American Journal of
Food Sciences and Nutrition
(AJFSN)

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AJP

American Journal of Food Sciences and Nutrition
ISSN 2789-3154 (Online)
Vol.4, Issue 2, pp 9 - 23, 2022
www.ajpojournals.org

Improper Food Labeling and Unverified Food Claims: Food Safety Implications

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Abstract

Purpose: Increasing food safety and nutritional concerns the world over has made proper food labeling and verification of food claims mandatory. Food labels offer many functions one of which is establishing communication between food manufacturers and consumers. When food labels bear false information or unverified claims, it defeats the aim of "protecting consumers health and preventing food fraud" as stated by Food and Agriculture Organization. This act poses food safety risks to consumers as in cases of food allergies. This study aimed at reviewing the current situation of food labeling and food claims in different regions including Africa, Europe, America and Asia; the safety implications of improper food labeling and unverified food claims, and the role of government, consumers and manufacturers as stakeholders in ensuring proper food labeling.

Methodology: Several scholarly works were consulted and screened for information relevant to the subject. Most previous studies on food labeling revolved around awareness and consumer behavior towards usage of labels on prepackaged foods. Information regarding the food safety implication of claims on food label was found to be scarce.

Findings: Results from this review reveal progress so far while encouraging Food Scientists, Food Microbiologists, Food Developers, Plant Scientists and relevant professional bodies to research and provide more insight towards plant/food ingredients and their potential to offer nutrient and health benefits in order to substantiate current and future food claims.

Recommendations: Intensification of efforts by the government and regulatory bodies towards regulation of food labeling and usage of logos; verification and approval of health and nutritional claims is recommended, especially in developing countries. Sensitization of consumers (especially the elderly and consumers with special health needs) by nutritional society groups, government and non-governmental bodies is also recommended to ensure correct understanding and interpretation of nutrient and health claims.

Keywords: *Food labeling, food claims, food safety, nutrient claims, health claims*

1.0 INTRODUCTION

We are what we eat, hence knowing what we eat; the composition, benefits and sources should also be of great significance and concern to us. Such information or claim can be obtained from the food label. Based on the United States Food and Drug Administration (US FDA) regulations, there are three classifications of claims that can be written on food labels. They include claims that highlight the health benefits of food, claims that highlight the nutrient content of food, and claims that highlight the structure or function of food (US FDA, 2022). Every consumer has the right to know, as this is one of the concepts of health freedom. Healthy food choices can hardly be made if one is void of or misinformed of the food composition. Also, health risks and hazards are liable to thrive on the advent of improper food information. The wide gap created by miscommunication of the health benefits of food is reduced or even closed when food manufacturers use food labels as a communication tool. This in turn helps consumer's make informed decisions regarding their diet (Jordan Lin *et al*., 2004; Loureiro & McCluskey, 2000).

Economically, consumers and/or customers run at a loss as value is not gotten in return for food purchases made in the case of improper food labeling and unverified food claims. This can be likened to a case of food fraud. Studies have suggested that all food buyers do not see food label information as a factor to consider while shopping (Jáuregui *et al*., 2020). However, this should not serve as a ground to neglect the implementation and sustenance of proper food labeling and verification of food claims, as the well-being of the public is at stake, and not just that of a targeted few. The enforcement of governmental food policies and regulations are promoting factors to achieving food safety standards, overseeing compliance, and rendering timely interventions to non-adherence.

The regulatory agency in charge of food and drugs in Nigeria which is the National Agency for Food and Drug Administration and Control (NAFDAC) has been authorized by virtue of a federal government law propounded in 2004, to elevate the acceptable conditions for food manufacturing as well as legal action against food products that constitute adverse health effects to consumers (Danilola *et al*., 2019). Consumers make informed decisions through the aid of food labeling (Jáuregui *et al*., 2020). Credible information makes known the essence of a thing and proves it probable. In many countries, food product labeling is a policy tool used by regulators to gauge the response of consumers to health information and is used by food companies for product differentiation strategy (Kaur *et al*., 2016). It is safe to say that food safety encapsulates not just the food product, but the credibility of the information on the packaging material. It is the responsibility of food business owners, importers, manufacturers, packers, and vendors to see to the compliance of food safety standards and alignments to food claims and labeling regulations (Food Safety & Applied Nutrition Directorate, 2014). NAFDAC has stated that food labels must have attributes of the name of that particular food product. Other important attributes of food labels are: visible information, the name which indicates the true nature of the food specific terms, ingredients listing starting the ingredient with the highest inclusion rate, net weight, shelf-life, recommended preservation method, batch details, name and production location of the producer, allergen declaration, nutrition labeling, and other particulars which require a mandatory mention, for example, irradiation (FSAND, 2014).

