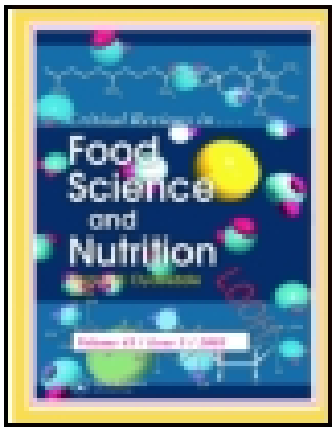

Critical Reviews in Food Science and Nutrition
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/bfsn20

Legislation, impact and trends in nutrition labeling: A global overview

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Accepted author version posted online: 02 Jul 2014.

To cite this article: William Kasapila & Sharifudin Md. Shaarani (2014): Legislation, impact and trends in nutrition labeling: A global overview, Critical Reviews in Food Science and Nutrition, DOI: 10.1080/10408398.2012.710277

To link to this article: http://dx.doi.org/10.1080/10408398.2012.710277

Legislation, impact and trends in nutrition labeling: A global overview

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Abstract

The need for accurate nutrition labeling on food products has never been greater. Obesity has assumed near-epidemic levels in both industrialized and emerging nations in recent years, and governments and consumer groups around the world are looking for ways to improve the nutritional choices for their citizenry while simultaneously balancing their freedom of choice through the use of nutrition labeling. Despite increasingly aggressive efforts by government and industry organizations to raise consumer awareness, though, many consumers either do not consult nutrition labels or they are not in a position to interpret the information on these labels accurately. To gain some fresh insights into nutrition labeling practices worldwide, this paper provides a review of the relevant peer-reviewed, scholarly and government literature to describe regulations enacted to date, evolving and future trends, and the likely impact of food product labels. In this regard, the paper highlights similarities and discrepancies that exist, identifies gaps, and gives directions for the future.

Key words: Obesity, Menu labeling, Diet, Consumer behavior

Introduction

Given the universality of the need for healthy food choices among consumers, it is not surprising that nutrition labeling has attracted a great deal of interest in recent years (Hassan et al., 2010). This interest has been fuelled in part by increasing concern over the harmful effects of obesity and how nutritional choices affect consumers (Tangari et al., 2010). In response to these public health treats, a number of governments, most notably the United States and throughout the European Union (EU), have launched public awareness campaigns that encourage consumers to make healthier choices in their foods, including those prepared at home as well as those consumed outside the home (Hassan et al., 2010). Although more research is needed in this area, a recent study by Rejman and Kasperska (2011) summarizes the body of knowledge concerning research conducted during the past 10 years in the European Union (EU). The results of this analysis confirmed that, "European food consumers are increasingly interested in health and a healthy lifestyle and that the awareness of food, nutrition and health linkages has become higher" (Rejman & Kasperska, 2011).

Notwithstanding this increasing consumer awareness and interest in nutrition content in the foods they consume at home and away from home, there are some conflicting trends identified in the study by Rejman and Kasperska (2011) that make formulating optimal nutrition labeling solutions especially challenging. For example, on the one hand, "There is much more interest in healthy foods like fruits and vegetables, fish and wholegrain products than before. People are

trying to cut down on the consumption of sugar, salt, fat and artificial additives, and increase their intake of dietary fiber, vitamins and minerals" (Rejman & Kasperska, 2011). On the other hand, though, "At the same time, paradoxically, an increased prevalence of obesity and other diet-related diseases is observed" (Rejman & Kasperska, 2011). As a result, governments, food companies, food retailers and international health organizations have all become more actively involved in collaborating about what needs to be done and what approaches will be most effective in providing consumers with nutrition information in a format that will make the data more comprehensible. In this regard, some countries, such as the United States, Canada and EU member countries have enacted mandatory labeling regimens for some food products, while others remain voluntary but carefully regulated (European Food Information Council [EUFIC], 2011). For example, Hassan et al. (2010) advise that, to provide consumers with the appropriate information to make these choices, many countries have made nutrition labeling mandatory on packaged foods (e.g. Nutrition Labeling and Education Act 1990 in the United States, and revisions to and harmonization of nutrition labeling in the European Union).

