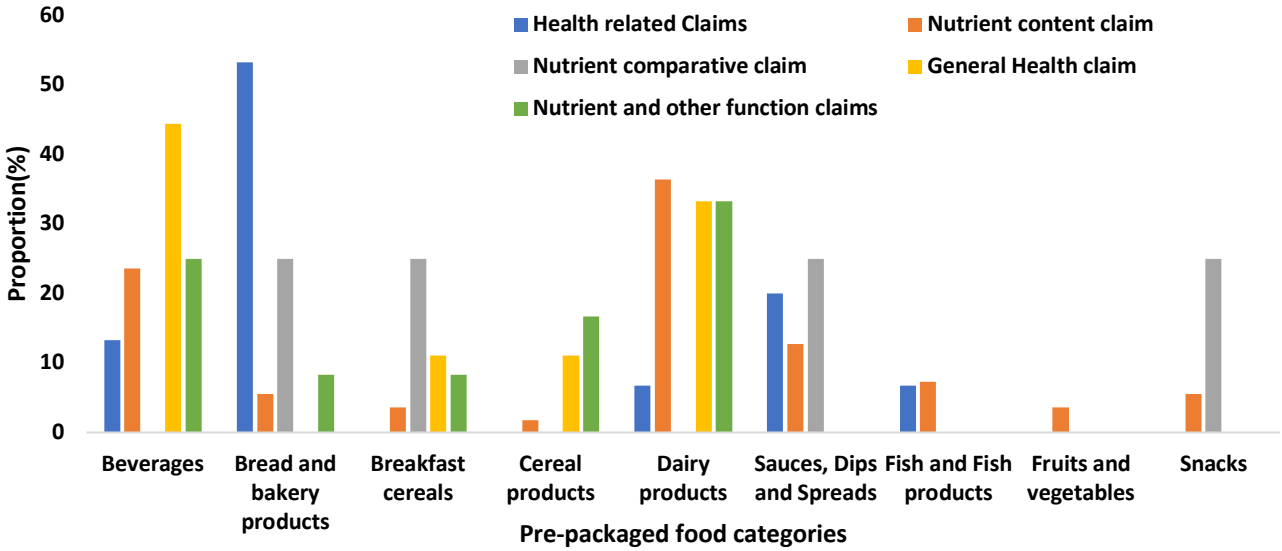

Figure 3: Distribution of different types of Health-related claims on pre-packaged foods according to food categories

Types of Health and nutrition Claims, claim phrases and their frequencies

Table 3 shows the different types of health and nutrition claims together with illustrative examples of the stated claims with their frequencies. *Nutrient content claim* was the most frequently stated nutrition claim. *General health claims* and *nutrient and other function claim* types of health claims were least stated. Furthermore, claims were classified as those with text, numeric or symbolical/pictorial formats and mixed formats (combination of text, symbol, or numeric). Most of the claims' presentations on labels were textual; symbolic format claims were the least frequently identified.

DISCUSSION

The results showed that beverages, bakery and dairy products in the three leading categories of pre-packaged foods found in these local retail shops in Accra (Figure 1). This suggests that consumption of products in these categories are high. Therefore, a higher supply in these shops was needed to keep abreast with the demand. In a study investigating the food environment in Accra, the sale, advertisement and the consumption of these three categories were found to be high [4]. Regarding investigations regarding health-related information on pre-packaged foods, the focus had been FOPs and health and nutrition claims. However, ingredient list is an important source of information to aid consumers evaluate nutrient profiles of food products. For example, the 2010 US Dietary Guidelines states that; "increase whole grains in place of refined grains by using the ingredient list on packaged foods to select foods that have whole grains listed as the first grain ingredient" [27]. High prevalence of ingredients list on pre-packaged foods sampled is probably because it is a mandatory requirement for general food labelling, except single ingredient products. Notwithstanding, although mandatory food labels are a requirement for pre-packaged foods in Ghana, some pre-packaged foods did not have labels. Non-compliance to mandatory labelling

requirements and weak enforcements tends to be common observations with countries with voluntary nutrition labelling [24].

The study suggests disclosure of health-related information on pre-packaged foods was appreciable against the backdrop that nutrition labelling policy in Ghana is voluntary. The extent of nutrition information declarations are consistent with a study in Malawi, a country with similar nutrition labelling policy [24]. However, higher rates were reported in developed countries [28]. For instance, at a time nutrition labelling policy was voluntary in the European Union, 85% was reported for pre-packaged foods across five food categories from 28 countries [28]. In the USA, 98% of pre-packaged foods audited had BOP labels and 43 % of newly food products on the market had health or nutrition claims [29].

Regarding the details of BOP labelling, the provision of nutrient list and values were inconsistent across the food product categories. This inconsistent trend of BOP labelling is also a feature of countries having voluntary nutrition labelling. In a study examining nutrition labelling on pre-packaged foods in Serbia, inconsistent forms of BOP labelling dominated their market space [30]. In such jurisdictions, manufacturers are permitted to present nutrition information in a way that suits them. In this situation, food companies are unlikely to report unfavorable attributes of their product. Depending on the type of claim made, the manufacturer must provide nutrient values consistent with the claim [21]. This inconsistent provision of the nutrient list makes it difficult for consumers to compare the same products across different brands. Also, this study found that '*greater than Big 4 but less than Big 8'* description of the BOP nutrition was dominant across most of the food product categories. Presently, Codex recommends mandatory nutrition information for proteins, available carbohydrates, saturated fat, total fat, sodium, sugars, total calories, serving sizes and nutrients relative percent daily values [19]. Likewise, this recommendation is in line with the proposed benchmark of INFORMAS [22]. With these current recommendations, nutrition labelling prevalence found in this study is unsatisfactory.

