

# The Impact of Food Labelling on Consumer Choices: A Comprehensive Review

Mehta Himachal Prakashkumar<sup>1</sup> and Dr Ishita Raval<sup>2</sup>

Research Scholar, Department of Commerce & Management, Sabarmati University, Ahmedabad<sup>1</sup>

Assistant Professor, Department of Commerce & Management, Sabarmati University, Ahmedabad<sup>2</sup>

**Abstract:** *Food labels have been an important form of communication about food and how to consume it between different parties: the producer(s), the governing bodies/regulatory authorities, and the consumer(s). This article offers a comprehensive review of the evidence supporting the impact of each distinct type of food label on people's food choices, their shopping habits, and the ultimate dietary results of their choices. The types of food labels included in this review are nutrition facts panels, front-of-pack (FOP) labels, health claims and nutrition claims, organic and/or eco-labels, and country-of-origin labels. This review draws from an international body of consumer behaviour literature, including examples from Europe, North America, Asia, Africa, and the Middle East. Overall, there is a high level of consumer interest in food labels. However, actual food label use in real-world shopping situations is much lower than consumer interest suggests, and this is highly variable. The use of food labels in real-world shopping environments can vary by many factors such as the person's health literacy; their education; their age; their presence of a disease; the culture they are a part of; and how difficult the food label is to read and interpret. The most dramatic positive impact on consumers making healthier food choices has been achieved by simplified front of pack labels, primarily through their use of colour coding, such as Nutri-Score or Multiple Traffic Lights (MTL). There are still significant gaps in the understanding of how to measure real-world dietary behaviour change, particularly for consumers in developing countries. Finally, this article discusses potential policy implications, the role and responsibilities of the food industry, and future research directions.*

**Keywords:** Food Labeling, consumer, front-of-pack (FOP) labels, health , nutrition.

## I. INTRODUCTION

There is a connection between the global issue of non-communicable diseases (NCDs) such as cardiovascular disease, type 2 diabetes and obesity with dietary patterns that are significantly less favourable. (Wandel, 2016) One way that we can provide the public with information on how to eat correctly is through population-level dietary interventions such as food labelling. There is now an increasing acceptance of food labels as an effective tool in reducing NCDs through public health initiatives. Consumers rely on food labels to provide them with the nutritional content, ingredients, allergens, country of origin, and sustainability of products, as well as health-benefit claims, when making decisions about what foods they buy.

Not every consumer will use food labels in the same way or to the same degree of success. There are varying degrees of recognition and comprehension among consumers regarding food labels, and the regulatory frameworks differ among countries, which also causes inconsistencies in the use of food labels and inconsistent experiences across consumers. (Grunert & Wills, 2007) This extensive review synthesises several pieces of research in order to demonstrate how food labels can impact many different aspects of consumer choice, including: types of labels used, types of consumers using labels, regions of the world where different types of consumers live, and different types of public policies related to food labelling.



### 1.1 Scope and Objectives

This review aims to:

- Categorise and describe the major types of food labels in use globally.
- Evaluate evidence on how each label type affects consumer awareness, understanding, and food choice.
- Identify key moderating factors (demographic, cognitive, cultural) influencing label effectiveness.
- Assess the regulatory landscape and industry compliance.
- Identify research gaps and provide policy recommendations.

## II. TYPES OF FOOD LABELS AND THEIR MECHANISMS

Food labels can be broadly classified into the following categories, each operating through distinct informational and psychological mechanisms:

**Figure 1: Major Food Label Types and Their Primary Consumer Functions**



### 2.1 Nutrition Facts Panel (NFP)

The nutrition facts panel (NFP) is the most commonly found food label that provides the most comprehensive nutritional information and nutritional data on beverages and foods and has been mandated by law in many countries, for example, 85% of products in the European Union (EU-27) and Turkey contain back-of-panel (BOP) nutrition information and only 48% of products have front-of-panel (FOP) nutrition information. (Storcksdieck genannt Bonsmann & Fernández Celemin, 2010) In India, 90% of urban residents state they read food labels; however, 81% of them only look for manufacture/expiration dates; and only one-third report they check for nutrition information. (Vemula & Gavaravarapu, 2013)

Front-of-Pack (FOP) Labelling Systems  
FOP labels aim at reducing the cognitive load associated with making judgements about nutritional quality of foods and are intended to provide a concise, straightforward and clear to see, summary of the nutritional quality of a food product. The main systems studied include:

FOP System	Format	Key Finding
Nutri-Score	A–E colour-coded letter grade	Most effective for ranking food nutritional quality; preferred by 64.9% of Moroccan consumers (Aguenaou & El Ammari, 2021)
Multiple Traffic Lights (MTL)	Red/amber/green per nutrient	Most consistently helps consumers identify healthier products Hawley & Roberto, 2012)
Health Star Rating (HSR)	0.5–5 star scale	Used in Australia/NZ; moderate effectiveness