2.0 CURRENT SITUATION OF FOOD LABELING AND FOOD CLAIMS IN DIFFERENT REGIONS: AFRICA, EUROPE, AMERICA, ASIA

2.1 The Situation in Africa

The Food and Agriculture Organization (FAO) of the United Nations has recommended a guideline for food manufacturers which requires providing nutrition information or nutrition facts on food labels to enable consumers make informed decisions in many developing nations, as well as developed countries (Codex Alimentarius, 2020). Countries in Africa including Nigeria have started developing and implementing guidelines for food labeling (NAFDAC, 2014), while South Africa has shown great effort in ensuring standardized food labeling and food claim procedures (Van der Merwe & Venter, 2010). In Africa, South Africa is the only country that uses glycaemic index (GI) rating as claims on food labels and this is a specification from the Department of Health's Regulation 1055 which was adopted in 2002 (Barclay *et al.*, 2021). The regulation 1055 states that the Glycaemic Index nutritional claims may only be used for foods with not less than 40% cumulative glycaemic carbohydrate value out of the total energy value of the food. The regulation also requires stating whether the Glycaemic Index is low, intermediate or high whenever it is inscribed as a logo on a food label. These specifications of the Glycaemic Index nutrition content claims, as specified within the legislation (Barclay *et al.*, 2021), see Table 1. In 2010, the Department of Health's GI Regulation 1055 was revoked and substituted with Regulation 146 which is neither for nor against the use of GI nutrition content claims on food labels. Consequently, GI claims was added to the draft Regulation 429 food labeling rules in South Africa. The Glycaemic Index Foundation of South Africa (GIFSA) developed the glycaemic index symbols which was approved in 2011 by the South African Director-General of Health, see Figure 1.

Ogunmoyela *et al*. (2021) in their study evaluated the situation of nutrition labeling in processed food products available in markets across the city of Lagos, Nigeria. Information gathered from this study indicated that the 'eye logo' was the only standardized, government regulated logo across the board. The eye logo depicts vitamin A fortification of food in Nigeria. Vitamin A fortification became imperative in Nigeria because of the high incidence of mother-child deaths of which one major causative factor is the deficiency of vitamin D all over the world (Emerald, 2012). In order to nutritional content of food in terms of vitamin and mineral composition, some group of professionals drawn from NAFDAC and the Standard Organization of Nigeria (SON) selected 3 food sources (flour, sugar and vegetable oil) based on availability and affordability and identified limits for each nutrients. Consequently, The Food Fortification Programme was birthed in the later part of 1990. The Food Fortification Regulations 2021 of NAFDAC has outlined regulations concerning label declaration of food mandatorily fortified with vitamin A (NAFDAC, 2021).

2.2 The Situation in Europe

The European Union over the years has shown unwavering commitment towards ensuring the health of her citizens especially when it concerns food safety. This obligation birthed Functional Food Science (FUFOSE) project which took place in 1995 as well as the Process for Assessment of Scientific Support for Claims on Foods (PASSCLAIM) project held in 2001 (de Boer, 2021). The outcome of these projects pointed out the need to develop some specific categories for food claims and also supplied a scientific basis to substantiate the claims (Aggett *et al*., 2005). The European Commission in the year 2000 through a White Paper on Food Safety expressed their plans to control food claims relating to nutrition and health (Skogstad, 2001). The General Food Law (GFL, Regulation (EC) No 178/2002) finally developed in

Europe in 2002 laid the foundation for laws aimed to regulate food safety throughout the food production value chain (Szajkowska, 2009).

