EVALUATING CONSUMERS' PERCEPTIONS AND UNDERSTANDING OF FOOD LABELS FOR PROCESSED/ ULTRA-PROCESSED PACKAGED FOODS

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B.SC. FOODS AND NUTRITION- DIETETICS

EVALUATING CONSUMERS' PERCEPTIONS AND UNDERSTANDING OF FOOD LABELS FOR PROCESSED/ ULTRA-PROCESSED PACKAGED FOODS

A dissertation submitted for partial fulfilment of Degree of Masters of Science Foods and Nutrition (Public Health Nutrition)

BY

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CERTIFICATE

This is to certify that the research work presented in this thesis has been carried out independently by **Ms. Arushi Loiwal** under the guidance of Dr. Vijayata Sengar is pursuing a Degree of Masters of Science (Family and Community Sciences) with a major in Foods and Nutrition (Public Health Nutrition) and this is her original work.

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Arushi Loiwal

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Introduction: The prevalence of Non-Communicable Diseases are increasing due to unhealthy diets.Food Labelling can be used as a strategy to address this matter.

Methods: The present study wasa cross-sectional study conducted to evaluate consumers' perception and understanding of Food Labels for processed and ultra-processed packaged foods. The study wasdivided into three Phases- Phase I-Market Survey, Phase II-Consumer Survey and Phase III-Development of Manual. In Phase I-Market Survey, one superstore from each zone of Vadodara city was randomly selected. Listing of all processed and packaged foodsand assessment of labelling across all brands was done. In Phase II, information wascollected on socio-economic status, medical history, perception towards consumption of processed packaged foods and frequency of consumption of processed packaged foods, awareness regarding BoP and FoP labels. In Phase III, a manual for capacity building of consumers was developed to facilitate them for making healthier choices.

Results: During market survey 420 processed packaged foods were listed. Only 24% of the processed packaged foods had front of pack label mentioned. Only 24% of the processed packaged foods had Calories/Energy as the RDA related informationmentioned on their front of pack. All of the processed packaged foods had Back of Pack Label mentioned. Most of the packs had Veg, FSSAI as their symbols and logos. All of the packs had nutrition facts panel mentioned. Most of the packs had minerals andvitamins as the nutrient claims. Most common health claim was 'supports immunity'. For consumer survey, 425 subjects were enrolled. Mean height, weight and BMI of themales was found to be higher than the females. Half of the subjects had normal BMI. Around 19.5% of the subjects that were in age group 20-<25 years were found to have a normal BMI. Around 51.9% of the subjects that were having normal BMI purchased processed packaged foods regularly. Most of the study participants did not have any major health concern. Around 72.2% of the subjects purchase processed packaged foods. Around 63.2% of the subjects looked for Back of Pack Label while purchasing processed packaged foods, and around 61.4% of the subjects looked for Front of Pack Label while purchasing processed packaged foods. Participants' perceptions wereanalyzed to see how much they could understand from BOPLs. It was observed that although they reported of information being received from BOPL, the extent of information understood by them was low. Participants' perceptions were analyzed to see how much they could understand from FOPLs. It was observed that

although they reported of information being received from FOPL, the extent of information understood was low. Development of a manual was carried out for the consumers to make them understand about the processed packaged foods and food labels.

Conclusion: Thus, the present study stresses upon the fact that there is a strong need to educate consumers about labels so that they can understand the information behind it and use it for making healthier food choices.

INTRODUCTION

Non Communicable Diseases

Non-communicable diseases (NCDs), sometimes referred to as chronic diseases, are conditions that develop over an extended period of time as a result of a combination of genetic, physiological, environmental, and behavioural factors (WHO, 2022).

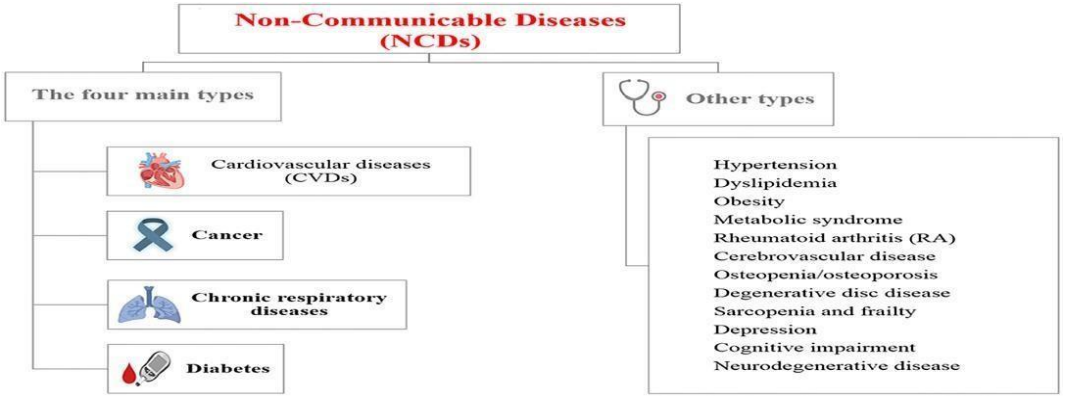
The four primary categories of NCDs include diabetes, cancer, chronic respiratory diseases like chronic obstructive pulmonary disease and asthma, and cardiovascular diseases like heart attacks and strokes (WHO, 2022) (Fig.1.1).

Non communicable diseases (NCDs) account for 41 million annual deaths, or 74% of all fatalities worldwide. Seventeen million people die due to NCD before they turn 70 each year; 86% of these untimely deaths take place in low- and middle-income nations. Three-fourth of NCD-related deaths occur in low- and middle-income nations. The majority of NCD deaths, or 17.9 million people per year, are caused by cardiovascular illnesses, which are followed by malignancies (9.3 million), chronic respiratory diseases (4.1 million), and diabetes (2.0 million including kidney disease deaths caused by diabetes). Over 80% of all NCD-related deaths that occur prematurely are caused by these four disease types (WHO, 2022).

Around 20.6% women and 20.3% men have hypertension in Gujarat (National Family Health Survey 5, 2019-21) whereas 15.8% women and 16.9% men have diabetes in Gujarat (National Family Health Survey 5, 2019-21) (Fig. 1.2). Nearly 22.7% men and 29.1 % women have cardiovascular diseases in Gujarat. According to LASI 2018, 19.7% men and 27.4% women have hypertension in Gujarat while 13.2% men and 11.8% women have diabetes in Gujarat (Fig. 1.3).

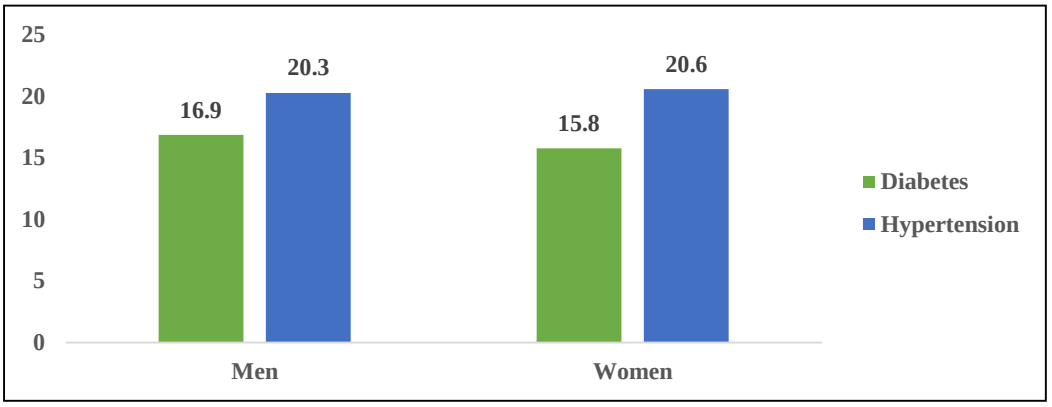
The risk of NCDs is increased by a number of modifiable behaviours, including tobacco use, physical inactivity, unhealthy eating habits, and harmful use of alcohol (WHO, 2022) (Fig. 1.4). Every year, tobacco use results in more than 8 million fatalities (including from the effects of exposure to second-hand smoke). Overconsumption of salt and sodium has been linked to 1.8 million deaths annually. More than half of the 3 million deaths per year linked to alcohol use are caused by NCDs, such as cancer. Insufficient physical activity is responsible for 830 000 deaths each year (WHO, 2022).

Fig. 1.1 Types of Non-Communicable Diseases



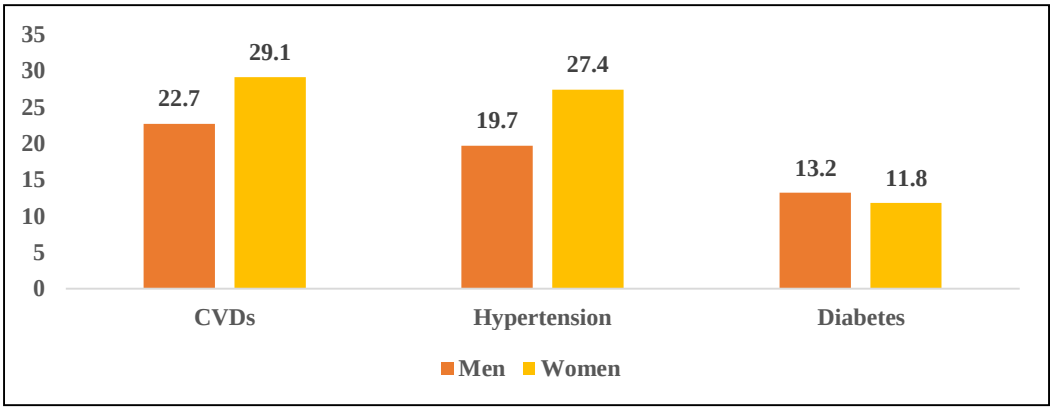
Source: Frontiers in Public Health, 2020

Fig. 1.2 Prevalence of Diabetes and Hypertension-Gujarat



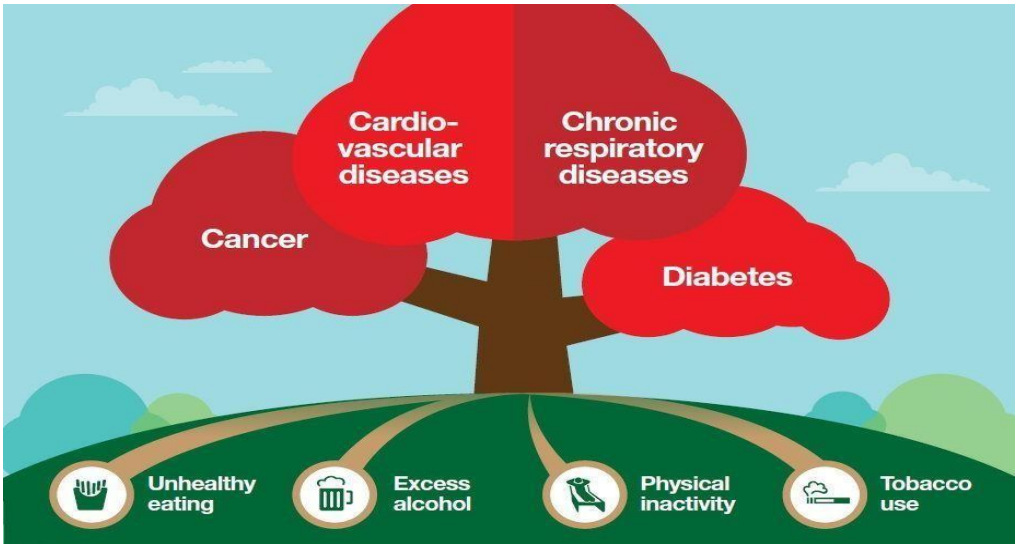
Source: NFHS-5, 2019-21

Fig 1.3 Prevalence of CVDs, Hypertension and Diabetes-Gujarat



Source: LASI, 2017-18

Fig 1.4 Causes of Non-Communicable Diseases



Source: IFMA (International federation of Pharmaceutical Manufacturers and Associations), 2014

Fig. 1.5 Unhealthy diets

Source: The conversation, 2019

Fig. 1.6 Processed Packaged Foods

Source: Technology Networks Applied Sciences, 2021

Unhealthy Diets

A diet that does not maintain or enhance general health is considered unhealthy. An unhealthy diet deprives the body of vital nutrients such macronutrients and micronutrients, sufficient fibre, energy, and hydration. Sugar, salt, and fat are abundant in an unhealthy diet. One of the main risk factors for a number of chronic diseases, such as cancer, diabetes, cardiovascular disease, and other disorders associated with obesity, is an unhealthy diet (WHO, 2022).

Four of the top 10 risk factors for death worldwide—high blood pressure, high blood glucose, overweight and obesity, and high cholesterol—are associated with unhealthy diets. About 1.7 million deaths per year are attributable to inadequate eating of fruits and vegetables, which also increases the risk of certain cancers and cardiovascular diseases. Dietary salt intake plays a significant role in determining blood pressure levels and overall cardiovascular risk; high blood pressure is the leading cause of mortality worldwide. High consumption of trans and saturated fats is associated with heart disease, the leading cause of death worldwide (World Heart Federation, 2017).

Poor communities around the world are frequently those that suffer due to unhealthy diets. In many nations, fat and sugar have replaced fruit and vegetables as the cheapest and most convenient sources of calories. They are frequently even less expensive than traditional staples like grains, beans, and lentils. The largest expanding markets are in low- and middle-income nations, which makes them ideal for aggressively promoting harmful goods like soft drinks and fast food (World Heart Federation, 2017) (Fig. 1.5).

Processed Packaged Foods

Processed packaged foods are those foods that undergo chemical or mechanical methods to either change their structure or to preserve them for long time. These foodsundergo processes such as freezing, canning, baking, drying and pasteurising. During these processes, ingredients such as salt, sugar and fat are added to make these foods more appealing, change them in structure and to prolong their shelf life. These foods are available in packaged form. The examples of these processed packaged foods are potato chips, biscuits, instant noodles, instant pasta, instant soup mixes, ketchups and sauces, chutneys, pickles, papads, juices and many more (Ultra-processed foods, diet quality, and health using the NOVA classification system, FAO, 2019) (Fig. 1.6)

The processed packaged foods typically contain a lot of sugar, salt and sodium,saturated fats, and trans fats. In general, these foods are low in fibre, vitamins, minerals, monounsaturated and polyunsaturated fats, carbohydrates, proteins, and other nutrients (Ultra-processed foods, diet quality, and health using the NOVA classification system, FAO, 2019).

The processed foods include simple cheeses with salt added, most freshly baked breads, and canned or bottled vegetables or legumes (pulses) preserved in brine, whole fruit preserved in syrup, tinned fish preserved in oil, and some types of processed animal foods like ham, bacon, pastrami, and smoked fish. They are created by combining unprocessed or lightly processed foods with salt, oil, sugar, or other elements from processed culinary products. Processes include several preservation or cooking techniques, as well as non-alcoholic fermentation with breads and cheeses. Here, processing either improves the sensory aspects of unprocessed or minimally processed foods or makes them more durable (Ultra-processed foods, diet quality, and health using the NOVA classification system, FAO, 2019).

The majority of processed foods are made with only two or three ingredients and can be recognized as slightly altered versions of unprocessed or minimally processed meals. They can be eaten alone as snacks but are typically prepared to be eaten with meals or other foods. Most of these foods are highly palatable. Similar to components used in cooking, some processes used to create processed food products date back in time and are still utilized domestically or artisanally today. But today, practically everything is produced industrially (Ultra-processed foods, diet quality, and health using the NOVA classification system, FAO, 2019).