Most frequently, nutrition information featured on packaged foods assumes the form of nutrition facts panels or Percent Daily Values (shown as "%DV"); however, in some cases, governments employ a comparable approach such as in the UK where the format for nutritional labeling is the Guideline Daily Amount (GDA) developed in 1988 by a consortium of the government, consumer organizations as well as the UK food industry (Hassan et al., 2010). According to these researchers, the GDA format typically shows the amount and percent of GDA of calories, fat, saturated fat, sugar and salt for adults or for children (depending on the product type). The GDA

information is now presented on the front-of-pack, in addition to the nutrition facts panel, to provide a quick source of information when consumers initially view a product. Similar to the UK approach, US food companies also provide GDA information in a standardized format on the front-of-pack for all of their food products marketed in different countries (Hassan et al., 2010).

In addition, the increasing popularity of fast food restaurants has fuelled additional concern over the need for nutrition information for these typically high-caloric products. According to Hassan et al. (2010), in the United States, more than 20 states and localities have considered legislation requiring fast food chain restaurants to provide nutrition information on menus. California was the first US state to pass a menu labeling law which requires calorie counts to be displayed on menus and menu boards in fast food and other chain restaurants with twenty or more outlets. Other states have considered stricter legislation requiring not only calorie counts but also other nutrition information such as fat, carbohydrates and sodium contents (Hassan et al., 2010). To this end, the paper reviews the relevant peer-reviewed, scholarly and government literature for nutrition labeling to describe regulations enacted to date in the major regions of the world, current and emerging trends, and the likely impact of food product labels. In this regard, the paper highlights similarities and discrepancies that exist, identifies gaps, and gives directions for the future.

Nutrition labeling legislation and regulations

Sound legislation provides a framework for ensuring that food, whether imported or local, conforms to the regulations and standards for a particular region or country. For this reason, food

regulatory authorities worldwide have evolved and promulgated regulations to govern labeling of products in their jurisdictions. For instance, in the United States, the labeling of food products is regulated by a number of different federal and state government agencies, but the majority of packaged food products (i.e., produce, seafood, milk, and eggs) are controlled by the U.S. Food and Drug Administration (FDA) as overseen by the U.S. Department of Health and Human Services (Goldstein & Goldstein, 2002). By contrast, poultry products and meat are regulated by the Food Safety and Inspection Service (FSIS) in the U.S. Department of Agriculture (USDA) and the U.S. Federal Trade Commission (FTC) is responsible for the oversight of food advertising. The controlling legislation for nutrition labeling in the United States include:

1. The Meat Inspection Act of 1906;
2. The Federal Food, Drug and Cosmetic Act of 1938;
3. The Poultry Products Inspection Act of 1957; and,
4. The Wholesome Meat Act of 1967

It is important to point out, though, that an ingredient label is not the same thing as a nutrition label. In this regard, Goldstein and Goldstein (2002) report that, a food's ingredient label lists the composition of a food. Federal food, meat and poultry laws require a statement of ingredients on most food labels. Both FDA and USDA regulations require that ingredients be listed in order of their predominance in a food and by their common, specific names. Conversely, nutrition labeling describes the nutritional content of the food products themselves.

Although nutritional information on food labels is becoming increasingly commonplace in the United Sates, the push to include this important information on food product labels only began a

relatively short time ago. For example, Goldstein and Goldstein (2002) report that during the early 1970s, the FDA initiated the steps that would ultimately lead to current nutrition labeling practices in the United States. In 1973, the FDA developed a standard format for food labeling that remained voluntary for the majority of food products until 1990 at which point "nutrition labeling was mandatory on any food for which a nutrient was added (i.e., enriched with Vitamin C) or for which a nutrition claim was made (i.e., low fat)" (Goldstein & Goldstein, 2002).