Through a series of policy documentations and proposals inspired by previous research works, a conclusion was reached in December 2006 and the Nutrition and Health Claims Regulation was accepted (de Boer *et al*., 2014). This regulation was specifically designed to protect consumers by utilizing facts gathered about the food. The facts of interest are: the nutritional content of food and the favorable health effect of the constituting ingredients (European Commission, 2020). The European Union also accepted nutrition and health claims Regulation (EC) No 1924/2006 which was enforced to defend consumers from untrue and unverified food claims (European Committee, 2006). Similarly, the European regulation on Food Information to Consumers (FIC) No 1169/2011 was also designed to help consumers get appropriate information on foods by making it mandatory for certain elements to be included in labels (Stuyck, 2013). As at 2014, the Nutrition and Health Claims Regulation (NHCR) had a total of 30 authorized nutrient claims and 265 authorized health claims (de Boer, 2021). However, reports from an evaluation conducted from 2015 to 2020 indicated that the NHCR was yet to attain its objectives (European Commission, 2020). de Boer (2021) in his study highlighted the major challenges European Union's nutrient and health claim regulatory bodies are faced with: botanicals, lack of developing nutrient profile for foods, consumer understanding of claims, measuring health effects, and effective enforcement.

2.3 The Situation in America

The United States FDA Center for Food Safety and Applied Nutrition conducted a survey concerning food label/package in 2000-2001. From this survey, the following were observed: there were about 1281 FDA-regulated processed and packaged food; that the level of compliance to nutrition label regulation for packaged food based on the data collected from the study was 98.3 %; that 1.7 % of food products were those excluded from the nutrition labeling requirements (Legault *et al*., 2004). In another national survey conducted by Ollberding *et al*. (2011), the following were observed: 61.6 % of survey participants checked at the "Nutrition Facts" panel at least once before buying a food product; 51.6 % checked the list of ingredients; 47.2 % checked the serving quantity; 43.8 % checked the health claims on the food (Ollberding *et al*., 2011). Past studies carried out reveal that about 45 to 80 % of US adults read food labels (Bender and Derby, 1992; Guthrie *et al*., 1995; Wang *et al*., 1995; Blistein and Evans, 2006; Neuhouser *et al*., 1999; Satia *et al*., 2005), with corresponding improved dietary habits traceable to these practices (Neuhouser *et al*., 1999; Satia *et al*., 2005; Lin *et al*., 2004; Kreuter *et al*., 1997; Kim *et al*., 2001).

The US FDA has the responsibility of regulating health and nutrition claims in the US based on the 1990 Nutrition Labeling and Education Act (NLEA). The act is an amendment of the 1938 federal Food, Drug and Cosmetic Act. It also serves as a replacement for 1938 federal Food, Drug and Cosmetic Act and the 1966 Fair Packaging and Labeling Act. The US FDA controls labeling of food which includes nutrition information, nutrient claims as well as health claims (US FDA, 2013). Despite the fact that there are no particular criteria for the nutrition facts label proportion, the requirement as given by FDA states that "Nutrition Facts" should occupy the entire breadth and bear the largest font size on the food label. This is to ensure label readability and conspicuousness (Lwin, 2015). There are different health claims recognized in the United States, they include: Significant Scientific Agreement (SSA) claims, FDA modernization act (FDAMA) claims, and qualified health claims (Kušar *et al*., 2021). Apart from the above listed claims, other claims not mentioned in the NLEA but stated in the 1994

Dietary Supplement Health and Education Act (DSHEA) include function claims, structure claims, nutrient deficiency disease claims and general well-being claims (Kušar *et al*., 2021).