Guideline Daily Amounts (GDA)	% of daily reference intake	Widely used in EU; less intuitive for lower-literacy consumers
Warning Labels	Octagonal "High in X"	Strongest deterrence effect; used in Chile, Mexico, Israel

In a study from Belgium with 1,007 respondents there were no statistically significant differences in food choice between the various FOP formats, yet Nutri-Score was the only format that was able to assist consumer in ranking food products correctly based upon their nutritional quality.(Vandevijvere & Vermote, 2020)

### 2.2 Health and Nutrition Claims

There are many marketing tools which could function as both positive and negative sources of information to consumers, examples of marketing tools are labelled health claims and symbols. (Hieke & Kuljanic, 2015)Swedish consumer research indicated that in some instances, a lack of knowledge of what constitutes a nutritional claim caused consumers' to have a suspicion of that food product; however, this was sometimes mitigated by confidence in the manufacturer of that food product or by the country's food legislation. (Svederberg & Wendin, 2011)A negative outcome from consumers' use of health claims was the behaviours associated with labelled foods; specifically, the consumption of labelled "healthy" foods may lead consumers' to over-consume because they believe they have a greater safe consumption volume. (Kerr & McCann, 2015)Sustainability and Eco-Labels

Misinterpretation of sustainability labels by consumers remains an important hindrance to sustainability labels; when consumers were shown additional information regarding the meaning of 12 different sustainability labels, their relative preference scores changed dramatically (the best-worst scaling research). Label literacy and label standardisation are also important factors in consumer choice. (McLeod & Yang, 2023)

### 2.3 Novelty and Affective Labels

In addition to the informational labels, affective cues (i.e., surprise labels) may also have a large impact on consumer behaviour via packaging. In an experimental study, unchanging (nutritional) information but unexpected packaging caused the selection size of snack foods to increase by virtue of enhanced enjoyment due to perception (the halo effect). (Schumacher, 2020)These findings show that the influence of labelling is much broader than simply being rational when processing nutrition information.

## III. CONSUMER ENGAGEMENT WITH FOOD LABELS

### 3.1 Who Reads Food Labels?

Evidence consistently suggests the characteristics of consumers who utilize nutrition labels regularly are not shared by all consumers. Demand for nutrition label information typically occurs with consumers that have common characteristics:

- Diet-related health conditions Consumers with diabetes in Saudi had twice the probability of purchasing food items with a "sugar-free" label as compared to non-diabetic consumers. (AlbuObaid & Al-Mahish, 2022)
- Higher education levels: A positive correlation between level of education and checking for label information existed among age groups in urban Indian consumers. (Vemula & Gavaravarapu, 2013)
- Weight management intent: Consumers who are currently on weight loss diets check nutritional information more often than consumers not on a weight-loss diet. (Kerr & McCann, 2015)
- Gender: Women who are concerned about using foods high in fat and sugar check food items nutritional label information more frequently. (Vemula & Gavaravarapu, 2013)Age: Older consumers had more than a 2 to 1 chance of purchased food products with labels that indicate reductions in sugar content when compared to younger consumers.(AlbuObaid & Al-Mahish, 2022)



### 3.2 Barriers to Label Use

Barriers to judges' engaging successfully with product labels occur consistently:

- Numerical and health literacy: Consumers often do not have sufficient background knowledge about sodium labelling to make informed decisions about their salt and sodium intake. According to research on sodium labelling in New Zealand, most consumers do not have enough background knowledge about sodium content in food to understand how to manage their salt intake. (McLean & Hoek, 2013)
- Information overload: Pushback from food professionals in Portugal indicated that excessive technical jargon, volume of information, and unclear symbols were major barriers to effective student food label communication. (Franchini & Oliveira, 2021)
- Price dominance: Consumers in Saudi Arabia reported being much less likely to engage in health claims or label claims when they were predominantly focused on the cost of purchasing a product. (AlbuObaid & Al-Mahish, 2022)
- Trust deficits: Consumers generally perceive labels as untrustworthy, particularly in relation to health claims, GM labelling and additives, and this lowered the potential utility of food labels. (Van der Merwe & Venter, 2010)

### 3.3 Understanding vs. Use

A significant difference exists between \*understanding\* a food label and \*using\* the label to change consumer behaviour. A recent review of 58 EU-based studies has shown that although consumers demonstrate significant interest in nutrition information (with relatively high rates of recall) in controlled laboratory situations; there have been very few studies addressing how people actually use food labels when they are, "shopping in real life," or the impact of food labelling on dietary consumption patterns, such as how many servings of a particular food or how often an individual consumes a food or beverage that has been labelled. (Grunert & Wills, 2007)