These early efforts to develop understandable nutritional labeling were followed by a grassroots movement among consumers during the early 1980s that called for more transparency in food labeling practices to include more accurate information concerning nutritional content. In response, Congress amended the Food, Drug and Cosmetic Act of 1938 (FDCA) and enacted the Nutrition Labeling and Education Act (NLEA) of 1990, which authorized the Food and Drug Administration (FDA) to regulate nutrition labeling and disclosure statements (Goldstein & Goldstein, 2002). According to Nayga (2000), the purpose of the NLEA is to provide consistent, understandable, and usable labels that can help consumers make healthier food choices. The development of standardized formats and ensuring that accurate nutritional content was included on food product labels were just part of the process in helping consumers understand the information and the NLEA went even further in its objectives. In this regard, Nayga (2000) reports that the NLEA required the federal government to participate in activities to educate consumers about use of the improved label information in making dietary choices. The NLEA has done much more. All products regulated by the FDA are required to have food labels. Since May 8, 1994, all packaged food must have labeling, and fresh fruits, vegetables, and seafood

must have point-of-purchase information (USFDA, 1994). Although nutrition labeling remains voluntary in the United States for a number of fresh fruits, vegetables, and fresh fish, "if a nutrient or health claim is made (e.g., low calorie), then nutrition information must be available" (Rubin, 2001).

The rules and laws concerning nutrition labeling vary from country to country. For example, as noted above, the United States has an elaborate nutrition labeling program in place that mandates listing of nutrients on the "Nutrition Facts" panel, including total fat, calories from fat, energy as calories, sodium, cholesterol, dietary fiber, total carbohydrate, protein, sugars, vitamins A and C, and minerals (e.g. iron and calcium). The current guidelines for serving size for the nutrition information presented in the food product nutrition facts panel is based on a 2,000-calorie diet, which may not be applicable to other regions of the world where smaller body sizes require fewer calories per day (Goldstein & Goldstein, 2002). Moreover, the International Food Information Council Foundation (IFICF) advises that the nutrition facts panel's daily value percentage information on the nutrition facts panel indicates the amount of a specific nutrient that foods contain compared to a recommended per day amount (IFICF, 2011).

Likewise, the EU and China both had voluntary nutrition labeling but went on to adopt regulations that make nutrition labeling mandatory in an effort to remain aligned with international trends (EUFIC, 2011). Some countries, such as Canada, Mexico, Australia and New Zealand, Malaysia, Israel and Mercosur countries, already have mandatory nutrition labeling requirements in place. In some other countries, though, nutrition labeling remains voluntary, in

particular those countries that follow Codex standards, except in those instances where an actual claim concerning the nutrition involved is made (Hawkes, 2004). At the national level, countries can be broadly grouped into two categories based on their statutory regulations concerning nutrition labeling (e.g. mandatory and voluntary) as depicted in Table 1.

Current efforts to amend Codex guidelines

During May 12 through 15, 2012, discussions were held in Ottawa, Canada by the Codex Alimentarius Commission concerning the current mandatory and voluntary aspects of Subsection 3.1 of the Guidelines on Nutrition Labeling. The Commission considered several suggestions from member states regarding the need to make the nutrient declaration mandatory on the labels of prepackaged foods for which nutrition claims have been made, with some members calling for mandatory labeling for all other foods as well. Following its review of the various options set forth below, the Commission assigned a working group to develop recommendations for the next meeting of the Commission (Joint FAO/WHO Food Standards Programme, 2012):

- Option 1a. No change to 3.1.2 (e.g. nutrient declaration should be voluntary for all other foods)
- Option 1b. For all other foods, national authorities should consider whether the nutrient declaration should be voluntary or mandatory taking into account the local circumstances for all other foods.
- Option 2a. Nutrient declaration should be mandatory for all other foods.
- Option 2b. Nutrient declaration should be mandatory for all other foods, subject to an amended list of nutrients (Paragraph 3.2.1.2).