The code of federal regulations and other special guidance documentation applicable in the US requires that the health claim dossier give details of the food product's safety as a specific requirement for the approval of new health claims in food products. Prior to submission of a health claim, the food safety status of usage of the food or food ingredient awaiting approval must be ascertained (for instance, the food material must be approved for use as an additive in food, GRAS (generally recognized as safe), or approved by a preceding authorization from FDA) (US, 2014; US FDA, 2009, 2013; Kusher *et al*., 2021). Also, in terms of food safety considerations, FDA regulations specify that all information relevant to the assessment of the health claim proposal be provided during submission and application stage, including favorable and unfavorable publications (Kušar *et al*., 2021). Although the FDA and USDA have taken steps to ensure that food labels do not mislead food consumers via usage of ambiguous jargon, the Center for Science in the Public Interest contends that these efforts are minute implying that the agency needs to do more to prevent deceptive nutrient and health claims (Lwin, 2015; Seiders & Petty, 2004), thereby checkmating the increasing usage of unverified and deceptive food claims (Hoffmann & Schwartz, 2016).

2.4 The Situation in Asia

Countries in the Southeast Asia region have deployed strategies to harmonize food label regulation, which has somewhat been achieved although there are still differences between them. When drafting their food labeling regulations, several countries in the region are noted to have adopted the international Codex Alimentarius guidelines for food labeling (Kasapila & Shaarani, 2011).

Putting nutrition labeling and claims into consideration, there are currently zero standardized nutrition labeling and claims regulation in the Southeast Asian countries. Generally, each country follows the Codex recommendations for nutritional content and nutrient/function claims with differing qualification requirements among the countries. On a regional level, adherence to the minimum requirements stipulated by the Codex standards is a must. Deceptive claims are not tolerated and claims that promise reduction of risk to certain diseases are not allowed in some countries like Philippines, Singapore and Indonesia (Kasapila & Shaarani, 2011; Tee *et al.*, 2002; Lwin, 2015). The Agri-Food and Veterinary Authority (AVA) in Singapore is in charge of monitoring labeling of food and food claims (health and nutrition claims) to ensure conformance to the Health Promotion Board's recommendations. Thailand's Food and Drug Administration (FDA) adopts the US FDA's standards as a reference for regulating health and nutrient content claims in Thailand. Both Singapore and Thailand adopt the Codex guidelines on food labeling (Preechajarn, 2007; US FDA, 2013).

The Food and Drugs Monitoring Agency (FDMA) in Indonesia is in charge of nutrition labeling. While efforts are currently underway to revise the 2004 food labeling laws to address issues such as health and nutrition claims, as well as the nutrition labeling and serving size tolerance levels, food manufacturers who seek to make claims not covered by the current laws must put forward a formal proposal to FDMA which will be reviewed and approved if the requirements are met (Sihombing, 2010; Lwin, 2015). In addition to national labeling and advertising requirements, the Philippines have embraced the Codex recommendations. Mandatory nutrition labeling, nutritional content claims, comparison claims, and health claims are all governed by these criteria (Alcaraz, 2012). The Food Safety and Quality Division under the Malaysian Ministry of Health oversees matters relating to health and nutrient content claims. Nutrient content claims, comparative and function claims, fortification and enrichment claims,

and any statement with synonymous connotation is included in the nutrient claims approved by the ministry. On the other hand, use of disease risk reduction claims and health claims are prohibited in Malaysia (Eksan, 2010).

Tao *et al*. (2011) in their study discovered that the level of nutrition labeling of food in China was very low (as low as 30%), as shown in food products sold in the metropolis and in urban markets. In China, food nutrition labeling was declared by food manufacturing companies out of goodwill until 2008 when the Chinese Ministry of Health published and endorsed the maiden Chinese Food Nutrition Labeling Regulation (CFNLR). Although CFNLR is the regulatory framework that oversees food labeling and food claims in China, there remains much to be done as CFNLR is optional which gives room for a lot of flexibility (Tao *et al*., 2011). China has a total of twenty-seven approved health claims, twenty-four are function claims while the remainder are claims relating to reduction of disease risks (Yang, 2008). There is a list of the approved health claims in China, see Table 2. However, there are some mandatory series of food regulations for food labeling in China since 1987. They are: Pre-packaged Food with Nutrition Claim Labeling Regulation, Alcohol Drinks Labeling Regulation, and Baby Food Labeling Regulation. Summarily, compulsory regulation of food labeling is required across the board in China to help facilitate food labeling awareness.