Salting, salt-pickling, smoking, and curing are examples of preservation techniques. Other processes include canning and bottling with oils, sugars, or salt. The procedures change the nature of the foods as a result of the components contaminating them. Most of the original food's components and basic identity are typically retained in processed food products. However, when too much oil, sugar, or salt is added, they lose their nutritional balance. With the exception of canned veggies, their caloric density ranges from moderate (the majority of processed meats have between 150 and 250 kilocalories per 100 grams) to high (around 300-400 kilocalories per 100 grams for most cheeses). They can be overused, just like processed food ingredients. They also provide tasty dishes and dinners that are nutritionally balanced and have lower energy densities than

most ready-to-eat food products when used sparingly, and in the case of processed meats, only seldom (Ultra-processed foods, diet quality, and health using the NOVA classification system, FAO, 2019).

Food Labelling

One of the most significant and straightforward ways to inform the consumer is through a food label, which is the information shown on food products. Any tag, brand, mark, pictorial or other descriptive matter that is written, printed, stencilled, marked, embossed or impressed against, or attached to, a container of food or food product is considered to be a food label according to the generally recognised definition. To encourage the sale of the food, this information, which covers things like ingredients, quality, and nutritional value, might be placed with the food or displayed nearby (FAO, 2007).

The Food Safety and Standards (Packaging and labelling) Regulations, 2011, apply to all packed food products sold in India. The Food Safety and Standards Authority of India, which is a division of the Ministry of Health and Family Welfare, published the Food Safety and Standards Regulation, 2011 as a notification (FSSAI, 2011).

All "Pre-packaged" or "Pre-packed" foods in India are required to adhere to the labelling requirements. According to the regulations, pre-packaged food is defined as food that has been put into a packaging of any kind so that the contents cannot be changed without interfering with it and is prepared for sale to the consumer (FSSAI, 2011).

Back of Pack Labelling

A Back of Pack Labelling (BoPL) is a labelling provided at the back of pack of food products (Fig. 1.7). The BOPL provides a detailed information regarding the nutrient composition of food product. The BOPL gives amount and percent Recommended Dietary Allowances (%RDA) of nutrient information per 100g or per serving of the food product. The BOPL provides nutrient information regarding Energy, Carbohydrates, Proteins, Total Fat, Dietary Fiber, Total Sugars, Cholesterol, Sodium, Calcium, Iron, Potassium, Vitamin A, Vitamin D, Vitamin E, Vitamin C and many more.

Fig. 1.7 Back of Pack Labelling

Nutrition Facts

4 servings per container

Serving size **1 cup (227g)**

Amount per serving

Calories **280**

	% Daily Value*
Total Fat 9g	**12%**
Saturated Fat 4.5g	**23%**
Trans Fat 0g	
Cholesterol 35mg	**12%**
Sodium 850mg	**37%**
Total Carbohydrate 34g	**12%**
Dietary Fiber 4g	**14%**
Total Sugars 6g	
Includes 0g Added Sugars	**0%**
Protein 15g	
Vitamin D 0mcg	0%
Calcium 320mg	25%
Iron 1.6mg	8%
Potassium 510mg	10%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Source: US FOOD AND DRUG ADMINISTRATION (FDA), 2022

General Labelling Requirements (Back of Pack)

According to the Food Safety and Standards (Labelling and Display) Regulations, 2020, the following labelling requirements must be complied with by all prepackaged food sold in India:

- The label must be written in Devnagri, Hindi, or English. The label may also include information in any other language as needed, in addition to what has been mentioned.
- Any information on the food's label that might be construed as inaccurate, misleading, deceptive, or otherwise give the wrong impression about the product is prohibited.
- The label must be attached to the container in a way that prevents it from being easily removed.
- The information on the label should be easy for the consumer to read and should be provided in a clear, noticeable, indelible manner.
- If a wrapper is used to cover the container, it must either provide the relevant information or make the label of the product within easily readable by not concealing it.
- Along with the trade name and a description of the meal within, the name of the food must be provided. If there are many ingredients in the food, they must be listed in descending order of their composition by weight or volume, as applicable and at the time the item was manufactured.

Nutritional Information

The following information must be included on the label in addition to the nutrition data per 100 g, 100 ml, or per serving of the product: value of energy in kcal; the amounts of fat, protein, and carbohydrates (including how much sugar there is), expressed in grams or millilitres; Any other nutrient's quantity for which a nutrition or health claim is made: It is significant to note that the FSSAI officials carefully examine any "health claims," "nutrition claims," or "risk reduction claims" contained on the label. Therefore,any such claim needs to be supported by test results.

Due to limitations of Back of pack labels, FSSAI has now come up with Front of pack labelling (FSSAI, 2022).

Front of Pack Labelling

A Front of Pack Labelling is a labelling provided at the front of pack of food products. The FOPL provides a brief information regarding the nutrient composition of food product. The FOPL gives the amount and percent Guideline Daily Amounts (%GDA) of nutrient information per serving of the food product. The FOPL provides information regarding energy, total sugars, total fat, saturated fats and sodium.

Front-of-pack labelling (FOPL) is a crucial policy tool for nations to assist consumers in selecting healthier food choices (World Health Organization, 2019). A comprehensive technique to encourage healthy lifestyles is front-of-package warning labelling, which enables consumers to quickly, clearly, and effectively identify items rich in crucial nutrients linked to the burden of NCDs in India. A crucial tool in the global fight against diabetes and obesity is effective FOPL (FSSAI, 2019).

Goals of FOPLs

- FOPL improves consumer food selection: Most research indicate that customers choose each packaged food item for 6–10 seconds.
- FOPL promotes reformulation: According to studies, if the nation has mandated FOPL, food producers are more likely to reformulate and make their goods healthier.
- FOPL classifies meals and drinks to help not just those going shopping but also with school feeding and the environment of schools.

Objectives of FOPLs

- Information about specific nutrients of concern, such fat, salt, and sugar present in processed packaged foods, is included on front of pack labels (FOPLs), which are straightforward and simple to comprehend.
- FOPLs are a way to verify marketing statements made at locations where processed packaged foods are purchased.
- The FOPLs assist consumers in making better-informed decisions.
- Consumers' healthy eating habits are encouraged through FOPLs.
- FOPLs encourage producers to redesign and develop healthy products.
- Labels for the front and back of a package should work together. The first for proper consumer education, and the second for compliance and enforcement.

Benefits of FOPLs

- Front of Pack Labels (FOPLs) encourage consumers to develop the habit of selecting healthful foods.
- FOPLs aid in encouraging customers to lead better lifestyles.
- FOPLs assist in reducing both direct and indirect healthcare spending.
- FOPLs assist customers in identifying the nutrients of concern, such as sugar, salt, and fat, which are important nutrients linked to non-communicable diseases.

Role of labelling in reducing the consumption of processed packaged foods

The disclosure of the major nutrients, such as salt, fat, sugar, and energy content, on the label of a food product is referred to as nutrition labelling. It is a tool for policy that can be used to direct consumer food selection by governments, the food business, and non-governmental health and consumer organisations (SHAKE technical Package for salt reduction, WHO, 2016).

The goal of labelling in salt reduction is to direct consumers toward less-salty, healthier food options. By requiring manufacturers to publicly disclose the amount of salt used in a product, nutrition labelling, in particular front-of-pack labelling, may also drive the reformulation of food goods. This may cause the product to compare unfavourably with that of a rival and lose customers (SHAKE technical Package for salt reduction, WHO, 2016).

Various voluntary and required nutrition labelling schemes are in use in the world, most frequently used to describe pre-packaged food and drink items. The type and quantity of nutrients that are labelled, the reference values that are utilised, whether the information appears on the "front-of-pack" or "back-of-pack," and if the label offers any interpretive assistance to the consumer are all variables in different labelling systems (SHAKE technical Package for salt reduction, WHO, 2016).

As required by the Codex Alimentarius, nutritional declarations, which typically take the form of a "back-of-pack" listing of the nutrient content of foods, shall be posted on all pre-packaged foods (food code). Governments can employ "front-of-pack" labelling as an extra tool to help consumers make informed food choices by prominently displaying information that is simple to understand regarding the nutrient quality of food goods (SHAKE technical Package for salt reduction, WHO, 2016).

Labelling should facilitate quick product evaluations by consumers and aid in the comprehension of quantitative information. It is crucial for a message to be understood very instantly because research shows that people only pay attention to nutrition labels for between 25 and 100 milliseconds when making food decisions (SHAKE technical Package for salt reduction, WHO, 2016).

A front-of-pack labelling system that is interpretative, or able to show, "at-a-glance," if a food contains high or low quantities of a nutrient or group of nutrients, is ideal. The relative nutritional content of the product can be rapidly determined by consumers thanks to labelling techniques like the "colour code" system. Consistent research suggests that customers like straightforward, user-friendly designs and are in favour of the implementation of front-of-pack labelling. It has also been demonstrated that these programmes aid consumers in choosing healthier options (SHAKE technical Package for salt reduction, WHO, 2016).

With the help of the Ecuadorian Traffic Light Label, consumers can easily understand how much sugar, salt, and fat are present in processed foods. Participants in the Focus Group Discussion were able to understand and positively evaluate the label, which increased their understanding of the value of salt, sugar, and fat in the diet. Additionally, the results imply that some population segments have transformed their attitudes as well as their practises of purchasing and consuming processed meals with high fat, sugar, or salt content. The Traffic Light Label is a useful tool for disseminating information about the fat, sugar, and salt content of processed foods. Its straightforward graphical presentation makes use of a recognisable and simple-to-understand colour scheme and language, which helped Focus Group Discussion participants learn and understand and, in some cases, changed attitudes and practises around the purchase and consumption of processed foods. However, while the Traffic Light Label can help consumers make healthier decisions, it does not always result in a change in consumption habits. For this reason, it is crucial to comprehend how various demographic groups make decisions regarding processed foods (Wilma B Friere et al, 2016).

Food labelling regulations are put in place to help people make educated decisions about the nutritional value of their food (Amos Laar, 2021). Australia (health star rating system): Three years after its establishment, the Health Star Rating system in Australia could be found on 28% of products that qualified. The Health Star Rating logo was well-liked, easily comprehensible, and used by consumers, but its impact on purchases

was mostly unclear. The most obvious ways to increase the public health impact of Health Star Rating are through reasonable improvements to its star graphic and algorithm, starting mandatory implementation, and strengthening its governance (Amos Laar, 2021). Chile (Warning Label): Six months after the warning label's introduction, popular support in Chile was strong. The label was changing consumers' buying habits and had a favourable effect on product reformulation. Following the enactment of Chile's Law of Food Labelling and Advertising, sales of high-calorie beverages considerably decreased; these decreases were greater than those seen from single, stand-alone initiatives, such as previously enacted tariffs on sugar-sweetened beverages in Latin America. According to the study, when the law went into effect, the volume of high-intensity beverages purchased per person per day fell by 22.8 mL or 23.7% (Amos Laar, 2021). Ecuador (Traffic Light Label): One year after the Traffic Light Label's installation, research showed that Ecuadorians were consuming less products with "high" labels and favouring "medium" and "low" labels more frequently (Amos Laar, 2021). Netherlands (Choices Logo): Prior to its exit from the Netherlands, the Choices Logo prompted the redesign of already-existing items and the creation of new ones with a healthier product composition. The most commonly reformed items to carry the mark were soups, and the snack category saw the greatest new product development. Dietary fibre was significantly higher in new goods compared to reference items in categories, and sodium was the ingredient that has been the most modified in the product groupings (Amos Laar, 2021). Health Star Rating System of New Zealand: The Health Star Rating system has a 20.9% acceptance level four years after installation. Reformulation of products with the Health Star Rating was higher than that of items without the label throughout the same time period (for example: energy reduction, sodium content) (Amos Laar, 2021). Singapore (Healthier Choice Symbol): Evaluations in Singapore revealed a 5% annual growth in the number of products sporting the Healthier Choice Symbol. Healthier Choice Symbol product consumption was linked to better diet quality (Amos Laar, 2021). UK (Traffic Light Label)-A study that compared the percentage change in sales four weeks before and after the retailer introduced traffic light labels revealed that sales of the products bearing the label increased (by 2.4% of category sales) in the four weeks following their introduction, whereas sales of the chosen sandwiches did not change significantly. According to the study, there was no correlation between changes in product sales and the items' nutritional value (Amos Laar, 2021).

Food labels are seen as an essential part of plans to combat obesity and unhealthful eating habits. The availability of healthier items and calorie intake can both be improved through food labelling. A slight drop in body mass index would benefit consumers of food labels because it would gradually reduce the risk of contracting chronic illnesses including diabetes, cancer, and cardiovascular diseases. The population's health would significantly improve as a result, and medical costs would decrease (M. Cecchini and L. Warin, 2015). By giving nutrition information on food labels, consumers are empowered (Campos S et al, 2011). The industry may generate healthier food as a result of nutrient reformulation as a result of food labelling (Emrich TE et al, 2015; Hawkes C, 2015).

One of the most difficult health issues is the link between nutrition and certain malignancies, heart conditions, and obesity. Front-of-pack nutrition profile signposting labelling is increasingly regarded as a crucial tool in the fight against unhealthy food choices and the improvement of public health because it conveys clear, understandable nutrition information. As a result, nutritional profiling techniques and the creation of optimal nutrition standards are given a lot of attention in policy and research. The usefulness and significance of these labelling systems for consumers have gotten less attention, despite the fact that consumer research on nutrition signpost labelling is now progressively surfacing in the literature (Ellen Van Kleef & H. Dagevos, 2012).

Consumers report that one of their primary selection criteria that guides their food decisions is health, and FOP labels are favoured as a tool for streamlining healthy food selections (Lando & Labiner-Wolfe, 2007; Schor et al., 2010; Verbeke, 2008). The potential influence of nutrition labels on the consumption of fat, sugar, and sodium in a Dutch population of young adults was assessed by Temme and colleagues in 2011. They demonstrate that decreasing intake of unhealthy substances like fat, sugar, and salt is feasible if food producers reshape their goods in accordance with the existing Choices health label guidelines or even more stringent criteria.

The possible impact on nutrient intakes in a range of worldwide populations after substituting usually eaten foods in diets with foods that are qualified to display a Choices label was evaluated by Roodenburg and colleagues (2009; 2011) using a similar modelling method. According to the simulation analysis's findings, this can result in significant increases in nutritional intakes and a minimal change in energy intake. Vyth and colleagues (Vyth et al., 2011) estimated the nutritional intake of the

Dutch adult population before and after replacing goods that did not meet the Choices label standards using national data on food consumption and food composition. According to their research, eating meals that meet these requirements may somewhat lower cardiovascular risk through affecting blood lipid levels. Foltran and colleagues (2010) don't have a very optimistic view. Similar to this, they carried out a simulation exercise to evaluate the potential impact on mortality and weight loss of implementing the nutritional profile guidelines for the reduction of salt and fat consumption in the European population. They believe that dietary profiling has only a modest impact on disease prevention. FOP labelling promotes food manufacturers to improve the nutritional composition of their products, which helps customers make better decisions (Feunekes et al., 2008; Lobstein & Davies, 2009). It also has a positive stimulating influence on product innovation (Rayner et al., 2001). The World Health Organization advises giving customers accurate and balanced information to empower them to make informed, healthy decisions in order to support a healthy diet (World Health Organization, 2008- 2013). Although competing interests would prevent future advancement, FOP labels might be essential to implementing this suggestion.

One of the effective strategies for battling bad eating patterns and rising obesity rates is nutrition labelling (Baltas, 2001). A list of nutrients on a food label together with a method of quantification is referred to as nutrition labelling (Hawkes, 2004). From a policy standpoint, it has the potential to promote healthy eating while upholding individual freedom. By offering product-specific information, it gives consumers a way to lessen the information asymmetry that exists between manufacturers and consumers. From the standpoint of the manufacturer or retailer, it offers a way to credibly highlight the favourable nutritional properties of items (KG Grunert et al, 2012).