It is interesting to note most of the FOP schemes identified were produced locally. A possible explanation for this observation is that Ghanaian food industries export to countries where FOP labelling schemes have been implemented. They would normally adhere to their specifications. Another plausible reason is the infiltration of transnational food companies producing food products for the local market and export [5]. The study identified GDA as the most prominent form of FOPs and 5CN. These findings are consistent with other studies examining the extent of penetration of FOP labels [17], [28]. The GDA provides nutrient values for energy, key nutrients and their percentage daily values in relation to stated Nutrient Reference Values (NRV). However, without implementation of a standardized interpretative FOP and its regulation, influx of all manner of FOPs can be seen only to increase profit margins of food companies rather than achieving a public health policy.

The study also assessed the prevalence of nutrition and health claims on pre-packaged foods. Twice as many foods carried nutrition claims (18%) compared to health claims (7%). Much of the nutrition claims related to "nutrient content claims" and much more

of "nutrient function and other claims: for health claims. Furthermore, most of these claim's presentations were textual. These results may be explained by the fact that most nutrition marketing strategies are presented in catchy phrases on food labels to influence consumer food purchase and increase sales. Food label at point of sale is an advertising tool and can influence product sales. In the study of Kasapila and Shaarani [24], the prevalence for nutrition claims present on pre-packaged foods in Malawi was 14.8%, 20% for South Africa and 36.6% for other Southern African countries [24] as compared to 18% reported in this study. Outside Africa, in a related study of five European countries in 2015, an average of 21% of products carried a nutrition claim [17], 29% reported for a study undertaken in the UK in 2011 [26] and 37% in Slovenia in 2015 [31]. Likewise, in this present study the prevalence of health claims was 7% as compared to 11% reported in the European study [17], 15% in the study in the UK [26] and 13% in the Slovenia study [31]. It is important to note that under current voluntary nutrition policy, for claims to be made on pre-packaged foods they must be substantiated. However, little is known about the level of compliance to and enforcement of this directive in the Ghanaian setting. In many developed countries, the use of health and nutrition claims is well regulated. For example, food producers are only allowed to use authorized health claims in the European Union register.

This study appears to be the first in Ghana to describe health-related label information on pre-packaged foods. However, besides the inherent weakness of cross-sectional studies, the scope of this work was limited, and the sample size recorded was small. Therefore, one must be cautious in generalizing the findings of this study. Also, this study did not account for seasonal variations in food availability. This calls for further research on these issues.

CONCLUSION

Our study found that most of the pre-packaged food products sold in local food retail shops in Accra carried nutrition information. The nutrition information was more of BOP than FOP. Also, most labelled pre-packaged food products had ingredient list components of food labels. Various types of FOPs were identified; however, GDA was the most common format. The study found that nutrition claims were twice as much as health claims on pre-packaged foods. Most of the claims were written and the others were a combination of words, numbers and pictures/symbols. This study has shown a high disclosure of health-related label information on pre-packaged foods but information presentations on labels were not consistent. Health-related information on pre-packaged foods has the potential to help consumers make healthier dietary decisions, however, the provision of inconsistent label formats and multiple systems may lead to consumer confusion. More simple and standardized nutrition information is required. Therefore, a conscious regulation of the sector is important especially about the use of health and nutrition claims. Furthermore, efforts towards mandatory nutrition labelling policy for Ghana is imperative.

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Table 1: Health-related and Nutrition label information on sampled Pre-packaged Foods obtained from neighborhood shops in Accra

Health-related Label Characteristics	Total [N]	frequency[f]	%
Food products with label	351	343	97.7
List of Ingredients	343		
Food products without List of ingredients		21	6.2
Food products with List of ingredients		315	91.8
Single Ingredient Foods products		7	2.0
Nutrition label declarations	343		
Products without nutrition declarations		107	31.2
Products with nutrition declarations		236	68.8
Type of nutrition declaration	236		
BoP*		204	82.3
FoP#		32	12.7
Types of claims on labels	343		
Nutrition claims[a]		61	17.8
Health claims[b]		23	6.7
Other claims[c]		119	34.7
No claims		140	40.8

***Back-of-Pack**; #**Front-of-Pack**; **Nutrition claims[a]**: "Any representation which states, suggests or implies that a food has particular nutritional properties including but not limited to the energy value and to the content of protein, fat and carbohydrates, as well as the content of vitamins and minerals". **Health claims[b]** are "any representation that states, suggests, or implies that a relationship exists between a food or a constituent of that food and health". **Other claims[c]** refers to other claims not related to nutrients or diseases but could be health-related such as gluten free, environment-related such as organic or food description such as tasty

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Table 2: Types of FOPS schemes present and their country of origin on pre-packaged foods

Types of FOP schemes	Countries of Origin					Total
	Ghana	UK	USA	Africa	Other countries	
Multiple Traffic Light-MTL	3	0	0	0	1	4
Guideline Daily Allowance -GDA	8	3	7	3		21
5-Colour Nutrient Scale -5CNS	3	0	0	0		3
Summary Table/Logo-SUML	1	0	0	0	3	4
Total	15	3	7	3	4	32

Table 3: Types of health and nutrition claims, illustrative examples, and format of presentation on Labels

Types of Health and Nutrition claims	An illustrative example of the claims	Claims format				
		Text	Symbol	Mixed	Total	%
a. Nutrition Claims						
Health-related ingredient claim	100% cocoa	11	0	3	14	16.7
Nutrient content claim	Low cholesterol	29	4	9	42	50.0
Nutrient comparative claim	Higher in Fibre	5	0	0	5	6.0
b. Health claims						
General Health claim	Super healthy	14	0	2	16	19.0
Nutrient and other function claim	Calcium for stronger bone	6	0	1	7	8.3
Total		65	4	15	84	

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