3.0 SAFETY IMPLICATIONS OF IMPROPER FOOD LABELING AND UNVERIFIED FOOD CLAIMS

The desire to minimize increased consumer demands for transparency by food producers birthed the idea of labeling food (Swartz, 2019). The concept can be dated back to the 17th century era where animal skin was tied to the neckline of champagne bottles and in the 18th century when alcoholic beverages were labeled to indicate the manufacturer's name, quantity and quality of content.

Over time, this practice has gained wide application in several parts of the world as a result of its numerous merits, one of which is the correct identification of products (Marcotrigiano *et al*., 2018). In recent times, these food labels have been modified into food safety signage which serve as a reminder to food consumers notifying them of the suitability of the food for human consumption (Swartz, 2019). Food producers are required by government regulators to provide nutrition, microbiological and physicochemical information of the food on the label to ensure the safety of consumers. This affords the food consumer the opportunity to make selection of products based on values such as consumer risk tolerance and the nature of the product (genetically modified or organic).

A lot of people are becoming more conscious of the food they consume, more so, industrially processed food products (Viola *et al*., 2016). It therefore becomes difficult for consumers to have basic knowledge of their food when food manufacturers intentionally falsify nutritional content by declaring untrue claims on the packaging. Dadhich (2011) reported that improper food labeling and unverified food claims are common among food industries that desire to increase sales and profit without considering the potential risks the practice poses to consumers. Though, in some cases, the labeling may be correct but unable to pass the intended information, as such leading consumers to make false inferences.

When a food product bearing deceptive label is marketed by a manufacturer, consumers are robbed of facts which could protect them from adverse health effects and allergic reactions (Marcotrigiano *et al*., 2018). In an article by Ajay (2019) in "The Conversation", a report by Natasha Allergy Research Foundation estimated the number of hospital admissions of children with anaphylactic shock to have progressed over the past 6 years by 72%. The author further

laid emphasis on the case of 15 year old Natasha Ednan-Laperouse whose tragic death occurred in 2016 due to an allergic reaction she experienced after consumption of baguette which had sesame (an allergen) that was not stated on the label. Improper food labeling resulting from withholding information in non-pasteurized fruit juice labels has also been implicated in foodborne disease outbreaks in the United States.

The effect of deceptive food labeling information often differs from one divide to another, with some divides being more vulnerable than others. For example, the young inexperienced and the aged stand a higher risk of falling victim to deceptive food labeling. Similarly, diabetic consumers are likely to be lured in by reduced sugar or zero sugar claims in food products. It is common to make an assumption that any food with such claims is suitable for diabetics and this may not be so in all cases (Randell, 2010). There are a lot of serious issues around food labeling that are yet to be addressed, however proper verification should be conducted to ascertain that foods really contain substances that pose health threats to some consumers. This is to ensure that some allergy sufferers do not limit their choices and end up not eating foods that are safe.

4.0 THE ROLE OF DIFFERENT STAKEHOLDERS IN FOOD LABELING: GOVERNMENT, CONSUMERS, MANUFACTURERS

Food labeling is the chief mode of information dissemination from food manufacturers to consumers. The Codex Alimentarius standards by FAO and WHO on food labeling was published to permit knowledge and adoption of food labeling by the government, regulatory agencies, food manufacturers, retailers and consumers (FAO/WHO, 2007). Food labeling enables consumers to have proper understanding of the constituents and ingredients that make-up their food thereby promoting openness and easy access to relevant information which will be useful during purchases.

4.1 Government

The US FDA in January 2020 reviewed her labeling guide to inform businesses that a yearly average sales of over ten million dollars will result to compliance with FDA labeling rules. They further went on to state that by the same date, all food businesses are required to update their labels with FDA's new regulation mandating remarkable changes to the nutrition facts, serving quantity, daily allowance, types and size for certain constituent element, new declaration for added sugar, new footnote for defined daily value (DV) and nutrient requirement (US FDA, 2022). Based on information from the EU, Food Labeling Information System (FLIS) gives users an information technology friendly solution which enables them to choose and promptly retrieve the mandatory EU labeling indications in different languages; also providing links to relevant legal provision and existing guidance documents (European Commission, 2020). The role of the government concerning food labeling regulation is to establish consumer's right to safe food with accurate and honest information. In 2012, the Codex Alimentarius recommended a guideline that nutrition labeling must be provided even if there is no declared health claim on the food. However, some countries still opt for a voluntary food labeling system. Countries such as Canada, Australia, India, and United States ensure food labeling is made mandatory while Nigeria, South Africa, Japan, Kenya, Thailand, Turkey among others continue to use voluntary labeling system (Koen *et al.*, 2016).