## IV. REGIONAL AND CULTURAL DIMENSIONS

**Figure 2: Regional Evidence Summary — Food Labelling Effectiveness**

Region	Key Finding	Dominant Label Type	Key Gap
Europe (EU-27)	85% BOP coverage; Nutri-Score most effective for ranking	GDA, MTL, Nutri-Score	Real-world behaviour change evidence
North America	MTL most consistent for identifying healthier products	NFP, FOP systems	Serving size comprehension
South Asia (India)	90% read labels but only for dates; low nutrition literacy	Expiry date, quality symbols	Nutrition education; simplified formats
Middle East (Saudi, Lebanon)	Health-condition-driven label use; price dominates for others	Ingredient lists, health claims	Low-income consumer engagement
Africa (South Africa, Morocco)	Nutri-Score most effective in Morocco; regulatory gaps in SA	Emerging FOP systems	Developing-country adaptation; NCD burden
Oceania (NZ, Australia)	Sodium label literacy gaps; HSR in use	HSR, NFP	Numeracy-independent label formats

### 4.1 Developed vs. Developing Country Contexts

Most of the food labelling research conducted to date has occurred in high-income countries; South African researchers also stated there has not been adequate research on food labelling in lower-income nations and that laboratory research would be useful focal points for future food label research, particularly in areas with a high rate of malnutrition and the



growing incidence of NCD, such as diabetes and obesity. (Wandel, 2016) Although nearly half of surveyed grocery shoppers in Lebanon reported frequently checking food labels (44.6%); nonetheless, very few surveyed consumers reported consulting food labels to determine how much fat calories are contained in a particular level of food, and radio was considered the most significant source of food-related information suggesting that food labels may be influenced by the larger media and culture environment in which they are placed. (Boustani & Cardoso, 2022)

#### The Role of Trust and Ethics

Trusting what is on a label is fundamental to enabling labels to be successful. Studies into ethical food logos have shown that many people have negative views about food logos with regard to how much trust can be placed in health claims, how clearly ingredients are displayed, and how products with genetically modified ingredients are labelled. (Van der Merwe & Venter, 2010) Therefore, it is up to the food industry to provide ethical, truthful or trustworthy, and easy-to-read labels that adequately convey this information, and to be supported by an adequate number of regulations for monitoring and enforcing these rules.

## V. LABEL DESIGN, FORMAT, AND COMMUNICATION STRATEGY

### 5.1 Simplification and Interpretive Labels

In fact, research indicates that most people prefer simpler explanatory types of label formats than complex numerical or graphic types of labels. Roberto and Khandpur (Harvard) identified that in order for nutrition labels to achieve their intended purpose, they must do the following: (i) attract consumers attention, (ii) be simple to understand, and (iii) display nutrition data in a simplified format such as clearer spoken language format than percentage or number format, and provide serving size information that is clear or simple to understand. (Roberto & Khandpur, 2014)

### 5.2 Serving Size Information

Serving size continues to be a significant obstacle in using nutrition labels properly. Research indicates that consumers frequently do not pay attention to serving sizes, and they tend to overeat foods that are perceived to be healthy (i.e., due in part to a "health halo" effect). (Kerr & McCann, 2015) It is essential to place consistent, clearly understandable, simple size information on package (front or back) and at points of sale.

### 5.3 Healthy Choice Labels — Limited Standalone Effect

Although healthy choice labels are now used widely, they do not have much of an effect on their own. A study done in Switzerland (n = 780) has shown that adding a healthy choice label to breakfast cereal choices has only a small effect on people's ability to guess correctly which breakfast cereal is healthier than the comparable product without the healthy choice label — many of the participants (median between 78% – 91% accurate in control condition) were already making correct guesses based on their previous experience with the products. (Siegrist & Hartmann, 2019) This may indicate that the majority of people use their previous product experience and general perception to make decisions. However, when considering product categories that are unfamiliar or completely new, product labelling tools will provide increased benefits to consumers.

### 5.4 Health Claims and Symbols — The CLYMBOL Framework

To get a better sense of how health claims and symbols affect consumers' understanding of, purchase of, and consumption of products in real life; the EU sponsored the CLYMBOL project which used multiple methods of research that included eye movement studies, in-store product trials, consumer focus groups and survey research, and population panel studies. (Hieke & Kuljanic, 2015) Results of the CLYMBOL project suggest that additional research should be done on the differences among countries and individual motivations and cognitive styles when determining the effects of product labelling.