A briefing paper submitted by the European Union to the Codex notes that the EU generally accepts the principle of mandatory nutrition labeling, especially for food items for which a nutrition claim has been made, but otherwise recommends cosmetic changes to the existing text only, leaving the decision to require nutrition labeling for all other foods besides prepackaged foods to national authorities (European Union comments, 2012). An agenda item (4a) considered at the recent Codex meeting also made recommendations concerning claims related to reducing the energy or nutrient content (e.g. “reduced”/ “lower”); “light” claims; and comparative claims that are related to foods having more of a nutrient (e.g. “more”) as well as to formulate appropriate guidelines for trans-fatty acids content in the Guidelines for Use of Nutrition and Health Claims (Proposed draft revision, 2012).

Taken together, it is clear that the Codex Alimentarius remains a work in progress with respect to nutritional labeling practices among its member states, with many countries in the EU expressing their desire to retain national authority to control what types of labeling practices will be used for certain foods. Such varying administrative systems and differing approaches to complex policy issues on health trigger discrepancies in the labeling of products in terms of the number and type of nutrients required, format and size of the label, expression of nutrients and reference figures used as depicted in Table 1.

The foregoing trends have significant implications because variations in labeling practices for different products have repercussions for the industry and regions that are committed to cross-

border food trade such as the EU, North America and Asia Pacific. For instance, due to the existing differences on labeling of products, food products are tested and re-tested as they move from one region or country to another. The time and costs involved at least delay the availability of desirable products and, in worst-case scenarios; products do not reach the market at all (Kasapila & Shaarani, 2011; Lelieveld & Keener, 2007). More significantly, perhaps, is the possibility for these discrepancies to create information asymmetry in the marketplace that can affect effective comprehension and utilization of nutrition labels by consumers as discussed further below.

Consumer understanding of nutrition labels

In reality, reading, understanding and using nutrition labels should be a straightforward enterprise because this is their fundamental purpose. For instance, according to Cheftel (2005) labels on food products have a number of basic purposes and functions, including the following:

1. Inform the consumer and prevent confusion;
2. Protect the consumer against risks and abuses;
3. Help sell the product (labels strongly influence consumer choice); and,
4. Promote fair trade and prevent frauds

Nevertheless, given differences in national regulatory requirements and the broad-based nature of labels on food products, it is perhaps not surprising that comprehensibility of nutrition labels is somewhat challenging on the part of consumers. Besides differing regulations and label formats, there are also other barriers to understanding of nutrition labels (such as complexity of

terminology and numeracy) and these barriers exist in all regions of the world to slightly varying degrees. The extent to which consumers in different regions of the world typically understand nutritional information on food packages is given in the most recent study by the Nielsen Company (2012).

According to this study, the percentage responses to the survey question, "How well do you understand the nutritional information panels/labels on food packaging?" differed significantly from region to region as follows:

1. In North America, for example, an overwhelming majority (93%) either mostly understood nutritional information panels/labels (57%) or understood it in part (36%), but 7 percent responded "not at all" to this question.
2. Comparable response levels were recorded for Europe, 93 percent of the consumers also either mostly understood or understood nutritional information panels/labels on food packaging in part (45% and 48%, respectively) and 7 percent reporting not understanding the information at all.
3. In the Middle East/Africa region, only 5 percent of consumers reported not understanding the information at all and more than half (51%) reported mostly understanding the nutritional information panels/labels on food packaging and 44 percent reported understanding it in part.
4. In the Asia Pacific Region, though, a global high of 8 percent of consumers reported not understanding the information at all, while 92 percent reported either mostly understanding the information (61%) or understanding it in part (31%).

5. Finally, 94 percent of consumers in the Latin American region either mostly understood the information (46%) or understood it in part (48%), but 6 percent of consumers reported not understanding the information at all.