Rationale

- Studies have shown that Back of pack labels are difficult to comprehend by layman and thus leave the consumer consfused.
- FoPL has been successfully implemented in few countries and can be one of the effective strategies to address NCDs.
- Since FoPL regulations have been announced there is a strong need to understand consumers' perception towards the need of FoPL and also the understanding of FoPL in India.

- Thus, the present study is designed to evaluate the consumers' views towards consumption of processed/ ultra-processed packaged foods and to evaluate consumers' perception and understanding of food labels

Objectives

Broad Objective

- To evaluate consumers' perception and understanding of food Labels for processed and ultra-processed packaged foods

Specific Objectives

- To evaluate the current status of labelling for processed/ ultra-processed packaged foods.
- To conduct a consumers' survey for assessing their perception towards labelling and consumption of processed/ ultra-processed packaged foods.
- To develop a manual for capacity building of consumers' to make healthy choices.

REVIEW OF LITERATURE

Nutrition Transition, Unhealthy Diets and Processed Packaged Foods

The changes in food, physical activity, and body composition appear to be happening faster. In lower- and middle-income transitional nations, the rate of the rapid nutrition transition—a change in food and activity patterns from the time period known as the receding famine pattern to one dominated by Nutrition related Non Communicable Diseases (NR-NCDs) seems to be accelerating. When discussing NR-NCDs, reference to nutrition rather than diet is done since NR-NCDs encompass the impacts of diet, physical activity, and body composition rather than concentrating exclusively on eating patterns and their effects. This is based in part on unfinished data that appears to show that the prevalence of obesity and certain NR-NCDs is rising considerably more quickly in low- and middle-income countries than it has in the west. Another factor is that urban populations are changing considerably more quickly than they did in the west a century or so ago. A third factor is the change in occupational structure and the quick spread of modern mass media. There is a widespread worry that fast globalisation is the foundation of these shifts (Barry M Popkin et al, 2004).

The term "nutrition transition" refers to dietary and lifestyle changes as well as population-level demographic and epidemiological changes. The change in nutrition has been profoundly impacted by urbanisation, migration, economic development, globalisation, and trade. People live in a variety of surroundings more frequently as nations get wealthier and more urbanised. Low-income nations start to imitate the habits of more industrialised, high-income nations as part of this transition. Rural communities grow less dependent on agriculture for a living, and subsistence farming in rural areas becomes less widespread. Food markets, supply networks, and habitats are becoming more diverse, occasionally more advanced, and lengthier. Diets and nutrition are directly impacted by these modifications to economies and food systems. Diets shift from being straightforward and less varied to becoming more varied as economies change. Previously dependent populations can now acquire a wider variety of nutrient-rich foods, such as animal source foods, in addition to seasonal and local foods. Although these developments may make it easier for people to get healthful meals, processed and fast food are also more readily available. The adjustments brought about by the nutrition shift have an impact on health outcomes as well. Along with nutritional

changes, physical activity declines frequently when lifestyles, career options, and modes of transportation alter. Disease loads may shift as a result of these adjustments; populations that were formerly at risk for undernutrition, communicable diseases, maternal and infant mortality, may now be more likely to suffer from overweight, obesity, and non-communicable diseases (NCDs). LMICs might be able to prevent the bad health effects of the nutrition transition, but doing so needs a lot of work (Jessica Fanzo and Claire Davis, 2021).

Changes in eating habits and nutrient intake are part of the nutrition transition that occurs when societies evolve economically and socially. It has been linked to concurrentrises in Nutrition Related Non-Communicable Diseases related to nutrition and obesity,which are currently some of the major causes of death worldwide. Compared to high- income countries, the risk of Nutrition Related Non-Communicable Diseases is rising quicker and at a lower economic threshold in African nations. This increased illness riskcould be partially explained by changes in food habits. Increased consumption of fat, especially from vegetable and edible oils, increased added sugar, increased animal- source foods, and decreased consumption of cereals and fibre, particularly from coarsegrains, staple cereals, and pulses are some of the generalised patterns of dietary changeassociated with nutrition transition. However, the precise type of dietary behaviour changes and the items that promote nutrition transition differ by region (Emily K Rousham et al, 2020).

Today, unhealthy diets and inadequate nutrition are the main causes of disease around the world. Nowhere is this more true than in the Pacific, where non-communicable diseases (NCDs) associated with being overweight, obese, or having a poor diet have a significant negative social and economic impact. Prior research has been done on the impact of processed foods on Pacific communities' diet-related health, and it is important for a number of reasons. We define processed food products as elements that have been extracted and refined from minimally or not at all processed or unprocessed foods that are "ready to eat" or "ready to heat," made from industrially prepared ingredients and additives, typically very palatable and heavily marketed, and frequently high in free sugars, trans-fats, and low in micronutrients. Foods are categorised by their degree of processing using a variety of frameworks. In these frameworks, the majority of the food items examined in this investigation are regarded as ultra- or highly processed. However, we also added other product categories for basic processed foods,

like bread, and culinary ingredients, such vegetable oils, which have their own unique additional crucial consequences for nutrition in developing nations. Food processing, which has been done by humans for millennia, is not inherently unhealthy for the body. By making food less perishable, improvements in food processing technology have improved global food security. Processed foods do, however, contribute to long-term negative health effects. While knowledge of the precise mechanisms relating food processing to health consequences is still being developed, several tenable hypotheses are starting to surface. First off, a lot of these foods are high in 'risk' nutrients like free sugars, salt, and trans fats and are frequently very energy dense. Second, they may replace whole and lightly processed foods, lowering the overall quality of the diet. Third, different industrial processing techniques itself may alter the food's physical makeup and chemical content, which may have a negative effect on metabolic functions (Katherine Sievert et al, 2019).

The prevalence of non-communicable diseases (NCD) has substantially increased in both industrialised and developing nations. One of the main causes of NCD development is an unhealthy diet. Recent research has shown that certain nutritional quality features have declined in numerous geographical regions, including low- and middle-income countries (LMIC). Most diseases that are brought on by a bad diet can be avoided or postponed before they develop fully. In order to have the biggest impact, it is crucial to recognise and address bad eating habits. Inadequate dietary intakes have not been recognised as a risk factor that leads to the development of NCDs by national dietary related programmes, which have typically concentrated on micronutrient insufficiency and food security (Rimante Ronto et al, 2018).

Around the world, it is typical to see people consume too many bad foods and nutrients and too few healthy ones. LMIC should pay particular attention to initiatives to decrease this twin burden of micronutrient deficit and unhealthy diets. The most effective and long-lasting interventions and policies are those that address entire populations, thus they should be given priority. The incidence of NCDs can be significantly and significantly reduced by population-based strategies such as health information and communication campaigns, fiscal actions such as taxes on sugar-sweetened beverages, direct restrictions and mandates, reformulation and improving the nutrient profile of food products, and standards regulating marketing to children. More nations must

implement population-based, efficient strategies to enhance current diets (Rimante Ronto et al, 2018).

Because they are more exposed to risk factors and have less access to primary care than their wealthier counterparts, low- and middle-income countries, as well as marginalised groups in wealthy countries, now suffer a heavier burden of NCDs. In the majority of Latin American nations, certain racial and ethnic minorities, those with lower socioeconomic level, and rural populations are disproportionately more likely to have NCD risk factors, such as obesity. Urbanization, technological advancements that impact energy use during transit, work, and leisure, and dietary changes, notably with the consumption of highly processed foods, are among the variables driving the sudden shift in illness burden in low- and middle-income nations (Catalina and Fernández, 2020).

A recent study revealed that one of the major NCD risk factors, obesity, has dramatically increased in rural populations worldwide, even exceeding the obesity incidence seen in urban populations today and rising at a faster rate compared with urban populations in most low- and middle-income countries. Migration to urban areas was largely responsible for the rise in NCD risk factors in developing countries because of the lifestyle and dietary changes associated with living in cities. While the trend suggests that this pattern will soon predominate in emerging nations, Chile is currentlythe only country in South America where age-standardized mean BMI is presently greater in rural women than it is in urban women. Although the trend suggests that thispattern will soon predominate in emerging countries, Chile is the only country in SouthAmerica where age-standardized mean BMI is presently higher in rural women compared to urban women. The Western dietary pattern (pattern 4: degenerativediseases), which is characterised by a high intake of saturated fats, sugar, and refined carbohydrates and a low intake of PUFAs and fibre, has been adopted in low- and middle-income countries with rapidly expanding economies at the same time as the epidemiological transition (Catalina and Fernández, 2020).

Since the end of the 1980s, there has been evidence of a nutritional shift throughout Latin America toward a Western eating pattern, however the pace and magnitude of this change differs greatly among the various nations in the region. Similarly, since then, comorbidities linked to the nutrition change, like NCD mortality, have increased concurrently. Sedentary behaviour, use of cigarettes, and alcohol intake are other

behavioural traits linked to nutrition and epidemiological transitions that have increased in these populations in recent decades. It is possible that individuals within a generation were regularly exposed to food insecurity and infections early in life whereas they are now presented with food abundance—especially refined carbohydrate foods—as adults due to the rapid transition from food- and nutrient-deficient environments to affluent environments (Catalina and Fernández, 2020).

It has been discovered that the mismatch between the quantity of food in adulthood and the poor early life situations anticipated as a foetus is a contributing factor in the increased occurrence of chronic diseases in developing countries. According to Uauy and colleagues, the rates at which dietary and lifestyle changes have taken place in these communities would have exposed people to more NCD risk factors, increasing their susceptibility to NCDs. It has been suggested that the "triple evolutionary mismatch" of genetic, cultural, and developmental factors accounts for the increased prevalence of NCD in low- and middle-income nations. Our genetically based physiology, evolved to a Paleolithic hunter-gatherer lifestyle, in an unmatched environment characterised by modern dietary and physical behaviours, would explain the rise in NCD in contemporary cultures. According to this theory, populations that transitioned from a hunter-gatherer lifestyle to a Western dietary pattern with a high intake of refined carbohydrates and saturated fats over a short period of time would be at a lower risk ofNCD because dietary adaptations would have reduced the evolutionary genetic mismatch. Other NCD risk variables have been found in recent decades to interact intricately with health outcomes, and their effects may differ between communities and cultural contexts. This study included ethnographic fieldwork, oral history interviews, collection of anthropometric and blood NCD biomarkers, as well as dietary and physicalactivity data, in order to better understand the associations between long-standing subsistence strategies, nutrition transition in various cultural and environmental settings, and NCD risk-related health outcomes (Catalina and Fernández, 2020).

Data were gathered from two remote indigenous tribes in Chile that lived in diverse landscapes and had different subsistence practises in the past (hunting-gathering compared with agropastoralism). In the recent past, both cultures have experienced changes in their nutritional practises. It was anticipated that NCD risk biomarkers would vary between the 2 populations as a result of these obvious differences between the 2 groups, as each group would exhibit context-specific responses to the difficulties posed

by changes in lifestyle and diet as well as market integration (Catalina and Fernández, 2020).

Everywhere diets are changing. The consumption of coarse grains, staple cereals, and pulses has decreased; the consumption of animal foods, sugar, salt, fats and oils, refined grains, and processed foods has increased; and, depending on where you look, the consumption of fruits and vegetables has either increased or decreased. Different locations and populations are experiencing these changes at varying speeds, but the developing world is experiencing the greatest rate of change. For instance, consumption of sugar, salt, and especially fat from processed foods has reached a standstill in high-income nations but is rising quickly in middle-income nations. According to the Global Panel on Agriculture and Food Systems for Nutrition, "people are gradually consuming more of the recommended foods in high-quality diets. However, despite dietary advancements, low-quality diets are still prevalent in most nations. According to current estimates, poor diets, which lack vital nutrients and contain an excess of toxic ingredients, are the main contributing factor to the worldwide burden of disease. The "nutrition shift," which refers to dietary changes and their effects on nutrition, is closely tied to the rising burden of overweight and obesity as well as diet-associated non-communicable diseases including diabetes and heart disease.

According to the World Health Organization, 1 in 12 people worldwide have diabetes, and 1.9 billion people are currently overweight or obese. Non-communicable illnesses have the potential to drive millions of people below the poverty line and are estimated to cost the global economy up to US$47 trillion in lost wages and medical expenses over the next 20 years, accounting for 75% of the global GDP in 2010. Drivers of thesedietary changes operate on a variety of scales and entail cyclical shifts in the supply anddemand of food (Corinna Hawkes, Jody Harris and Stuart Gillespie, 2017).

Globalization's policies and processes, the expansion of the large-scale food industry, including supermarkets and mass marketing, as well as rising income levels and shifting employment pressures that influence eating and activity patterns, are all strongly linked to shifting dietary patterns and the resulting health conditions. All of these elements are directly related to the urbanisation processes since diets and nutrition are affected by changing settings and preferences. They examined the statistics on urban diets, nutrition, and associated health consequences before delving deeper into some of the

factors influencing urban diet and nutritional change and discussing the implications for research and policy (Corinna Hawkes, Jody Harris and Stuart Gillespie, 2017).

In middle-income nations, where the vast majority of the world's population resides, the rapidly expanding consumption of processed foods is now projected to have a considerable role in the existing and future illness burden resulting from non-communicable diseases (NCDs). Nutrition transition theory foresees these trends. This hypothesis contends that as economies expand, communities go from minimally processed diets rich in staple foods of vegetable origin to diets high in meat, vegetable oils, and processed foods. This idea is relevant given the growing globalisation of food systems. This idea is already empirically well-established in several Asian nations, and current predictions suggest that processed food consumption will continue to rise in developing nations without the need for state intervention.

Given that processed foods frequently contain high amounts of refined sugars, sodium, saturated fats, and trans fats (collectively referred to as "sugar, salt, and fat") and that an excess of these nutrients is linked to obesity and diet-related NCDs, the role of processed foods in the nutrition transition is coming under closer scrutiny from a public health perspective (P. Baker and S. Friel, 2014).

Targets for policy intervention can therefore be found by determining which processed foods are the most significant "vectors" for these nutrients. However, only a small number of research have examined which types of processed foods are the most important "product vectors" for these nutrients in Asian nations. Processed food production and distribution practises promote consumption. Transnational food and beverage firms (TFBCs) have leveraged the power of food science to produce goods using globally standardised recipes that are then modified and sold to suit regional tastes and consumer preferences. To create "hyper-palatable" products, advanced ingredients and manufacturing techniques are combined with added sugar, salt, and fat. The same procedures improve the transportability and durability (shelf life) of the product, enabling long-distance and extensive distribution. Additionally, they are produced, branded, packaged, and sold in sophisticated ways that make them more desirable to consumers with different levels of age, socioeconomic class, and lifestyle. These cuisines are linked to an alternative "food culture" as well. In contrast to processed foods, which can be consumed anywhere at any time, unprocessed and minimally processed foods are often cooked and eaten at home at regular intervals. They are created to be "ready-to-eat" or "ready-to-heat," requiring little preparation and

providing convenience for consumers under time constraints. These qualities make processed foods not only very palatable for consumption but also lucrative for the businesses that manufacture them (P. Baker and S. Friel, 2014).

For a number of reasons, it is important to look into how processed foods have impacted Asia's nutritional transition. First, roughly half of the world's population lives in Asia, where better nutrition has the potential to enhance the lives of billions. It is a region that is rapidly developing economically, and the rises in household income that have accompanied them are likely to have increased demand for processed foods. As per capita income rises, the percentage of total food expenditure that is spent on processed foods rises from less than one-third in lower-middle-income countries (L-MIC) to roughly one-half in upper-middle-income countries (U-MIC) and high-income countries (HIC). The area has some of the greatest rates of rural-urban migration in the world, and China and Vietnam are likely to have the fastest rates of urbanisation over the next few decades (P. Baker and S. Friel, 2014).