4.2 Consumers

A functional food labeling is relevant in allowing consumers make judicious choices about food. Survey has shown that consumers on an average respond positively to verified health claims indicated on food labels but another model reveal a considerable heterogeneity in

consumer behavior towards the source of such verification i.e if the verification of the health claim of food label was done by the government or a third party such as a Heart or Stroke Foundation (Zou & Hobbs, 2010). Pictorial representations (partial claims) has been purported to convey deeper information compared to written information (full claims) when the intent is to inform consumer about the functional benefits of a certain food product because pictures or images tend to attract attention and may be easier to understand than written claims which consumer may not take time to read or find its meaning elusive. To this end, symbols and logos of endorsement or healthy recommendations by heart foundations or diabetic associations and the likes gives consumers restive assurance about a food product but most times consumers are noncommittal over who or which organization approved such claim (Zou & Hobbs, 2010). Consumer-oriented research on the use of nutritional labeling information by Adesina *et al.* (2022) shows that half of the time, consumers in Lagos, Nigeria make choice of which food product to go for based of the content of food labels and another half of the time consumers can neither read nor comprehend the dialogue represented on food labels. The need to promote good health also contributes to the use of food labels. Women in the guise to monitor their diet, gain or lose weight and remain in good body form actually show more interest in food labeling as opposed to men with higher risk appetite and less concern about their weight. Comparatively, a research involving 2192 respondents in India has about 95.8% of its respondents being aware of nutrition food labeling and 88% of them use the food labels. Another 65% reportedly use food labels to avoid harmful constituent of food (Donga & Patel, 2018). The marked difference in consumer orientation about the use of food labels can be alluded to varying level of education, development and poverty. Consumer's choice on a food product may also be influenced by food labels (external influence), need or other factors, see Figure 2.

4.3 Manufacturers

In some climes like Canada, the allowable health claim on functional food products is so restricted that manufacturers resort to the use of pictures and visual imagery (partial claims) to suggest the health benefits of food. For example, picture of a red heart on food label suggests a product that is heart friendly (Zou & Hobbs, 2010). In Africa, using Nigeria as a case study, manufacturers over time have used their food labels both as an advert medium, a means to earn consumer continuous patronage over other competitors, as well as a means to share the nutritional gains of the food to consumers. The competitive advantage a food label may have is embodied in the beauty or the attractiveness of the label. Other advantages are garnered in the complete disclosure of various food composition like protein, fat, carbohydrate; food additives like preservatives and so on. Today, ready-to-eat foods and take-out from restaurants to a large extent indicate the content of their food on the labels in other to avert possible lawsuit from the consumption of allergenic foods. Such ready-to-eat foods now have labels itemizing possible constituent food allergens such as nuts, prawns, crustaceans, milk (lactose) as the case may be (NAFDAC, 2014). Tobacco brands has even gone further to add two pictures of liver on their cigarette label; one is a healthy liver and the other a failing liver. This pictorial representation further buttress the full claims boldly spelt out on cigarette pack labels and on billboards that "smokers are liable to die young". More so, manufacturers also use their food labels to instruct consumers of the best use or method of use and preparation of the food in question in other to maximize the food benefits.