There have been some efforts to make the nutrition information contained on products more understandable at regional and national levels, though, including new specifications for standardized serving sizes and the inclusion of definitions for nutrition terms such as free, low, light or "lite," reduced, less, and high. In the United States, for instance, the term "high" is allowed to be used with food products that contain as much as 20 percent or more of a food product's daily value of a given nutrient per serving; likewise, the term "good source" connotes that a single serving of a food product contains a minimum of between 10 and 19% of the daily value of the nutrient (Rubin, 2001; USFDA, 2004). Similarly, there have been exact values specified for the nutrition claims made for food products that help standardize the information and make the decision-making process for health-minded consumers easier, including the following:

1. A product may be considered calorie free if it has less than 5 calories per serving;
2. A low-calorie item must be less than 40 calories;
3. A fat-free food can have no more than 0.5 grams of fat; and,
4. To be considered low fat, a food should have no more than 3 grams of fat

Given the aforesaid disparities in the ability to comprehend the nutritional information contained on food packaging labels and recognizing the best efforts initiated to help consumers make

healthful food choices, many different researchers have also examined the determinants to the use of nutrition information on products.

Determinants to the use of nutrition information on products

Concerning the determinants to the utilization of nutrition labels, a study by Nayga (2000) found that consumers who prefer adhering to dietary guidelines were more likely to read nutrition labels compared to their counterparts that do not follow such dietary guidelines. In addition, Nayga also found that individuals who agree that what one eats can affect the risk of getting a disease, such as cancer or heart disease, are likewise more likely to use nutrition labels than others. According to Nayga (2000) these results suggest the importance of these health related belief factors in influencing label use behavior.

The above-mentioned study by Rejman and Kasperska (2011) found widespread consumer interest in the nutrition and health properties of food, but there were some differences noted as well. In this regard, these researchers concluded that their study indicated that, “Some consumers showed an interest in making healthy food choices, particularly women and those with a better education level. Respondents' knowledge of food, nutrition and health issues was found to be basic so it could not motivate them to purchase more healthy foods” (Rejman & Kasperska, 2011). Likewise, a study of the determinants of nutrition label use by Rasberry et al. (2007) found that females exhibited greater knowledge, more favorable attitudes, and more frequent label use than males. Health reasons, looking for specific information, weight control, and knowledge predicted frequent label use.

Conversely, some consumers may use nutrition labels when taste is the most important issue for them. In this regard, Nayga (2000) adds that individuals who perceive nutrition and taste as important when purchasing food are more likely to use food labels than others. This finding may imply that nutritionally improved foods, which do not have the sensory taste attribute, would not be well received by these individuals (Nayga, 2000). A study by Hassan et al. (2010) found that in the UK, Guideline Daily Amount information had a moderating effect on the relationship between the two psychological factors, conflict and self-control for female consumers; however, no such relationship was identified for temptation and consumer choice; temptation, conflict and self-control, though, were found to all have a direct impact on consumer choices of food. These findings are congruent with the results of a recent study by Rejman and Kasperska (2011) that showed, "Significantly more women than men checked the content of calories, fat, sugar, minerals, fiber and salt, whereas protein content was more important for men". Taken together, it is clear that many consumers want and need to know the nutritional information in the food products they purchase, but making the right decisions is complicated by a number of constraints to understanding and interpreting the data provided, making the overall impact of nutrition labels mixed as discussed further below.

Impact of nutrition labels

Beyond the important improvements that could be achieved in consumer health through healthier food choices, there is an opportunity to reduce the enormous economic costs that are associated with poor food choices in the process as well. For instance, in his book, *The Dilbert Future*,

humorist and futurist Scott Adams (1999) loudly complains that it has become almost impossible to tell whether food products are healthy or not using the information provided on food product labels, and argues that better nutritional information on food product labels can help normal people identify healthy choices in their diets. The cumulative effect of more understandable nutrition information on American would be enormous, of course, but there would be a corresponding economic benefit as well: "Imagine the impact on health if people had a convenient way to identify healthy food. If better eating habits could cut health costs by 10 percent – and that's a modest goal – the impact on the economy would be gigantic. Assuming it's cheap (healthy foods tend to be expensive), it could be the most economical way to deal with poverty without raising taxes" (Adams, 1999).