Urbanization also boosts access to processed goods. Time constraints and the desire for convenience foods are probably going to increase as a result of changing family arrangements and workforce trends, especially the increasing economic participation of women. Increased use of appliances like refrigerators, microwaves, and motorised transportation may make a greater variety of foods more accessible. Second, roughly a quarter of the world's total FDI in 2011 came from Asia, which has received more FDI than any other emerging region since 1980. The intake of processed foods has probably increased dramatically as a result of the accompanying rising prevalence of TFBCs. Recent studies have shown that ultra-processed food products currently predominate the food supplies of HICs, and consumption is rising quickly in middle-income nations,but little is known regarding consumption patterns in the Asia area. Third, although being on average thinner than their Western counterparts, Asian populations are becoming increasingly overweight and obese, which is especially concerning considering their increased vulnerability to diet-related NCDs. This susceptibility results from a number of traits (P. Baker and S. Friel, 2014).

In Asia, underweight and obesity frequently coexist in the same households, and undernutrition in childhood may increase the risk of NCDs in later life when there is enough nutrition available. Compared to European populations, some Asian groups show higher total body fat percentages relative to body mass, higher central adiposity percentages, and higher risks of type 2 diabetes (T-2D) and cardiovascular disease

(CVD) at lower adiposity levels. For some Asian communities, this has led to the consideration (but not implementation) of lower World Health Organization body mass index cut-off values. Finally, various populations experience the globalisation of cuisines in different ways because there is no uniform change in nutrition. According to the dietary convergence-divergence theory, while consumption of a small number of food commodities is increasing globally (particularly vegetable oils, meats, some grains, and processed foods), local consumption is diverging more due to demographic,cultural, and socioeconomic factors that influence dietary preferences and consumer demand. Therefore, a regional focus may show disparities in the probable future trends in consumption and related health risk, in addition to existing trends in processed food consumption across the region. The purpose of this study is to determine the processed food categories that are the most major product vectors for fat, salt, and sugar in a number of Asian countries, as well as which nations are experiencing the fastest changes in levels and rates of consumption (P. Baker and S. Friel, 2014).

The main risk factors for chronic non communicable illnesses include "unhealthy commodities" such soft drinks and processed foods that are heavy in salt, fat, and sugar as well as alcohol and tobacco (NCDs). It is believed that their use is increasing quickly, especially in LMICs. The magnitude and causes of this rise in the consumption of harmful commodities are unclear, though. Numerous epidemiologists contend that economic development forces populations through a "nutrition transition" from undernutrition to overnutrition by changing people's food preferences from traditional diets with low salt, saturated fat, and glycaemic indexes to less healthy, complex western diets that cause obesity and related NCDs (David Stuckler et al, 2012).

Thus, it has been hypothesised that economic expansion and the resultant increase in incomes are raising the dangers associated with unhealthful commodity consumption. However, research has also shown that obesity and undernutrition can co-exist in the same homes, demonstrating the "two faces of malnutrition." Poor diets among underprivileged populations can lead to the consumption of both too many calories and too little nutrition (particularly from cheap, non-nutritious foods). In terms of obesity and the consumption of unhealthy foods, there is also a "social transition," whereby hazards that were previously more common among the richest people move to and establish themselves among lower-income groups. Contrarily, these findings suggest that lower income levels may not be a significant risk factor for the use of harmful goods. Studying the changes to economic and social institutions that are promoting their

rising availability and affordability is crucial to comprehend why people choose to purchase unhealthy commodities (David Stuckler et al, 2012).

Prior studies had concentrated on the role that urbanisation played in the nutrition transition, but with the rise of transnational food and beverage companies on a global scale, it is obvious that attention must now turn to the role that global producers play in producing and marketing the goods that are linked to NCD epidemics. Because of their high retail value, long shelf life, and low production costs, unhealthy commodities are very profitable. These market dynamics give industries unfavourable incentives to promote and advertise more of these items. They increasingly focus on expanding into markets in underdeveloped nations. Neoliberal policies, such as the opening of markets to trade and foreign investment, foster circumstances that enable multinational corporations to disseminate toxic goods widely (David Stuckler et al, 2012).

According to a hypothesis of "dietary dependency," countries' food systems become dependent on imports from and investments by sizable multinational processed food companies as a result of their integration into the global economy. When this occurs in LMICs, adjustments in food type, price, availability, and marketing that favour unhealthy goods have a growing impact on the consumption preferences and habits of those populations. According to reports, LMIC farmers and food vendors frequently fail or are incorporated into the production of processed foods when they are unable to compete with multinational corporations.

A thorough and global assessment of this relationship is required, notwithstanding preliminary data suggesting a connection between the use of hazardous goods and systems of food trade and market integration. Furthermore, the discussion has mostly concentrated on HICs, ignoring the rate and extent to which food systems in LMICs are absorbing more harmful items. Few studies have used quantitative data to examine the underlying population-wide causes for the variations across populations in the pace and degree of these dietary transformations among LMICs, despite studies beginning to document individual-level risk factors for consumption of such commodities (e.g., socioeconomic status, urban/rural residence, education level) (David Stuckler et al, 2012).

Recent findings suggest that non-communicable disease (NCD)-related disease burden has risen in developing nations. The World Health Organization (WHO) reports that developing nations currently account for 66% of all NCD-related deaths worldwide (WHO, 2004). One of the main risk factors for non-communicable mortality has also

been recognised as obesity, which is brought on by the "nutrition change" (McGinnis and Foege, 1993; Popkin 1998; Guo et al., 1999; Popkin et al., 2001; WHO, 2002). The use of highly and partially processed foods has significantly replaced staple crops and whole grains in emerging countries, which is linked to the nutrition transition (Popkin, 1998, 2002).

Processed foods frequently have low levels of dietary fibre and other crucial nutrients while being heavy in salt, sugar, and saturated fats. Industrialization, improvements in the food sector (production and development of new processed foods), and the quick growth of supermarkets globally have increased access to a wide range of processed foods at affordable prices. As an illustration, supermarkets have become very popular in developing nations, particularly in Latin American nations (Reardon et al., 2003; Codron et al., 2004), and they have transitioned from selling expensive luxury food items to selling mass-produced, low-cost canned and processed foods (Hu et al., 2004; Neven and Reardon, 2004; D'Haese and van Huylenbroeck, 2005; Reardon et al., 2005. As a result, there has been a noticeable change in household consumption patterns from staple and unprocessed foods to processed meals that are high in energy. According to the US Food and Drug Administration, almost 10,000 new processed foods are released each year (MacInnis and Rausser, 2005).

According to the biomedical literature, eating processed meals frequently can contribute to obesity in at least two different ways. First, processed foods, which frequently contain added sugar and other caloric sweeteners (especially those containing fructose), may artificially stimulate hunger by causing hormonal imbalances, which may lead people to eat more food than their bodies actually require (Kostoff, 2001; van der Vliet, 2001; Pereira et al., 2005; Srinivasan et al., 2003a, b; Berkey et al., 2004). Second, highly processed (yet fiber-deficient) meals that are widely available in refined carbohydrates (like corn syrup) can be quickly and easily absorbed by the body. Therefore, the risk of obesity may be increased by processed carbs (Englyst and Englyst, 2005; Wylie-Rosett et al., 2004).

Numerous studies demonstrate how processed foods with highly refined starches, high glycemic indexes, concentrated sugars, and other chemicals like fructose can alter the body's hormonal balance and result in obesity and chronic diseases by creating "a toxic environment and an addiction to food" (Gross et al., 2004; Liu and Manson, 2001; Wabitsch, 2006; Pawlak et al., 2002; Liu et al., 2002; MacInnis and Rausser, 2005). For instance, MacInnis and Rausser (2005) demonstrate that one of the key risk factors for

the prevalence of paediatric obesity in the US is energy density. However, there is still a lack of empirical data, particularly in developing nations, about the connection between eating processed foods and the prevalence of overweight/obesity.

By experimentally evaluating the relationship between processed food intake and people's body mass index (BMI) in Guatemala, this study sheds light on this crucial topic. The variation in the proportion of processed foods to total food expenditure is thought to contribute to individual disparities in body weight. Three factors led to the choice of Guatemala for this study. First, comprehensive anthropometric and consumption data are openly available. Second, overweight and obesity have significantly increased in Guatemala during the past few years (Gregory et al., 2007). Finally, supermarkets, which are the main sources of processed foods, have been expanding rapidly in Guatemala (Asfaw, 2008). The number of supermarkets in the country has doubled since the 1990s, their share of the retail food market exhibiting an average growth rate of 10% per annum between 1994 and 2002 when it reached 32% (Dugger, 2004). With undernutrition and overnutrition, infectious and non-communicable diseases, the Pacific Island region is undergoing a nutritional and epidemiological change. Diets in the area have seen significant changes, with a rising reliance on imported goods and a falling level of food self-sufficiency. Traditional staples like fish are being replaced by meat products, while traditional snacks like fruits are being replaced by imported and processed foods like rice, bread, and noodles. According to the available data, food energy and fat/oil availability have increased significantly over the past few decades, and rising food imports coincide with rising energy density and consumption (Wendy Snowdon et al, 2013).

The impact of dietary changes on health is a topic of great attention in the area. To better direct interventions to improve diets, it is necessary to assess the availability of food in the area, its sources, and its nutritious composition. The only food composition tables in the area currently exist for the Pacific Islands and include a number of regional specialties. However, they only provide a little amount of information about processed foods, and what little information they do provide is composite data (average of the analysis of several samples), which is primarily obtained from other tables throughout the world. The quantities of salt in processed foods range significantly from one another, therefore using composite statistics to diagnose dietary issues can be deceptive. Processed foods were outlined as pre-packaged meals and drinks with more than one ingredient for the purposes of this study. Given the variations in nutrients found in

similar processed meals, information on their composition would also be useful in collaboration with the food industry to develop new products (Wendy Snowdon et al, 2013).

The globalisation of the food supply, as witnessed everywhere in the world, has resulted in food being shipped over large distances and in significant changes to the availability of food within nations. In the Pacific Island region, more effort needs to be done on developing strong food safety and labelling regulations because many nations still do not require nutrient information panels on food labels. Therefore, processed goods simply have to adhere to the nutrition labelling laws in each country. Countries that have recently changed their food standards still deal with enforcement challenges, so itis normal to see items with inappropriate labels (Wendy Snowdon et al, 2013).

Retail sales of processed food are increasing more slowly in high-income countries' mature markets than they are in developing nations. One of the industries with the highest growth in wealthy nations is ready-to-eat food, while breakfast cereals are expanding in non-traditional markets like Singapore and France. In many high-income nations, growth rates in retail sales of ingredients used in meal preparations, such as oils and fats and dry food, have slowed or even turned negative while growth rates for ready-to-eat products have increased. Retail sales of processed food items in Eastern European nations increased significantly in the 1990s. In these markets, multinationalcorporations and Western-branded goods are more widely recognised. Eastern European customers are becoming more affluent at the same time, driving up demand for items with convenience and health benefits (Mark Gehlhar & Anita Regmi, 2005).

Consumers in the Czech Republic and Hungary, in particular, have boosted their use of nutrient-rich and low-fat goods like yoghurt and speciality beverages. Young professionals' and entrepreneurs' hectic lifestyles can be blamed for the rise in demand for labor-saving breakfast cereals, snacks, and prepared dinners. Sales of items like frozen pizza, canned ready meals, and dried soups are particularly strong in the area. One of the retail market's fastest-growing segments has been dried food goods, particularly pasta and other noodles. The desire for high-value processed foods in various Eastern European nations has also been fueled by foreign investments in private label product development (Mark Gehlhar & Anita Regmi, 2005).

Similar to trends in Eastern Europe, retail food sales are changing throughout Asia and Latin America's developing nations. However, with lesser proportions of international

retail chains and a limited penetration of packaged food goods in rural regions, markets in nations like China and Vietnam are still in the early phases of transition. Similar to Eastern Europe, wealthier customers in Latin America are spending more on products that save time and have better health benefits. In Brazil, low-fat yoghurt and lean chilled and frozen food items are growing in popularity, while one of Colombia's fastest-growing industries is meal replacement drinks. Various ethnic meals are likewise becoming more and more popular among Latin American customers; pasta is the fastest-growing dried packaged good available there (Mark Gehlhar & Anita Regmi, 2005).

The "nutrition transition" is taking place in India, as it is in many other low- and middle-income nations. A traditional diet focused on fruits, vegetables, unprocessed cereals, and legumes is being replaced by a growing proportion of highly processed and packaged food, according to national nutrition surveys conducted over the previous few decades. Particularly among high- and middle-income groups, this change has been observed. Currently, 31% of India's consumption is made up of food and grocery. Even though it is believed that packaged goods only account for 6% of household spending, the industry is growing quickly. Consumers are anticipated to purchase more of these products in the future due to rising urbanisation, expanding distribution networks, and rising disposable incomes. Understanding the nutritional value of the Indian packaged food supply is crucial because of the unprecedented availability and aggressive marketing of these products, which are typically energy dense and high in harmful fats, sugar, and salt. This has led to unhealthy diets being a major global problem (Alexandra Jones et al, 2017).

The recent rises in the prevalence of type 2 diabetes and obesity are what have prompted calls for worry on the health effects of eating highly processed foods in India (Deepa, Anjana, and Mohan 2017; Geldsetzer et al. 2018; Luhar et al. 2018; Thow et al. 2016). India is one of many nations going through a nutritional transition, moving away from the traditional and healthy diet of legumes, vegetables, and whole grains and toward a diet gradually replacing it with more animal-sourced proteins, fats and oils, sugar-sweetened beverages, and generally more highly processed foods (Deepa, Anjana, and Mohan 2017; Gulati and Misra 2014; Misra et al. 2011; Popkin, Adair, and Ng 2012). Law et al. 2019 claim that sales of packaged and processed foods have nearly doubled from 2012 to 2018, emphasising that the causes behind such developments are

complicated. They base their information on their investigation of purchasing trends of processed foods in urban India (Euromonitor 2019; Law et al. 2019).

Globalization, which is linked to an increase in trade and economic growth, and lifestyle changes were named as major offenders. However, it's also crucial to comprehend how changing lifestyles are incorporated into cultural standards. Highly processed, packaged foods have become commonplace in daily dietary choices due to their accessibility, affordability, and ease of preparation. Understanding these changes critically depends on research into the cultural factors that influence the consumption of packaged, processed foods (Shaikh et al. 2017). High levels of processing have allegedly become "the lowest common denominator in diets across classes and geographies in India, peculiar in that they appear neutral, floating above older classificatory schemes, tethered solely to modernity (Baviskar 2018).

Researchers have noticed a rise in the use of sugar, oils, and highly processed foods in Indian diets over the past few decades (e.g., Meenakshi, 2016; Misra et al., 2011; Popkin et al., 2001; Shetty, 2013), with more pronounced alterations found in urban India (Shetty, 2002; Gulati and Misra, 2014). These modifications signalled a few significant dietary adjustments in the nutrition transition, which were also seen in other low- and middle-income nations (Drewnowski and Popkin, 1997; Popkin et al., 2012; Popkin, 2014). In many parts of the world, consumption of packaged and processed foods has increased due to the modern food retail industry's explosive rise (Popkin, 2017).