## **VI. REGULATORY LANDSCAPE AND INDUSTRY COMPLIANCE**

The regulations that govern food labeling include many complex national and international laws that exist together without coordination. There are three international standards currently being developed in the area of food labeling:

- EU Regulation 1169/2011: requires nutrition labelling on packaged products (Portugal food professionals report being dissatisfied with the degree of complexity of this regulation). (Franchini & Oliveira, 2021)
- US FDA Nutrition Facts Panel: continues to receive scrutiny regarding whether the serving sizes are accurate and if there should be a label on the front of the package to provide guidance to consumers ( Hawley & Roberto, 2012)
- South Africa R146/R429 Legislation: analysis of this legislation indicates that over 70% of food manufacturers will have nutrient composition and/or label changes once the R429 legislation becomes law, indicating very significant compliance challenges for industry. (Burse & Wiles, 2019)
- Morocco (Nutri-Score consideration): Morocco (Nutri-Score being a front-of-package labelling system). Moroccan regulatory authorities, based upon consumer research, have determined that nutri-score is the optimum and most preferable FOP system available. (Aguenou & El Ammari, 2021)

## **VII. IMPLICATIONS FOR PUBLIC HEALTH AND INDUSTRY**

### **7.1 Public Health Implications**

Nutrition labels alone cannot be a public health intervention; therefore, they require consumer education, health literacy programs, and point-of-purchase interventions to complement their effectiveness.

- Simplified Front of Package systems — especially colour-coded systems — should be prioritized in policy, especially for lower-literacy populations.
- Nutrition labels alone cannot be a public health intervention; therefore, they require consumer education, health literacy programs, and point-of-purchase interventions to complement their effectiveness.
- Serving sizes need urgent reform across all label formats
- There should be a priority on developing countries for food labeling-related research and policy development because of the increasing NCD burden and the limited existing evidence base.(Wandel, 2016)
- 7.2 Industry Implications
- Food companies have a moral duty to provide reliable labels that accurately communicate. (Van der Merwe & Venter, 2010)
- Label standardization for sustainability is important because consumer misunderstandings about eco-labels decrease the economic and ecological benefit associated with eco-labels. (McLeod & Yang, 2023)
- Elements of "Affect" and "Novelty" (e.g., "surprise" cues) can promote increased portion size and should be evaluated from a corporate social responsibility perspective. (Schumacher, 2020)

## **VIII. RESEARCH GAPS AND FUTURE DIRECTIONS**

The following research gaps have been identified through investigation of the evidence that has been published:

- Real-world dietary behaviour change: Change in dietary behaviours in the real world is the majority of research done is based on measurement or preference and not data that would show a change in diet today longitudinal studies are extremely important for linking label exposure to dietary patterns. (Grunert & Wills, 2007)
- Developing-country contexts: The evidence from low- and middle-income countries is limited relative to the NCD burden (non-communicable diseases). A considerable amount of research is necessary for these contexts. (Wandel, 2016)
- Digital and QR-code labels: The transition to digital labelling (e.g., QR code, augmented reality labels) and their impact on consumer engagement has been little studied.



- Interaction effects: There has not been a large amount of research conducted on the interaction of multiple labels on the same packaging, for example combining Nutri-Score, health claim, and ecological label together.
- Vulnerable populations: Vulnerable populations such as children, elderly consumers and those with lower levels of numeracy/literacy need to have label formats that have been tailored for them and require specific studies on this population.
- Cross-cultural label harmonisation Evidence-based information is required for the international harmonisation of labels to understand how the label format will translate in different cultures.(Hieke & Kuljanic, 2015)(Hawley & Roberto, 2012)

## IX. CONCLUSION

Food labels are complex tools that enhance quality of health for the public, give consumers more power to make informed food choices and are supported through research. The body of evidence demonstrates that front of package (FOP) systems can aid consumers in making healthier decisions, particularly simplified, interpretive FOP systems such as Nutri-Score (NS) and Multiple Traffic Lights (MTL). (Hawley & Roberto, 2012, Aguenau & El Ammari, 2021) The limitations on the effectiveness of food labels are moderated by numerous factors affecting consumers, including consumer health literacy, consumer education, consumer's disease status, the cultural context in which a consumer lives, and the level of trust the consumer has in the food system. Realising the potential of food labels as an intervention to improve dietary health is dependent on regulatory harmonisation, enforcement of mandatory compliance to regulatory agencies by industry, consumer education, and conducting targeted research in the countries developing countries

Evidence boundary: The information discussed here was originated from a search of the peer-reviewed literature that were available during this session. There was not a single indexed article titled "Food Labelling and Consumer Choice: A Comprehensive Review"; therefore, this paper offers a comprehensive collection of the best available published evidence on the major areas included in this topic.

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