From a strictly pragmatic perspective, nutrition labeling does in fact appear to be a highly cost effective approach to achieving the dual goals of improving the ability of consumers to make health food choices while reducing the healthcare costs associated with treating obesity and overweight related conditions. What remains to be done, it seems, is the identification of the optimal approach to providing consumers with this information in an appropriate format. In this regard, a study by Feunekes et al. (2008) investigated the effectiveness of different nutrition labeling formats in four European countries to identify the impact they had on consumer food selections. According to these researchers, in order to make healthier choices, consumers must be able to distinguish healthier products from less healthy ones. By providing consumers with accurate nutritional information in a comprehensible form on the front of food product containers, Feunekes et al. (2008) maintain that consumers will make healthier food product

choices more frequently than when such nutritional information is provided on the back of the label only.

Improving national health is the main thrust behind use of nutrition labeling by both developed and emerging nations. For instance, Michelmann et al. (2001) report that, "Nutrition labeling is seen by governments in higher-income countries as an important tool in the battle against health problems related to poor diet. The specific nutrient content of a processed food is a credence characteristic that can be signaled to consumers through labeling". Similarly, Roodenburg et al. (2011) point out that, "In the fast changing food markets of developing nations, there is a growing interest in nutrition labeling to help consumers make healthier choices while their food supply is changing rapidly". The impact of accurate nutrition labeling therefore relates to the overall improvement of consumer health through more informed food choices, an outcome that involves two distinct functions of the label itself which has two main goals:

1. Improve public health by providing the necessary information upon which consumers can base decisions about their diet; and,
2. Prevent the capricious use of labels to mislead consumers as to the nutritional content of food (e.g. regulations concerning the use of low-fat and diet claims on food products)

In sum, it is apparent that the growing interest in providing consumers with accurate nutritional information on food packaging has become widespread among industry organization and governmental agencies alike, and these trends will likely continue in the future as discussed further below.

Current and emerging trends in nutrition labeling

Many of the current trends can be reasonably extended into the future based on the growing recognition among adult consumers concerning the need for healthy choices in their own diets, as well as for their children to help reduce the epidemic levels of obesity that are affecting both industrialized as well as emerging nations. This assumption is supported by the observation from the International Food Information Council Foundation (IFICF) (2011) that advises, "As government and industry seek solutions in education and motivation to help consumers make positive choices that will promote healthful lifestyles, upgrading labeling of food packages is seen as a next step in the effort of reversing the trend of obesity"

In response to these trends, the Grocery Manufacturers Association (GMA) and the Food Marketing Institute (FMI) launched a voluntary initiative known as "Nutrition Keys" in an effort to promote the use of front-of-package labels that will help consumers better understand the nutritional information that is presented. According to the IFICF (2011), this program aims to help consumers decipher the nutritional content of the product, especially calories, fat, sodium, and sugar content, by adding call-out information on the front of product labels. Another nutrition labeling regimen that is gaining popularity in the European Union is known as "My Choice." This initiative helps EU consumers more readily identify healthy choices in their food products compared to the GDA. For example, the results of a recent study by Rejman and Kasperska (2011) found that among 200 adult consumers in Poland where the "My Choice" program competes alongside the GDA, fewer consumers noticed the My Choice logo but more consumers relied on it for making their decisions about which food products to purchase.

According to Rejman and Kasperska (2011), the positive influence of the 'My choice' symbol was declared by 40% of the consumers who had seen it, while 24% pointed to GDA, but only 30% of the Polish respondents looked for the GDA label (3% reported always, 8% reported often, and the remainder reported sometimes). Probably a better evaluation of the 'My choice' symbol was the result of its simplicity, as the logo unequivocally indicates that the product is a healthy choice within a food category. The “My Choice” symbol also provides consumers with more readily understandable information concerning nutritional information compared to the GDA. In this regard, Rejman and Kasperska (2011) emphasize that, “In order for a product to obtain the mark, it must meet specific criteria regarding content of the nutrients that are the major risk factors in the prevalence of diet-related chronic diseases. In the case of GDA, the consumers have to calculate themselves the appropriate amount of each product for a balanced daily diet”.