According to data from Euromonitor, the overall per capita sales of packaged and processed foods in India than quadrupled from USD 31.3 in 2012 to USD 57.7 in 2018 at constant 2018 pricing (2019). The 2018 Global Nutrition Report highlighted the detrimental dietary effects of industrially processed and manufactured foods because these foods frequently increase the overall dietary content of sugars, saturated and trans-fat, salt, and dietary energy density while lowering the content of protein, dietary fibre, potassium, iron, zinc, magnesium, and other micronutrients (Development Initiatives, 2018). Thus, it is not unexpected that numerous studies have expressed concern about the potential health effects of the increased consumption of these foods in India (as well as other developing countries) (Baker and Friel, 2014; Moodie et al., 2013; Popkin et al., 2012; Thow et al., 2016). Such patterns have complicated causes. Literature frequently links growing globalisation, trade, and economic growth to the dietary transition, as well as to related shifts in labour markets and lifestyles in general (Thow

and Hawkes, 2009; Kearney, 2010; Baker and Friel, 2014). This study examines consumer trends for eight different types of processed foods and beverages from 2013 to 2017. They make use of a distinctive, sizable, and demographically accurate dataset on take-home purchases of packaged food and beverages by urban Indian families from Kantar - Worldpanel Division. Urban areas are the focus due to their much greater rates of obesity and overweight as compared to rural locations. They also conducted a state-level study of the purchase trends in light of the variations in nutritional results between states and the variety of Indian diet. To the best of their knowledge, the consumption patterns of processed foods and beverages in India have only been thoroughly examined in a small number of cross-sectional research. An Indian food pattern that is strong in sweets and snacks has been linked to an increased risk of developing diabetes, according to a comprehensive analysis of studies on dietary patterns in India (Green et al., 2016).

In Mumbai and Trivandrum, Daniel et al. (2011) found evidence of eating patterns characterised by increasing consumption of fried snacks and sweets. Among manufacturing employees in Lucknow, Nagpur, Hyderabad, and Bangalore, Satija et al. (2015) discovered three distinct eating patterns, of which two were linked to a high intake of snacks. Other research on Indian eating habits used information from the National Sample Survey (NSS) and the National Family Health Survey at the household level (NFHS). Despite the fact that these cross-section datasets offer thorough records of the intake of unprocessed foods (such as cereals, meat, fruits, etc.), they frequently fail to reliably gather data on the amounts of processed meals or beverages consumed. As a result, there is a considerable void in the literature regarding detailed studies of the most recent developments in Indian consumption habits of processed foods and beverages. Their analysis revealed significant variances in the amount of processed food and drink purchases between states as well as variation in trends over time within states. In contrast to middle-income and high-income countries, it was discovered that per capita take-home purchases of processed food and beverages are relatively low and uncommon, save from dietary staples (processed wheat, oils, and milk). The key food categories whose volume of purchases have increased over time were sweet snacks, salty snacks, edible oils, and "other processed foods" (described below, but which primarily consist of noodles), whereas soft drink purchases and dairy items other than milk showed a modest reduction. The dietary risks among urban Indian households will change, with a potential for a higher prevalence of overweight and new challenges to

the nutritional health of the Indian population, if the rising trends in snack and oil purchases continue without any further changes in the consumption of other foods (Cherry Law et al, 2019).

The breaking of the relationship between diets and regional resource availability and customs is a crucial consequence of globalisation. Both direct (food demand and consumption) and indirect (health indicators, markers of malnutrition, and the incidence and prevalence of DR-NCDs) evidence exists regarding diet change. These findings demonstrate that, while undernutrition remains a serious problem, overnutrition is now becoming a more general public health concern in India. Over the past 20 years, there have been reports of increased intake of biscuits, salted snacks, prepared sweets, edible oils, and sugar in metropolitan areas. Consumers switched from traditional staples to foods more common in "westernised" diets in stage 1, such as a rise in wheat consumption in the form of bread, cakes, and cookies. Stage 2 saw a considerably more pronounced impact of globalisation and the availability of a wide range of convenience foods for customers (processed, ready-to-eat, deep-fried, and with added preservatives). The majority of Indians are currently transitioning to a second nutritional stage. In stage 3, some individuals—particularly those from upper socioeconomic strata—tend to become aware of their unhealthy eating patterns and make an effort to adopt a healthier lifestyle. These people also have the financial means to invest in pricey nutritious foods and to use expensive gym memberships and training equipment. Adolescents in India are being further influenced by the pervasiveness of ads, especially through audio-visual media, which is increasing the prevalence of obesity in their age range. According to a recent study, the frequency of obesity among children (aged 14 to 17) rose from 9.8% in 2006 to 11.7% in 2009. However, school-based nutrition and lifestyle interventions have had a positive impact on urban Indian adolescents' anthropometry, eating patterns, lifestyle behaviours, and metabolic risk profiles (Anoop Misra et al, 2011).

Many people's hunger has been decreased as a result of the increased availability of low-cost, high-calorie foods, frequently derived from staple cereal crops. However, thishas frequently come at the expense of diversity and has replaced regional diets, which are frequently healthier. Not everyone has experienced an increase in access to a varietyof foods high in micronutrients, such as fresh fruits, vegetables, legumes, pulses, and nuts, while harmful diets high in salt, sugar, saturated fat, and trans fats have grown more affordable and accessible. Additionally, there has been a significant rise in the

demand for and supply of meat, dairy products, sugar-sweetened beverages, and processed and ultra-processed foods worldwide (Francesco Branca et al, 2019).

The majority of foods include enormous levels of sugar, salt, and preservatives and are treated to improve taste, shelf life, and waste. Dietary changes have undoubtedly been affected by food marketing. Studies have indicated that by increasing the options of packaged and processed foods available to consumers, transnational supermarkets have decreased demand for homemade foods or goods from local markets (Hawkes, 2006).

The entire food environment pattern has changed as a result of a shift from traditional foods that are minimally processed to refined foods with increased intake of sugars, oils, hydrogenated fat (also known as "vanaspati") containing trans-fat, saturated fat, SSBs, animal foods, dairy foods, and salty snacks. Furthermore, people do not consumethe recommended amounts of whole grains, nuts, pulses, and legumes, as well as vegetables and fruits, which have a favourable impact on disease processes. However, due to taste preferences, availability in supermarkets and fast-food restaurants, and women's choice for monetarily rewarding occupations in metropolitan areas, processedand convenience snacks, street foods, and ready-to-eat meals are on the rise, steadily diminishing traditional home cooking (Kamala Krishnaswamy et al, 2016).

The primary risk factors for NCDs in humans are widely understood and consistent across nearly all nations. More than two-thirds of all new cases of NCDs are brought on by tobacco use, which increases the risk of complications for those who already have NCDs. Other risk factors for NCDs include physical inactivity, a poor diet rich in salt and sugar (especially in sweetened beverages), unhealthy alcohol use, and a diet high in saturated and trans fats. A good diet, regular exercise, and quitting smoking can prevent at least 80% of heart disease, stroke, type 2 diabetes, as well as 40% of cancer (World Cancer Research Fund 1997; WHO 2002).

At least 14 million deaths, or 40% of all NCD-related deaths per year, are attributable to the consumption of foods high in saturated and industrially generated trans fats, salt, and sugar (WHO, 2004). Up to 30% of all cases of hypertension are brought on by excessive salt consumption (Karl-Heinz Wagner, Helmut Brath, 2012).

A significant behavioural risk factor for non-communicable diseases that can be changed is an unhealthy diet (NCDs). They contribute to the development of the metabolic syndrome, which is characterised by abdominal obesity, hypertension,

dyslipidemia, and abnormal glucose or insulin metabolism. The metabolic syndrome accounts for a sizeable portion of the worldwide illness burden. The chance of getting NCDs such cancer, diabetes, chronic respiratory diseases, and cardiovascular diseases rises when the metabolic syndrome is present. Due to the dual burden of disease in low-to-middle income countries (LMICs), the global pattern of poor diets driving the incidence of metabolic disorders and NCDs has gained importance in recent decades. Although there has been a significant epidemiological shift in high-income countries, infectious diseases and noncommunicable diseases (NCDs) now collectively account for the majority of morbidity and death cases in LMICs (F. A. Olatona et al, 2018).

Chronic non-communicable diseases are caused by unhealthy dietary habits, such as consuming a lot of total fat for energy, using a lot of high-saturated-fat cooking oil (including native oils like palm oil and coconut oil), consuming a lot of sugar and sweetened beverages, consuming a lot of dietary salt, and eating few fruits and vegetables. Despite its significance, there are few trustworthy epidemiological studies on salt consumption in south-east Asia. Traditional eating habits are probably high in salt, which is made worse by the growing commercialization of processed goods and fast food. For instance, the average daily salt intake in the Philippines is 7–15 g, which is up to three times the recommended amount. In contrast to many European and North American nations, where processed foods, dining establishments, and catering are the primary sources of dietary salt, additional sauces for cooking in Southeast Asia come in a variety of forms, including soy sauce, fish sauce, and shrimp paste. The consumption of calories from foods and drinks with added sugar has increased. Large global or regional corporations, as well as small, medium, and unorganised sector businesses, create the majority of the calories we consume. Regulation of marketing, nutrient quality, and food safety is challenging because these corporations have significant economic interests in the area (Antonio Dans et al, 2011).

Smoking, alcohol use, poor diet, and insufficient physical exercise were identified to be the primary risk factors for NCDs in both rural and urban areas. The current increase in non-communicable diseases in emerging nations is significantly attributed to the socio-demographic and economic shift. People in developing countries are more at risk as a result of increased urbanisation since risky behaviour is more prevalent there (Unwin et al., 2010; Assah et al., 2009). Urban residents may have greater access to refined processed foods that are energy rich and/or high in fat than rural residents have, which

may help to explain the observed variations in risk factors and prevalence of non-communicable diseases in urban settings. This could be as a result of lack of availability to healthy food, which forces many people to consume what is inexpensively accessible, especially during business hours when they are outside their homes, increasing their risk of developing NCDs (Mary Mayige et al, 2012).

Food Labelling- An effective strategy for reduction in Non-Communicable Diseases

One of the most crucial and straightforward ways to inform the consumer is through the information provided on a food label, which is found on food products. A food label, as defined by the international community, is any tag, brand, mark, pictorial, or other descriptive information that is written, printed, stencilled, marked, embossed, or impressed on or connected to a container of food or food product. To encourage the purchase of the meal, this information, which includes details like ingredients, quality, and nutritional value, can accompany the food or be displayed near the food (FAO, 2011). The rising incidence of non-communicable diseases linked to diet are one of the primary motivators for nutrition labelling. These labels may be useful tools for guiding consumers toward selecting nutritious foods (FAO, 2011).

Nutrition information labels can be used to compare items and keep an eye on how much of our diet consists of foods that are high in fat, salt, and added sugars. A nutritionlabel can be seen on the back or side of the packaging for the majority of pre-packageditems. You can utilise nutrition labels to aid in eating a well-balanced diet. Consume foods and beverages that are heavy in fat, salt, and sugar sparingly and in moderation.

Nutrition information labels on the back or side of packaging

A nutrition label can be seen on the back or side of the packaging for the majority of pre-packaged items (Fig. 21.). Kilojoules (kJ) and kilocalories (kcal), commonly referred to as calories, must be listed on these labels. Additionally, they must provide details on salt, sugar, protein, fat, and saturated fat. They might also contain other nutrients, such fibre. Each nutritional value is given as 100 grams, 100 millilitres, or occasionally as a portion of the meal or beverage.

Fig. 2.1 Back of pack Label

Nutrition Facts

4 servings per container

Serving size **1 cup (227g)**

Amount per serving

Calories **280**

	% Daily Value*
Total Fat 9g	**12%**
Saturated Fat 4.5g	**23%**
Trans Fat 0g	
Cholesterol 35mg	**12%**
Sodium 850mg	**37%**
Total Carbohydrate 34g	**12%**
Dietary Fiber 4g	**14%**
Total Sugars 6g	
Includes 0g Added Sugars	**0%**
Protein 15g	
Vitamin D 0mcg	0%
Calcium 320mg	25%
Iron 1.6mg	8%
Potassium 510mg	10%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Source: US FOOD AND DRUG ADMINISTRATION (FDA), 2022

Nutrition labels on the front of packaging

Along with the guideline intake for each, many supermarkets and food producers now also list the amount of energy, fat, saturated fat, sugar, and salt on the front of the box. When you want to quickly compare various food and beverage goods, this is really helpful. Typically, front-of-pack labels include a brief overview of: Energy (kilocalories), Salt content, sugar content, fat content and saturated fat content. These labels specify the amount of calories (in kJ and kcal) in a serving or portion of the food or drink, as well as the grams of fat, saturated fat, sugars, and salt. Additionally, it can list the kJ and kcal per 100g or 100ml. Reference intake details are sometimes included on front-of-pack nutrition labels.

Across the world, some countries have mandatory Front of Pack Labels and some countries have voluntary Front of Pack Labels (Fig. 2.2)

The different types of Front of Pack Labelling (FOPL) around the world are as follows (Fig. 2.3):

- Bar code
- Warning Labels (WL)
- Health Star Rating (HSR)
- Guideline Daily Amount (GDA)
- Reference Intakes (RIs)
- Nutri-Score (NS)
- Traffic Light Label (TLL)
- Multiple Traffic Light (MTL)

Fig. 2.2 World map showing the countries with mandatory FOPLs and voluntary FOPLs

Source: Global Food Research program, 2018

Fig. 2.3 Different types of Front of Pack Labels (FOPLs) around the world

Categories of FoP schemes			Examples of FoP schemes		Countries of use
Nutrient-specific labels	Reductive (non-interpretative)	Numerical	Reference Intakes		Across Europe
			NutrInform Battery		Italy
	Evaluative (interpretative)	Colour-coded	Multiple Traffic Lights (MTL)		UK
		Textual	Chilean Warning Labels	ALTO EN AZÚCARES / ALTO EN GRASAS SATURADAS	Chile
Summary labels	Evaluative (interpretative)	Endorsement logos	Keyhole		Sweden, Denmark, Lithuania
		Graded indicators	Health Star Ratings	4.0 HEALTH STAR RATING	Australia, New Zealand
			Nutri-Score	NUTRI-SCORE A B C D E	France, Belgium, The Netherlands, Luxembourg, Germany, Spain

Source: Cambridge University Press and Assessment, 2021

General Labelling Requirements (Back of Pack Labelling) in India

All packed foods marketed in India must comply with the following labelling regulations:

- Either English, Hindi, or Devnagri must be used on the label. The label may also include information in any other language as needed, in addition to what has been mentioned.
- The information on the food label cannot be considered to be inaccurate, misleading, deceptive, or otherwise give the wrong impression about the product.
- The label's contents or information must be obvious, outwardly noticeable, indelible, and easily readable by the consumer. The label must be attached to the container in a way that prevents it from being easily removed.
- If a wrapper is used to cover the container, it must either include the relevant information or make the label of the product within easily readable by not concealing it. Along with the trade name and a description of the meal within, the name of the food must be provided. If there are many ingredients in the food, they must be listed in descending order of their composition by weight or volume, as applicable, at the time the item was manufactured.

  Nutritional Information

  The following information must be included on the label in addition to the nutrition information per 100 g, 100 ml, or per serving of the product:

  • Energy value in kcal; • Protein, carbohydrate (including the amount of sugar), and fat contents in grams or millilitres;

  • Any other nutrient's quantity for which a nutrition or health claim is made:

  It is significant to note that the FSSAI officials carefully examine any "health claims," "nutrition claims," or "risk reduction claims" contained on the label. Therefore, any such claim needs to be supported by test results.

  FSSAI has now developed Front of pack labelling due to the shortcomings of Back of pack labels (FSSAI, 2022)

Front of Pack Labelling in India

For governments, front-of-pack labelling (FOPL) is a crucial policy instrument for assisting customers in selecting healthier foods (World Health Organization, 2019). A comprehensive technique to encourage healthy lifestyles is front-of-package warning labelling, which enables consumers to quickly, clearly, and effectively identify items rich in crucial nutrients linked to the burden of NCDs in India. A crucial weapon in the global fight against diabetes and obesity is effective FOPL (FSSAI, 2019).

Front-of-pack labelling (FOPL) is the term used to describe nutrition labelling systems that:

• Can be used throughout the packaged retail food supply; and

• Are shown on the front of food packages (in the main field of view).

• Include a supporting nutrient profile model that takes into account the product's general nutritional quality or the nutrients that are of particular significance for ncds (or both).