5.0 CONCLUSION AND RECOMMENDATION

Food processing and manufacturing companies, from small to large scale, continue to spring up annually all over the world while existing ones seek for expansion all in a bid to exploit the increasing food demand brought about by population growth and urbanization. Regulation and

enforcement of food labeling and claims in prepackaged food is therefore imperative in order to protect the interest of unsuspecting consumers as this is a matter of food safety as well as food fraud. Information gathered from this review indicates that countries in Africa including Nigeria have started developing and implementing guidelines for food labeling (NAFDAC, 2014), while South Africa has shown great effort in ensuring standardized food labeling and food claim procedures (Van der Merwe & Venter, 2010). In Nigeria, Ogunmoyela *et al*. (2021) in their study observed that the 'eye logo' which signifies mandatory vitamin A fortification, is the only standardized, government regulated logo across the board. In Europe, the EU accepted nutrition and health claims Regulation (EC) No 1924/2006 to defend consumers from untrue and unverified food claims. However, regulatory bodies have highlighted botanicals, lack of food nutrient profile development, consumer understanding of claims, measuring health effects, and effective enforcement as major challenges to nutrient and health claim regulation (de Boer, 2021). In America, the Center for Science in the Public Interest insists that the efforts of FDA and USDA are minute implying that the agency needs to do more to prevent deceptive nutrient and health claims (Lwin, 2015; Seiders & Petty, 2004). In Southeast Asian nations, there are currently zero standardized nutrition labeling and claims regulation (Kasapila & Shaarani, 2011). China has a total of 27 approved health claims, 24 are function claims while the remainder are claims relating to reduction of disease risks (Yang, 2008). Health issues such as allergies (as in the case of Natasha Ednan-Laperouse who died in 2016) as well as increased risk of complications in hypertensive and diabetic consumers have been noted as implications of improper food labeling (Marcotrigiano *et al*., 2018).

Food Scientists, Food Developers, Food Microbiologists, Plant Scientists and other relevant professional bodies are encouraged to research and provide more insight towards plant/food ingredients and their potential to offer nutrient and health benefits in order to substantiate current and future food claims. Intensification of efforts by the government and regulatory bodies towards regulation of food labeling and usage of logos; verification and approval of health and nutritional claims is recommended, especially in developing countries. Sensitization of consumers (especially the elderly and consumers with special health needs) by nutritional society groups, government and non-governmental bodies is also recommended to ensure correct understanding and interpretation of nutrient and health claims.

ACKNOWLEDGEMENT

The authors are acknowledged for their roles in the manuscript. CEO developed the concept for this review. CEO, EIN, IMM, HA, ADO and IOO wrote the first draft of the manuscript. HO, OAO, ON and CEO assisted with proofreading and language edits. CEO revised the manuscript based on feedback from HO, OAO, ON and TP. HO supervised the project and critically revised the final manuscript. All authors contributed to the manuscript and approved submission of the final version.

No funding was received from agencies in the public, commercial, or not-for-profit sectors.

DECLARATION OF CONFLICT OF INTEREST

The authors declare that there was no support of any form from any organization and that there is no conflicting interest.

DATA AVAILABILITY STATEMENT

Supporting data for the findings of this review are available and can be provided on request from the corresponding author.

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TABLES

Table 1: Glycaemic Index claims classification

Glycaemic Index Claims Classification	Specification
Low	0 - 55
Medium	56 - 69
High	70 and above

Table 1 shows the Glycaemic Index (GI) nutrition content claims specification format

Table 2: List of Approved Health Claims in China

	Types of Claims
	Function Claims
1.	Enhanced immunity
2.	Antioxidants
3.	Assists in memory improvement
4.	Alleviates eye fatigue
5.	Facilitates lead excretion
6.	Moistens and cleans throat
7.	Improves sleep
8.	Facilitates milk secretion
9.	Alleviates physical fatigue
10.	Enhances anoxia endurance
11.	Assists in irradiation hazard protection
12.	Improves child growth and development
13.	Increases bone density
14.	Improves nutritional anemia
15.	Assists in protecting against chemical injury to the liver
16.	Eliminates acne
17.	Eliminate skin chloasma
18.	Improves skin water content
19.	Improves skin oil content
20.	Regulates gastrointestinal tract flora
21.	Facilitates digestion
22.	Facilitates feces excretion
23.	Assists in protecting against gastric mucosa damage
	Reduction of disease risk claims
24.	Reduces body weight
25.	Reduces blood lipids
26.	Reduces blood sugar
27.	Reduces blood pressure

Source: Yang, 2008

Table 2 shows the list of approved function claims and reduction of disease risk claims which are the types of health claims available in China.