Along the simplicity trend, the future will be characterized by the desire for simpler, uniform and carefully regulated information that foster nutritious choices, and innovation on the part of the industry. For example, many consumers now buy their food via the internet and will continue to do so in the unforeseeable future. These consumers have the same need for clear, essential information as those who shop in their local supermarket (Kasapila & Shaarani, 2011). This prompts Motarjemi et al. (2001) to suggest that those reviewing food regulations should primarily aim to create rules which are flexible enough to be easily adapted as consumer trends

evolve, and wide-reaching in their approach to ensure that there is consistency in provision of information on food to their heterogeneous populations.

In the U.S., while the Nutrition Labeling and Education Act (NLEA) mandated standardized nutrition labels for the majority of packaged food products, there have been some exceptions made; for instance, food that is prepared for immediate consumption is excluded from these requirements but the NLEA still requires that relevant calorie and nutrient information is provided in those cases where nutritional claims are made for menu items (IFICF, 2011). Major cities such as New York, Philadelphia and Seattle have already passed this type of legislation for restaurant chains operating in their jurisdictions, and a number of state-wide initiatives have been implemented as well, including Oregon, Maine, Massachusetts, and California (Roberto et al., 2009). In the United Kingdom, 28 foodservice organizations, which include some food chains that have been required to provide calorie labels in the U.S., have pledged to implement similar labeling from 1 September 2011 as part of the Department of Health's voluntary Responsibility Deal programme (Dumanovsky et al., 2011; United Kingdom Department of Health, 2011).

Furthermore, other future trends can be discerned from recent legislative efforts to improve the ability of consumers to learn more about their choices of foods consumed outside the home. For example, in early 2010, healthcare reform legislation enacted in the United States mandates calorie labeling on menus, menu boards and drive-through window facilities for all restaurant chains that have 20 or more stores operating in the country and the U.S. FDA is required to develop new guidelines for labeling restaurant items throughout the country (IFICF, 2011).

With respect to the likelihood of these trends continuing in the future, it is reasonable to suggest that governments, the food industry and consumer organizations, will continue to beat the "healthy choices" drum by making it as easy as possible for consumers to gain the nutritional information they need to make informed choices about the foods they eat away from home, an increasingly popular alternative for many in the growing middle classes in the emerging nations of the world. Nevertheless, busy consumers who are having a "Big Mac attack" will probably not consult the nutritional information but some will, and of these, most will be women according to the most recent research. Despite these tendencies, industry analysts maintain that the point must be driven home in order to make any substantive changes in many consumers' eating habits, both within and outside the home. In this regard, analysts at the International Food Information Council Foundation (2011) emphasize that, "Specifically, increasing consumer awareness of the calorie levels of the less healthful food items, which are typically underestimated, may result in more accurate product evaluations and, in turn, healthier choices."

Research needs and directions

Given the enormous public healthcare implications of these trends, it is not surprising that over the past decade there has been a growing amount of interest in nutrition labeling regimens. In fact, there have been nearly 300 peer-reviewed scholarly articles and six systematic reviews published concerning nutrition labeling in recent years (Tymms, 2011). The vast majority of these studies have been conducted in the US, the UK and some other north western European countries (Kasapila & Shawa, 2011; van Dam & van Trijp, 2007), where they examined how

adult consumers from the general public process and use nutrition information on products and assessed their preferences, knowledge and attitude towards different label formats. Moreover, it is evident that there is a strong need for more research in a wider variety of countries considering that every consumer market is different with respect to consumer behavior by virtue of cultural, economic and other variables, but that some gaps exist in the body of extant literature from the aforesaid industrialized countries.