•As a complement to the more in-depth nutrient declarations often seen on the back of food packages, provide clear, frequently illustrative information about the nutritional quality or content of products (World Health Organization, 2019).

Consumers are informed about the nutrients of concern included in processed packaged foods, such as sugar, salt, and fat, by Front of Pack Labeling (FOPL). Consumers can choose healthier foods thanks to FOPL. FOPL lowers the intake of packaged, processed foods. Non-communicable diseases become less common as a result of FOPL.

The journey of FoPL in India is as follows:

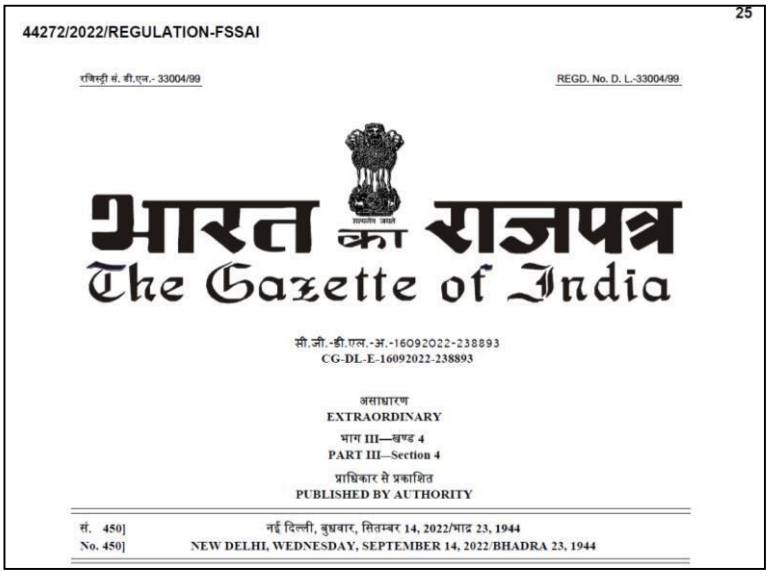
In 2014, FoPL was first recommended by an expert committee constituted in 2013 by FSSAI. In June 2015, FSSAI sets up 11 member committee. In May 2017, Committee endorses guidelines of 2013 committee. In April 2018, Draft FSS regulations (labeling and display). In August 2018, Panel set up for review of draft regulations. In July 2019, FSSAI issues Draft notification FSS (labeling and display) regulations 2019. In December 2019, delinking of FoP from labeling regulations. In December 2020, FSSAI notifies FoP not a part of FSS regulations 2020. In January 2021, Discussions with stakeholders on FoPL. In February 2022, FSSAI decided to adopt Health Star Rating in

FoPL. In September 2022, FSSAI releases Food Safety and Standards (Labelling and Display) Amendment Regulations, 2022.

The Draft Regulations for FoPL were proposed by FSSAI on 14th September, 2022. FSSAI has proposed a draft of regulations which are called The Food Safety and Standards (Labelling and Display) Amendment Regulations, 2022 (FSSAI, 2022) (Fig. 2.4).

- Indian Nutrition Rating (INR) has been proposed for India. The compliance of INR is voluntary till 4 years and will be mandatory after 4 years (FSSAI, 2022).
- The FSS Regulations have classified the processed packaged foods into three categories, namely:- Category I (Solid Foods), Category II (Liquid Foods) and Category III (Exempted from FOPNL) (FSSAI, 2022)
- The INR would be calculated on the basis of contribution of Energy (Kcal), Saturated fat (g), total sugar (g) and sodium (mg) as well as positive nutrients such as fruit and vegetable, nuts, legumes and millets, fibre and protein. (FSSAI, 2022)
- The INR system would rate the overall nutritional profile for processed packaged foods by assigning them a rating from ½ star (least healthy) to 5 stars (healthiest). (FSSAI, 2022)
- The INR logo shall be displayed close in proximity to the name or brand name of the product on front of pack (FSSAI, 2022) (Fig. 2.5).
- Along with the INR logo, additional interpretative information as per serve percentage contribution to RDA of energy, total sugars, saturated fats and sodium expressed as salt equivalent can also be given (FSSAI, 2022) (Fig. 2.6)

Fig. 2.4 The Food Safety and Standards (Labelling and Display) Amendment Regulations, 2022



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भारत का राजपत्र
The Gazette of India

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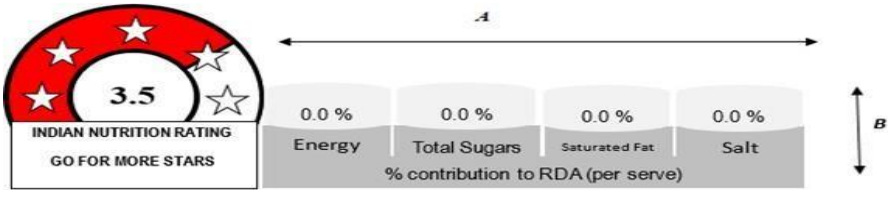
Source: FSSAI, 2022

Fig. 2.5 Indian Nutrition Rating (INR) Logo

Source: FSSAI, 2022

Fig. 2.6 Indian Nutrition Rating (INR) with additional interpretative information



Source: FSSAI, 2022

Studies related to consumers' perceptions regarding front of pack labels- Global

Eight front-of-pack nutrition labelling layouts that varied in complexity were examined in two experiments to see how they affected four different European nations. For studies 1 and 2, a total of 776 people from Italy and the United Kingdom and 1630 men and women (18-55 yrs) from Internet panels in the United Kingdom, Germany, Italy, and the Netherlands were recruited. Participants assessed various goods using a front-of-pack nutrition labelling format, including healthier and less healthy variations of the same product category. The first study assessed the impact of various labelling forms on consumer friendliness (understanding, liking, and trustworthiness), while the second study quantified how these various labelling formats affected decision-making (usage intention and process time) (Gerda I.J. Feunekes et al, 2008).

The findings showed a small difference in consumer friendliness and usage intent between front of pack nutrition labelling designs that are simpler (such Healthier Choice Tick, Smileys, and Stars) and more complicated (such as Multiple Traffic Light, Wheel of Health and GDA scores). The credibility of the labelling formats was significantly boosted by endorsement from domestic and international health organisations. Comparing the simpler front-of-packlabelling to the more sophisticated labelling format, participants took much lesstime. Therefore, in a retail environment where judgments are made quickly, simpler front-of-pack labelling designs seem more appropriate (Gerda I.J. Feunekes et al, 2008).

There is proof that nutrient information that is readily available, understandable, and consistent could help consumers choose healthier foods. This study examined Australian consumers' ability to use a variety of front-of-pack labels to identify healthier food goods using an online survey of 4357 grocery customers. Nine pairs of frequently bought food products each had seven various front-of-pack labelling schemes added to them, including variations of the Traffic Light labelling scheme, the Percent Daily Intake scheme, and a star rating scheme. Participants also had access to each product's nutrition information panel (Wendy L. Watson et al, 2014).

Using any of the five schemes that offered information on several nutrients, participants were able to identify the healthier product in each comparison more

than 80% of the time. Regarding consumers' ability to identify the healthier product, their reliance on the "back-of-pack" nutrition information panel, and their speed of use, no single method performed noticeably better. The nutrition information panel alone, the energy-only plan, and the plan with very restricted numerical nutritional type or content information all underperformed (control). To define the ideal structure and content of an interpretive front-of-pack nutrition labelling scheme, additional consumer testing is required (Wendy L. Watson et al, 2014).

Purchases of packaged foods that are healthier may benefit from front-of-pack nutrition labelling. The validity of Australia's decision to adopt the innovative Health Star Rating (HSR) system remains unknown. Identify the impacts of various front-of-pack labelling formats on customer perceptions of food purchases' nutritional value. Participants were given the option to access one of four nutrition labelling formats—HSR, multiple traffic light labels (MTL), daily intake guidance (DIG), recommendations/warnings (WARN), or control—at random (the nutrition information panel, NIP). While shopping, participants used a smartphone application to scan the barcodes of packaged items to acquire nutrition information. The main result was the packaged goods' healthiness as measured by the mean transformed nutritional profile score throughout a four-week period of purchasing. The 148,727 evaluable food items were purchased by the 1578 participants, who had an average age of 38 years and were 84% female (Bruce Neal et al, 2017).

When compared to MTL, DIG, or WARN, the mean healthiness of the purchases in the HSR group was non-inferior (all p 0.001 at 2% non-inferiority margin). HSR, MTL, and DIG purchases did not differ in their average healthiness when compared to the NIP control (all $p > 0.07$), but WARN caused consumers to make healthier packaged food purchases (mean difference 0.87; 95% confidence interval 0.03 to 1.72; $p = 0.04$). Participants thought HSR was more helpful than DIG and simpler to grasp than MTL or DIG (all p 0.05). Participants also thought the HSR and MTL were more beneficial than the NIP (all p 0.03) and easier to grasp. These empirical data support the HSR policy choice and are consistent with the experimental results. Further research should be done on recommendation/warning labels because they might be a more powerful motivator of purchasing of healthier foods (Bruce Neal et al, 2017).

Pre-packaged food nutrition labels are frequently used as a tool to promote healthy eating practises among the general public and to help lower the incidence and prevalence of disorders linked to diet. However, there is no solid proof that using food labels will have the desired impact on the population. Many explanations have been put out to explain this decoupling of efficacy, including challenges with comprehending the information on food labels. The present paper includes the findings of a survey on how nutritional labels are understood by Europeans and an assessment of the communication methods used to spread them. In 16 European nations, including Austria, Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Poland, Portugal, the Czech Republic, Slovenia, Spain, Sweden, the United Kingdom, and Hungary, 7550 phone interviews total were performed. Consumers were questioned about their dedication to healthy behaviour and their thoughts on thenutritional information offered at various levels (Dario Gregori et al, 2013).

It has been suggested that one way to provide clear, accessible nutrition information is to place it on the front of food packages. The goal of this study was to identify the front-of-pack food labelling system that Australian consumers would find most acceptable and useful. Different front-of-pack labelling schemes were evaluated based on consumer preferences and their capacity to contrast the nutritional value of fictitious food products. Foursystems were put to the test, including two iterations of the Percentage Daily Intake system (Monochrome %DI and Colour-Coded %DI), which shows the percentage of a serve of food's daily nutrient contribution, and two iterations of the Traffic Light (TL) system (Traffic Light and Traffic Light Overall Rating), which uses colour coding to show nutrient levels (Bridget Kelly et al, 2009).

790 customers participated in intercept surveys in which they were individually exposed to a single labelling system for performance evaluation. Participants expressed substantial support for a uniform labelling format across all goods as well as the inclusion of nutrient information on total fat, saturated fat, sugar, and sodium on the front of packages. Participants were three times as likely to identify healthier items using the TL method as opposed to the Colour-Coded %DI system (OR 14 3.01; p, 0.05) and five times more likely to do so when using the Monochrome %DI system. The implementation of uniform front-of-pack food labelling was welcomed by consumers. It is advised that TL labelling

laws be made mandatory to help customers choose healthy foods (Bridget Kelly et al, 2009).

Front-of-pack labels (FOPLs) have been developed since 1989 to combat the rising prevalence of non-communicable diseases (NCDs) and obesity. The European Community seeks to standardise a FOPL system that will be required for all member states, but other nations have already implemented one voluntarily. This narrative review's goals are to explain what FOPLs might be able to accomplish and whether there is sufficient data to support their effectiveness in changing consumer behaviour, guiding dietary habits toward a sustainable and healthy diet, and influencing the food industry to reformulate products. Non-directive FOPLs, which are currently being researched, seem to be educational and well-liked by customers even if they demand mental effort. However, most of them were carried out as retrospective studies and/or in simulated circumstances, although a few of studies have validated directive FOPLs. However, directive FOPLs are considered an intuitive tool and have shown a strong ability to assist consumers in categorising food goods as more or less nutritious (Luca Muzzioli et al, 2022).

In conclusion, the signals that directive and non-directive FOPLs deliver are different. A model that synthesises both messages is advised because no FOPL may be deemed exhaustive in relation to all the objectives listed in this narrative evaluation. There are still many unanswered issues, including the potential for repackaging pre-packaged goods, how to handle conventional goods, and the effects on the prevalence of NCDs and obesity. None of the current FOPLs can be viewed as a stand-alone health policy instrument given the complexity of factors influencing consumption decisions and health. Although there is still room for progress, these technologies do not appear to be able to simultaneously accomplish all of the objectives of the European Community as they stand now. They might only be able to accomplish these goals, in our opinion, if they are included in a multi-tiered, structured health policy intervention (Luca Muzzioli et al, 2022).

In Europe, various front-of-pack (FOP) labelling schemes have been created by businesses and groups dedicated to promoting good health. In order to determine the extent to which the most common FOP systems—guideline daily amounts (GDA), traffic lights (TL), GDATL hybrid (HYB), and health logos (HL)—

impact consumer perceptions of healthiness in addition to the FOP basic label (BL), which only provides numerical nutritional information, a study (n=2068) was conducted. Within- and between-subjects elements were included in the design. The food (pizzas, yoghurts, and biscuits), the meal's healthfulness (high, medium, and low), and the repeated assessments under BL and test FOP label conditions were the within-subjects factors. The system (GDA, TL, GDA-TL hybrid, HL), portion size (typical portion size and a 50% decrease of a typical portion), and nation were the between-subjects factors (the UK, Germany, Poland and Turkey). The supply of a FOP label carrying basic numerical nutritional information alone or between the various systems showed minimal change, despite the FOP systems evaluated producing slight gains for objective understanding under specific circumstances (Charo E. Hodgkins et al, 2015).

When consumers are presented with foods that have distinctly varied levels of healthiness, any structured and legible presentation of critical nutrient and energy information on the FOP label is adequate to enable consumers to discover a healthier alternative within a food category. The possibility to apply the various FOP systems in real-world retail scenarios, as well as gaining a deeper knowledge of the psychological and contextual aspects that affect motivation, should be the main goals of future study (Charo E. Hodgkins et al, 2015).

The optimum front-of-pack labelling strategy is the subject of intense continuous discussion among stakeholders, and new data reveals that the variety of approaches may confuse consumers. A Multiple Sort Procedure study involving free sorting of a variety of nutritional labels presented on cards was carried out in four countries (n = 60) in order to better understand the relevant psychological phenomena and consumer perspectives surrounding FoP labellingschemes and their optimal development. Using multiple scalogram analysis, theunderlying structure of the qualitative data generated was investigated. (Charo Hodgkins et al, 2012).

Results showed that consumers place a high priority on the amount of information on a nutrition label as well as the types of information it contains. The results showed that the amount of information on a nutrition label has high salience for consumers, as does the health utility of the label, although a dichotomy exists in the affective evaluation of the labels containing varying degrees of information aggregation. Elicitation of categorisations from

consumers has the potential to provide a very important perspective in this area. It is easier to comprehend why some front-of-pack labelling systems may be more successful than others in specific contexts or for specific customers when existing front-of-pack labelling methods are categorised according to a proposed dimension of "directiveness". An improved hypothetical front-of-pack labelling design that contains both directive and non-directive features is suggested based on this research (Charo Hodgkins et al, 2012).

The current analysis offers proof that FOPL programmes boost better food purchasing behaviours from both experimental and "real-life" trials. Labels with an interpretive message (that goes beyond just providing nutritional information) seem to have a greater chance of changing consumer behaviour. Inparticular, we discovered data supporting "high in" and MTL FOPL from experimental investigations as well as "high in" and traffic light and GDA evidence from ITS research. The findings presented here add to the body of research showing that FOPL on prepackaged goods may promote better consumer choices and maybe enhance family diets. According to our findings, household purchases may have a significant impact on sugar, calories, saturatedfat, and sodium. In particular, in UK contexts, and in regard to effects according to product type and socio-demographic variables, more study is necessary to deepen understanding of the effects of distinct FOPL on purchase and consumption (H. Croker et al, 2020).