In the U.S., for instance, there has been limited research on front-of-pack (FOP) labeling. Despite this limitation, the FDA is presently working to create a single FOP label format, which will appear on all products, based on the recommendations of the Institute of Medicine made, in October 2011, after reviewing 20 FOP labeling systems and examining their efficacy in terms of consumer use and comprehension (EUFIC, 2011). According to Pomeranz (2011) the standardized FOP system will help to supplement the Nutrition Facts panel, encourage the manufacturers to reformulate their products and allow consumers with varying education and backgrounds make healthier food choices. In the meantime, the Grocery Manufacturers of American (GMA) and the Food Marketing Institute (FMI), representing leading U.S. food and beverage manufacturers and retailers respectively, simultaneously developed, tested and implemented their own FOP scheme known as “Nutrition Keys”; this initiative is regarded as especially noteworthy considering that they do not have to comply with a voluntary FDA scheme in the pipeline (EUFIC, 2011).

Once the FDA finalizes its FOP scheme, a series of independent research will be required to assess the scientific validity and consumer receptivity, and consequently shed light on the way forward as regard considering mandatory labeling of these schemes in the U.S. Conversely, research on FOP labeling proliferate in other major regions of the world, including Europe, Australia and New Zealand, and Canada, although there still remains broad disagreements on what format is most effective at influencing consumer behavior.

Notwithstanding extensive research undertaken to date, the relationships among nutrition knowledge, nutrition label use and diet quality are presently not well understood, and there remains a paucity of studies that have sought to explore the effects of providing GDA information in the restaurant or café settings. Along with this gap, Chandon and Wansink (2007) lament inadequacies in past research that has attended to nutrition evaluation and purchase decisions instead of consumption choice based on assessments of calorie information and different presentation formats displayed on the menus or menu boards.

Conclusion

In response to growing concerns about the nutritional habits of consumers, many countries were shown to have enacted legislation designed to provide nutritional information about food products. A number of industry organizations are also actively involved in this endeavor. Some food products in some countries are required to provide nutritional data on food product labels, while the practice remains voluntary for others except when specific claims of health are made. The review showed that the nutrition label formats, and the number and type of nutrients to be declared on products vary across regions and countries. Women were shown to be more

interested in the nutritional information contained in food product labels, but many consumers, especially in the Asia Pacific region, were found to have significant problems understanding the nutritional information they were provided on food labels. Finally, although there is a groundswell of interest in providing consumers with the nutritional information they need to make informed decisions, these initiatives presume that consumers want this information. The research was consistent in showing that even when presented with accurate nutritional information, though, some consumers will continue to make poor nutritional choices based on the vagaries of the human behavior.

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Table 1: Discrepancies in nutrition labeling across regions and countries

Discrepancy	Region / Country	Description
Legislation	United States, EU, Canada, Mexico, Mercosur countries*, Israel, India, Indonesia, China, Hong Kong, South Korea, Malaysia, Taiwan, Australia and New Zealand	Mandatory Labeling
	Gulf Cooperation Council countries, Venezuela, Turkey, Singapore, Philippines, Thailand, Japan, Kenya, Mauritius, Nigeria and South Africa	Voluntary labeling
	The rest of the countries	Information not available
Mandatory Nutrients	USA	Energy as calories, calories from fat, total fat, saturated fat, cholesterol, sodium, total carbohydrates, total sugars, dietary fiber, protein, vitamins A and C, iron and calcium
	EU member countries, Australia and New Zealand	Energy, total fat, saturates, carbohydrate (total and sugars),

Discrepancy	Region / Country	Description
		protein and sodium
	Codex member countries	Energy, protein, carbohydrate and fat plus any other nutrient for which a claim
Expression of nutrients on the label	USA	Household measures (e.g. 1 cup or a spoon of mayonnaise) based on a 2,000-calorie diet
	EU, Australia, New Zealand and Codex member countries	Energy and nutrients are expressed per 100g or per 100ml or per portion of the food
Reference figures used	USA	Daily values percentages (%DVs)
	EU	Guideline Daily Amounts (GDAs)
	Australia and New Zealand	Recommended dietary intake (RDI)
	Codex member countries	Nutrient Reference Values (NRVs)

* Mercosur countries include Argentina, Brazil, Chile, Colombia, Ecuador, Paraguay and Uruguay

Sources: United States Food and Drug Administration (1994); Codex Alimentarius Commission (1997); European Union Food Information Centre (2011); Food Standards Australia New Zealand (2011)