They were able to empirically compare attention to the typical NFP label and the attention to FOP labels by using a change detection technique that is frequently applied in visual cognition studies. Their findings demonstrate unequivocally that FOP labels are more successful in drawing attention than conventional NFP labels, and that this advantage is due to both the FOP's placement on the front panel and its aesthetic components (Mark W. Becker et al, 2015).

Furthermore, their evaluations of various FOP designs show that color-coding FOP labels is a successful strategy for drawing attention to the FOP. These findings remain true whether novel brands with simple graphics or more realistic, widely available products are taken into account. Finally, no evidence was found that these results were influenced by the product's health status or that coding the FOPs with emotional expressions had any effect on consumers'

attention to the labels. Given the substantial amount of basic research that indicates that people have an attentional bias for face cues, the latter conclusion is a little surprising (Mark W. Becker et al, 2015).

The previous research on nutrition labelling has mostly relied on consumers' self-reports and frequently has taken a country-specific approach, which leaves a gap that the present study sought to fill. It demonstrates that self-reported opinions and usage intentions about labelling policies are not a reliable indicator of their impact on selecting healthy products. Despite the fact that a priori familiarity with the labelling schemes affects consumers' self-reported evaluation and usage intention, all three label types are effective in enhancing the choice of healthy products, both in the UK (where MTL and GDA labels are most prevalent) and in the Netherlands (where Choices Logo and GDA are most widely used). The results further demonstrate that all labels "reward" the healthier options within the selection in terms of perceived healthfulness, but only the MTL and GDA also eliminate other options. In particular, these later labels seem to make medium-healthy product selections less appealing than less-healthy ones (Erica van Herpen et al, 2012).

Front-of-pack labels (FoPLs) can help people choose healthier foods if they are simple to understand and people are encouraged to use them, according to prior study. There is some indication that evaluative FoPLs, which assess a food's health value, are simpler to use than those that merely provide numerical information on nutrients (reductive FoPLs). The Health Star Rating (HSR), a new evaluative FoPL, was just made available in Australia and New Zealand. The HSR differs from many other FoPLs in use around the world by including a summary indicator. Understanding how consumers of all ages utilise and interpret reductive and evaluative FoPLs, including evaluative FoPLs with and without summary indicators, was the main goal of this study (Zenobia Talati et al, 2016).

In order to evaluate responses to one reductive FoPL (the Daily Intake Guide), an existing evaluative FoPL (multiple traffic signals), and a new evaluative FoPL (the Daily Intake Guide), ten focus groups with adults (n = 50) and children (n = 10e17 years) were held in Perth, Western Australia (the HSR). Participants favoured the evaluative FoPLs over the reductive FoPL, with the FoPL with the summary indicator receiving the strongest preference (HSR).

Discussions exposed the cognitive techniques used to analyse each FoPL, which varied depending on the FoPL format (e.g., using cut offs, heuristics, and the process of elimination). The majority of participants reported being motivated to make decisions regarding foods that are taken as part of routine daily meals using the evaluative FoPLs (especially the HSR), but not for optional items enjoyed as snacks or desserts. The results offer additional proof of the potential value of evaluative FoPLs in promoting healthy food choices and can help policymakers choose between different FoPL formats (Zenobia Talati et al, 2016).

There were discovered to be four different perceptual patterns. People with low levels of education were typically found in groups that preferred straightforward presentations. In the group that was "favourable to CR," men and older people predominated. People with inadequate dietary information were proportionally more common in the "favourable to STL" group, whereas people with extensive knowledge were more common in the "favourable to MTL" group. While the "favourable to STL" and "favourable to MTL" and "favourable to CR" groups claimed to be more interested in nutritional information, the "favourable to STL" group more frequently self-reported noting pricing and marketing aspects during purchasing. The group that self-identified as being in favour of the Green Tick and PNNS logo admitted to paying closer attention to promises and quality guarantee labels. In our survey, the cluster that is "favourable to MTL" was most frequently found. However, basic FOP formats may be most effective for raising awareness of healthy eating among targeted groups with little interest in the nutritional value of packaged foods and little nutritional knowledge (Caroline Me'jean et al., 2012).

In Canada, mandatory front-of-pack (FOP) labelling was proposed to draw attention to foods that had excessive sugar, sodium, and/or saturated fat concentrations. This labelling would appear alongside the mandatory Nutrition Facts table and optional nutrition claims. Participants (n = 1997) in an online survey were assigned at random to one of four FOP labelling conditions: control, warning label, health star rating, or traffic light labelling. A healthier drink with or without a disease risk reduction claim, a healthier drink with or without a nutrient content claim, a less healthy drink with or without a disease risk reduction claim, and a less healthy drink with or without a nutrient content

claim—all four drinks—were presented to participants in a random order and one at a time (Beatriz Franco-Arellano et al, 2020).

Using a 7-point Likert scale, participants evaluated the perceived healthfulness of the product and their intentions to buy it. While reading labels, participants had access to the Nutrition Facts table. The findings showed that drinks with any FOP labelling were viewed as being less healthier than the control. Compared to warning labels, better drinks' health star ratings and traffic light labelling produced a "halo" effect. Purchase intentions showed comparable findings. Regardless of the product's healthfulness, drinks with a disease risk reduction claim were perceived as healthier than those without (p 0.001). A claim about the amount of nutrients had no discernible impact. For individuals who used the Nutrition Facts table, the impact of FOP labelling and claims was lessened. For consumers with varying degrees of health awareness, FOP labelling was probably useful. Overall, FOP labelling considerably influenced consumers' opinions more than nutrition claims, however the impact of each FOP label varied for healthier and less nutritious drinks (Beatriz Franco-Arellano et al, 2020).

The findings of this study are consistent with earlier research showing that consumers rarely use the required portion of food labelling (the NFP), which highlights the need for additional food labelling regulations requiring the consistent provision of more approachable, user-friendly nutrition information. According to research so far, interpretive FoPLs are better at encouraging healthier decisions than reductive FoPLs. This work is expanded upon in the current study by including the HSR in the analyses. The findings are consistent with recent research suggesting that summary indicators in interpretive FoPLs may be more useful than other interpretive FoPLs. The HSR decreased these for less nutritious items while increasing choice likelihood and willingness to pay for healthier foods. Specifically for items at either end of the healthfulness continuum, the MTL had some influence on choice and willingness to pay, whereas the DIG had no effect on either outcome variable (Zenobia Talati et al, 2017).

Overall, the findings highlight the significant potential of simply understood FoPLs to facilitate increased selection of better foods and decreased selection of less nutritious items, hence improving diets at the population level. The current

study's positivity bias, which was caused by the DIG, highlights the requirement for the development of a FoPL system that is efficient in assisting healthy decisions. The HSR seems to be the best candidate for this task out of the three FoPLs examined in this study (Zenobia Talati et al, 2017).

Front-of-pack labels (FoPLs) are of great interest as a potential mechanism for enhancing diets and consequently health at the population level. The goal of the current study was to gain more knowledge about the best ways to convey nutritional information on the front of food packages in Australia by examining the preferences of Australian consumers for various types and qualities of FoPLs. The two primary categories of FoPLs that have received the most attention to date are those that use "traffic light" colour coding and those that display daily intake values for certain nutrients (Simone Pettigrew et al, 2016). This study expands on previous research in four ways: i) by taking into account the new Health Star Rating system recently adopted in Australia and New Zealand; (ii) by allowing a sizable sample of consumers to self-nominate the evaluation criteria they believe to be most crucial when choosing between FoPLs; (iii) by oversampling consumers of lower socioeconomic status; and (iv) by including children, who consume and buy food in their own right and also influence their parents' food purchase decisions. 2058 Australian consumers (1558 adults and 500 children) participated in a cross-sectional online survey to gauge their preferences between the daily intake FoPL, the traffic light FoPL, and the Health Star Rating FoPL. The Health Star Rating was the most preferred FoPL across the entire sample and among all respondent subgroups (males vs. females, adults vs. children, lower socioeconomic status vs. medium-high socioeconomic status, normal weight vs. overweight/obese), and the daily intake guide was the least preferred (20%). The easiest use, interpretive substance, and salience were the justifications most frequently given by respondents for their selection. The results imply that a star-based food label that is easy to read and understand reflects a population-based nutrition promotion technique that is valued by a wide spectrum of consumers (Simone Pettigrew et al, 2016).

Around 1.9 million labels were placed on 1266 food goods in four categories in 60 supermarkets in order to determine if four pre-selected front-of-pack nutrition labels boost food purchases. The analysis of the nutritional quality of 1,668,301 purchases using the FSA nutrient profile score was done. Effect sizes

were, on average, 17 times less than those discovered in analogous laboratory investigations (Pierre Dubois et al, 2020).

While having no influence on purchases of goods with medium, low, or unlabeled nutrition quality, the most effective nutrition label, Nutri-Score, raised purchases of foods in the top third of their category nutritionally by 14%. In this way, Nutri-Score only marginally (2.5%) (or 0.142 FSA points) increased the nutritional content of the basket of labelled items that were purchased. In this way, Nutri-Score only marginally (2.5%) (or 0.142 FSA points) increased the nutritional content of the basket of labelled items that were purchased. The performance of Nutri-Score increased along with the variation (but not the mean) of the category's nutritional quality. According to in-store studies, Nutri-Score may be attributed to its capacity to draw attention and assist customers inranking products according to nutritional value (Pierre Dubois et al, 2020).

Adults in the current study were more likely to view front-of-package nutrition labels than Nutrition Facts labels during a food selection task. However, these higher rates of front-of-package nutrition label viewership only occurred when signage pointing out and describing the front-of-package nutrition labels was present in the grocery aisle. This finding shows that educational efforts informing consumers about the availability of this resource and how to use it might enhance consumer attention to front-of-package nutrition labelling (Dan. J. Graham et al, 2015).

FOPLs, or front of pack food labels, offer easily accessible nutritional data to help consumers make decisions. We set out to determine if FOPLs improve participants' ability to judge the healthfulness of foods and beverages using an online experiment with a sizable representative British sample. Comparing ranking abilities between FOPL groups and a no label control was the main goal. The NatCen panel was used to enrol adults (18 years) who were randomly assigned to one of five experimental groups (Multiple Traffic Light, MTL; Nutri-Score, N-S; Warning Label, WL; Positive Choice tick, PC; no label control). The stratification factors included the year of panel recruitment, sex, age, region of the government office, and household income (Jessica Packer et al, 2021).

Three variations of six food and beverage goods, each with a different level of healthiness, had packaging pictures made for them (pizza, drinks, cakes, crisps,

yoghurts, breakfast cereals). The three product photos were ranked by the participants' assessments of their healthiness. A single ranking was conducted, consisting of a baseline measure (without the FOPL) and a follow-up measure with the FOPL according to each participant's experimental group. The main result was the capacity to rate product healthiness accurately (all products ranked correctly vs. any incorrect).

The analysis covered the 4504 participants who had complete data in 2020 (Jessica Packer et al, 2021).

For the N-S, MTL, and WL groups compared to the control, the likelihood of right ranking at follow-up and improvement between baseline and follow-up was considerably higher across all goods. Only a few of the PC group's products showed this. N-S and MTL had the biggest effects, respectively. These analyses were modified to account for stratification characteristics, ethnicity, education, household structure, responsibility for grocery shopping, and current FOPL use. Exploratory studies revealed that individuals with greater education tended to score products more accurately than those with lower education. Conclusions: In this large representative British sample, all FOPLs were successful at increasing participants' capacity to accurately rank products according to healthiness, with the biggest benefits observed for N-S and MTL (Jessica Packer et al, 2021).

The qualitative and quantitative findings support several inferences. First, Uruguayans would often accept nutritional warnings. The policy is perceived as serving its intended purpose of providing a straightforward and user-friendly FOP nutrition label to increase consumer awareness of the nutritional value of food. In order to avoid products that carry warnings, consumers said they were willing to change their eating preferences, primarily by substituting items from the same food category. With relation to this influence, however, significant category disparities should be anticipated. Third, there shouldn't be many socio-demographic distinctions, suggesting that consumers who are middle-aged and older and belong to lower socioeconomic categories could be particularly affected (Gastón Ares et al, 2018).

The findings have implications for policy makers, who should anticipate that the public would support the policy when it is implemented. Therefore, nutritional warnings would probably be effective in influencing healthy eating habits and

lowering intakes of sugar, fat, saturated fat, and sodium in the Uruguayan population. The findings suggest that for industry stakeholders, a lucrative response would be to reformulate the items so that they display, at best, no or fewer warnings. The food sector ought to investigate further whether customer responses to nutritional warnings vary by category. Though category disparities should be acknowledged, policymakers should convey the motivation of a commercial opportunity entailed in the reformulation. The population's health status would further improve with such a supplementary reformulation (Gastón Ares et al, 2018).

To raise public knowledge of nutritional warnings and persuade people to consider them in their decision-making, warnings should be supported by information and communication efforts. Additionally, point-of-purchase cues that encourage customers to read nutritional warnings may help to improve the effectiveness of the policy, especially for customers who have low health motivation. In conclusion, the results of the current work emphasise the potential for nutritional warnings to deter the consumption of unhealthy items, supporting those of recent experimental studies. In-store nutritional warnings' impact on consumer attention and purchasing choices should be the subject of additional study (Gastón Ares et al, 2018).

This study is the first to examine the effects of various FOP labels on food selections utilising a large-scale RCT and experimental circumstances inspired by actual online purchasing scenarios. In comparison to more complex formats or a control scenario with no labels, the results showed that simpler and color-coded nutrition labels, particularly the graded 5-CNL, had a beneficial impact on food choices. The shopping cart's overall nutritional quality increased as a result of the graded label, which also resulted in lower levels of total calories and nutrients whose consumption ought to be kept to a minimum. Additionally, the 5-CNL led to generally better decisions in the majority of population segments, including those who may be more likely to consume a diet of lower quality. Therefore, it seemed that the label with the 5-CNL (Pauline Ducrot et al, 2016).

The most popular FOP labelling forms on the evaluated food goods in the UK retail market were TL and GDA. Both the use of colour in TL and the use of a table or grid in GDA are simple to grasp and could give customers quick access

to information about the goods they plan to purchase while shopping. These FOP formats could assist customers in cutting down on the amount of time they spend reading labels before making decisions about the foods they purchase, especially in situations where physical contact is restricted due to disease outbreaks, such as the recent Covid-19 pandemic, or even when shopping in-store. It might be a good idea to include these formats on all food goods to promote public nutrition (D. A. Ogundijo et al, 2021).

If customers use the FOP labelling to make educated judgments to buy healthier foods, the risks of numerous diet-related ailments may be lowered. Adopting FOP nutrition labelling formats, such as the TL and HL systems used by the UK government, may be especially beneficial in addressing the observed rise in diet-related illnesses in low- and medium-income nations. In contrast to the "least healthy" category, more goods in their analysis fell into the "healthier" and "moderately healthy" categories. This may indicate that the food industry is now responding to trends brought on by the public's desire for a greater variety of healthy foods. Food selections could be made from a variety of food types in the grocery stores, as evidenced by the foreign goods that were discovered in the UK retail market. Future plans for a front of pack label that is applicable in all nations should pay more attention to how information is presented on the label, and the usage of a color-coded, simple-to-understand structure for unilateral labelling should be promoted (D. A. Ogundijo et al, 2021).

This study offers proof that the installation of traffic-light labelling had little to no impact on supermarket sales of sandwiches and ready meals at one specific UK retailer's outlets. The results suggest that the use of front-of-pack labelling in this format and at this level of use may not be sufficient to significantly affect consumer behaviour, while these findings still require further investigation in other situations, in other product categories, and over a longer period of time. This study shouldn't rule out the chance that traffic-light labelling will enhance public health in the future, especially if it is used on more products or in conjunction with other in-store initiatives to encourage shoppers to make healthier choices. Additionally, the study did not examine all of the possible consequences of the installation of traffic-light labelling, such as product reformulation to avoid "red" lights and public awareness of nutrition. To accomplish the policy's stated goals, research like this should be used to

establish and improve food labelling regulations. These results should serve as a test for those who support various front-of-pack labelling designs, challenging them to show how other nutrition signal formats affect consumer purchases (Gary Sacks et al, 2009).

The findings from the trials presented in this paper offer suggestions on how to create warnings to identify items with poor nutrient profiles. The warning signs with octagonal borders such as excess of fat or excess of salt or excess of sugar have the ability to increase the sense of unhealthiness among consumers. Due to its great attentional capture, black octagons appear to be the ideal colour choice. This design is comparable to the one that was recently put into place in Chile; the only thing that makes it different is the language expression used in the warnings such as high in fat or high in salt or high in sugar. Additionally, suggestions for the best warning size and placement on the labels to maximise attentional capture were produced. It is suggested that policymakers include mandatory design requirements for nutrition warnings in their rules. This kind of public policy intended to encourage people to make healthier choices could benefit from the design of warnings based on consumer perceptions of healthfulness and attentional capture (Manuel Cabrera et al, 2017).

The European food sector has been driven to provide more straightforward information about the nutritional makeup of goods by growing public interest in food and health. To help consumers make better-informed and healthier food choices, the food industry has adopted simpler front-of-pack labelling in addition to the usual nutrition table on the back of the package. In this study, the attitudes of consumers in Germany and Belgium with simplified nutrition information, such as Guideline Daily Amount (GDA) and Traffic Light (TL), are investigated. 2008 saw the completion of consumer surveys in Germany (n = 147) and Belgium (n = 128). Regression analysis and descriptive statistics were used to analyse the data (Anke Moser et al, 2009).

While the majority of consumers in Belgium indicate a preference for the GDA, the traffic light is the most popular choice in Germany. According to regression analysis, socio-demographic traits and attitudes regarding the various labels have an impact on people's propensity for using them. The food industry and European nutrition policy officials should be mindful of regional variations in how people view simplified nutrition labels. Raising public awareness of the

potential role of simplified labels in helping Europeans make informed and healthy food choices is the challenge facing both stakeholder groups (Anke Moser et al, 2009).

Studies related to consumers' perceptions regarding front of pack labels- India

Policies requiring front-of-package labels (FOPLs) on packaged foods may assist Indian consumers in better identifying foods high in nutrients of concern, such as sugar, saturated fat, and sodium, and deterring their consumption—outcomes that are essential for preventing increases in non-communicable diseases linked to diet. The goal was to determine whether FOPLs could aid Indian consumers in identifying packaged goods that were "high-in" calories and help them avoid making those purchases. In six Indian states in 2022, they carried out an in-person, random experiment with 2869 persons between the ages of 18 and 60 (S. K. Singh et al, 2022).

Five FOPLs—a control label (barcode), warning label (octagon with "High in [nutrient]"), health star rating (HSR), guideline daily amount (GDA), or traffic light label (TLL)—were randomly assigned to participants. Following this, participants rated their reactions to the labels and impressions of a variety of packaged goods that were heavy in sodium, sugar, or saturated fat using the FOPL they had been given. The percentage of participants in the control group who correctly recognised every product rich in the nutrient(s) of concern was lower than 50% (39.1%). The highest differences were seen for the warning label (60.8%, p 0.001), followed by the TLL (54.8%, p 0.001), GDA (55.0%, p0.001), and HSR (45.0%, p 0.01). All FOPLs resulted in an increase in this outcome. The overall pattern of results revealed that warning labels are the mosteffective FOPL to help Indian consumers identify dangerous foods, even if no FOPLs caused a decrease in intentions to buy the packaged items (S. K. Singh et al, 2022).

The survey made clear that customers are aware of nutrition labels and value them while making food purchases. They were also in favour of the pack's front bearing a nutrition label. Although there are ongoing efforts at the level of the FSSAI and GOI to adopt the FoP Labeling on packaged or processed goods. More evidence-based study is advised about people's perceptions of the viability of FoP label design, using examples from other nations as a guide. This research

might serve as a foundation for laws and policies governing front of pack labelling (Sudip Bhattacharya et al, 2022).

To find out which of the five widely used formats of nutrient specific labels and summary ratings - Multiple Traffic Lights (MTL), Monochrome Guideline Daily Amounts (GDA), Nutri-Score, Warning Labels (WL), and Health Star Ratings (HSR) - is the easiest to understand and influences purchase intention, the first ever large scale randomised controlled trial was conducted within the complex socioeconomic-demographic setting of the Indian consumers (Arvind Sahay et al, 2022).

Their findings show that, on average, from the standpoints of ease of identification, understanding, reliability, and influence, the summary ratings of HSR and Warning Labels are the most recommended. Between the two, HSR definitely outperforms the nutrient-specific formats and looks to be more acceptable. The Southern, Central, and Western parts of the nation favour HSR more strongly. The Southern, Central, and Western parts of the nation favour HSR more strongly. MTL fared poorly in other metrics but was favoured when it came to reflecting important health information and the presence of an undesired nutrient. It is also noted that HSR performs better in terms of ease of identification, understanding, reliability, and lack of complexity, particularly among sub-populations that have a greater impact on influencing purchases, such as females, people who are primarily in charge of grocery shopping, people who live in cities, people who read labels now, people who don't read labels because they are unaware of them, and people who don't want information (Arvind Sahay et al, 2022).

The Food Safety and Standards Authority of India (FSSAI) has proposed a front-of-package labelling (FOPL) regulation in response to the sharp increase in the prevalence of overweight and obesity, as well as the high prevalence of type 2 diabetes and other non-communicable diseases linked to nutrition. In order to help customers distinguish between foods that are more and less healthy, an efficient FOPL system employs a nutrient profile model to identify foods that are high in sugar, sodium, and saturated fat. These goods would then be given a warning label (Chandra Pandav et al, 2021).

Based on Nutrition Alchemy data already gathered by the food industry (n = 1306), it was predicted that 96% of items in India would carry at least one

warning label. This almost complete overview of warning labels may be unreliable and deceptive. To address this, the current study compared two nutrient profile models—the WHO South-East Asia Region Organization (SEARO) and the Chilean Warning Octagon (CWO) Phase 3—applied to food products that were marketed in India between 2015 and 2020 and were gathered through the Mintel Global New Products Database (n = 10,501 products). According to the findings, at least one "high-in" level warning label would be present on 68% of meals and beverages. This study emphasises the necessity for a larger sample of food goods to be considered when evaluating the effectiveness of warning labels (Chandra Pandav et al, 2021).

METHODS AND MATERIALS

Worldwide, poor diets are responsible for more deaths than any other risk factor, and are the leading cause of non-communicable diseases (NCDs). Evidence suggests excessive consumption of processed/ultra-processed packaged foods are associated with increased risk of obesity and related NCDs. Effective nutrition labelling, including simple-to-use Front of Pack Labelling, has been identified as one of the strategies that countries should use to address the growing global concern of unhealthy dietary patterns.

The present study was a cross-sectional study conducted between November 2022 to February 2023. It was undertaken to list the processed/ultra-processed packaged foods available in one superstore from each zone of Vadodara city, to know the consumers' frequency of consumption of processed/ultra-processed packaged foods, to evaluate the consumers' perceptions regarding the consumption of processed/ultra-processed packaged foods, to evaluate the consumers' perceptions regarding back of pack labelling and front of pack labelling, and to develop a manual for capacity building of consumers to facilitate them for making healthier choices.

Broad objective of the study is to evaluate consumers' perception and understanding of food Labels for processed and ultra-processed packaged foods.
The study was divided into three phases as shown in **Figure 3.1.**

Phase I: Market Survey

Market survey was carried out to evaluate the current status of labelling for processed/ ultra-processed packaged foods. Vadodara city was divided into four zones as shown in **Figure 3.2.** For market survey, one superstore from each zone of Vadodara city was randomly selected. The listing of 420 processed/ultra-processed foods was carried out. A total of 420 processed packaged foods were listed based on FSSAI classification, 2022 (FSSAI, 2022). Out of 420 processed packaged foods, 321 were from solid category and 99 were from liquid category. The processed packaged foods from the solid category were further divided into 29 sub-categories and the processed packaged foods from the liquid category were further divided into 8 sub-categories.

The product name, brand name, price, size and serving size of these food products were noted. Examination of the food labels for various components of nutrition labelling for

Figure 3.1: Three phases of the study

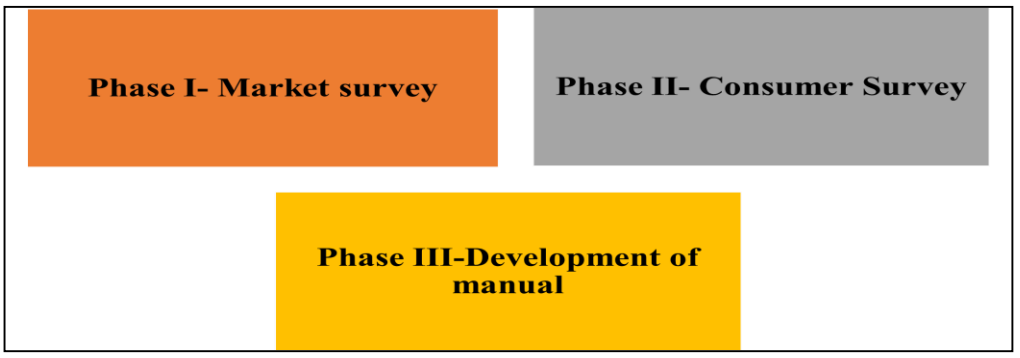
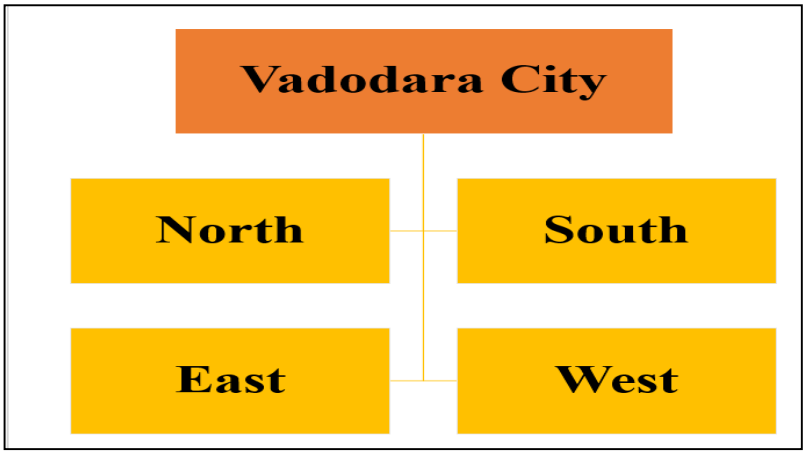


Figure 3.2: Four zones of Urban Vadodara



processed/ultra-processed packaged foods was carried out, such as-front of pack labelling, information regarding claims, information regarding RDA, information about whether the product is vegetarian or non-vegetarian, any other information, back of pack labelling, symbols and logos, nutrient claims, health claims, ingredients list, allergen declaration, Nutrition Facts Panel (NFP), information on colors, flavors and preservatives, manufacture and best before date and other miscellaneous information.

Phase II: Consumer Survey

For the consumer survey, snowball sampling (purposive sampling) was used. The data was collected online from 425 study participants (sample size calculation shown below) in the age group of 15-49 years residing in India. The study participants' general information, family history, medical history, frequency of consumption of processed/ultra-processed packaged foods, perceptions regarding the consumption of processed packaged foods as well as perceptions regarding back of pack labelling and front of pack labelling were collected.

The sample size of 310 was as per the sample size calculations given below:

Sample size calculation based on prevalence:

$$n = \frac{Z^2 P(1-P)}{d^2}$$

n= (1.96*1.96) *0.24*0.76/.05*.05= 280

Taking Z at 95 %CI = 1.96

P = 24% (HTN Prevalence 24% as per NFHS 5 for Vadodara)

Precision d = 0.05

Attrition: 10%= 280+28=310 (rounded off)

Actual sample taken: 425 (since responses were received online)

The semi structured questionnaire included the general information of the study participants, such as-Gender, Marital Status, Religion, Language, Education, Occupation, and Type of Family.

The socio-economic status of the study participants was evaluated using the Kuppuswamy scale. In the Kuppuswamy scale, different scores are given to the three parameters namely, education of the head, occupation of the head and monthly family income. The scores of these three parameters are summed up to obtain a final score.

According to the final score obtained, the families are categorised into five socio-economic classes, namely- Upper class, Upper middle class, Lower Middle class, Upper Lower class and Lower class.

The Food Frequency Questionnaire (FFQ) was used to know the frequency of consumption of processed packaged foods by the study participants. There was a list of various processed packaged foods and the frequency of consumption was divided into daily, alternate days, weekly, fortnightly, monthly, once in 3 months, rarely/occasionally and never (Appendix III).

Phase III: Manual Development:

In this phase, a manual was developed for capacity building of consumers to facilitate them for making healthier choices. The content of the manual was as follows:

- What are processed/ ultra-processed packaged foods?
- Transitioning packaged foods consumption patterns
- Food Label-An introduction
- Role of food labels in reducing consumption of processed/ ultra-processed packaged foods
- Information present on the processed packaged foods
- Understanding Back of Pack Labels
- Understanding Front of Pack Labels

  Refer Appendix IV

The parameters and tools for the study are shown in **Table 3.1**

Inclusion Criteria:

- Consumers who were in the age group of 15-49 years.
- Consumers who could read English.
- Consumers who were willing to participate.

Exclusion Criteria:

- Consumers who were not in the age group of 15-49 years.
- Consumers who could not read English.

- Consumers who were unwilling to participate.

Expected Outcomes

Primary Outcome

- Consumers perception and understanding of Food Labels for processed and ultra processed packaged foods

Secondary outcomes

- Frequency of consumption of processed/ ultra processed packaged foods
- Manual for capacity building of consumers for making healthy food choices.

Source of Bias

Since data was collected using online form applications therefore, there are chances of respondent bias. In addition, as snowball-sampling technique was used therefore majority responses received were from younger age groups. People who were using smartphones and online tools responded more as compared to others.

Statistical analysis

The data was entered through online form and was analysed using Microsoft excel (2010) and SPSS version 20 or above.

- Frequency distribution and percentage was calculated for all parameters that would be expressed in a rank order fashion. Chi square test was done to assess differences in groups.
- Means and standard errors was calculated for all parameters that were expressed numerically. Independent t-test was done for numerical variables

Table3.1: Parameters and tools

Study Phase	Parameter	Tools
Market survey	Product name, brand name, price, size and serving size, Labeling etc	Observation technique
Consumer Survey	Survey for Socio-economic status (SES)/ Medical history/ Consumption of processed/ ultra-processed packaged foods (online)	Semi structured questionnaire For SES, Kuppuswamy scale (2021) FFQ for Processed packaged foods

RESULTS AND DISCUSSIONS

Worldwide, poor diets are responsible for more deaths than any other risk factor, and are the leading cause of non-communicable diseases (NCDs). Evidence suggests excessive consumption of processed/ultra-processed packaged foods are associated with increased risk of obesity and related NCDs. Effective nutrition labelling, including simple-to-use Front of Pack Labelling, has been identified as one of the strategies that countries should use to address the growing global concern of unhealthy dietary patterns. The present study dealt with evaluating consumers' perceptions and understanding of food labelling for processed/ultra processed packaged foods. The study was divided into three phases:

Phase I- Market Survey

Phase II- Consumer Survey

Phase III- Development of a Manual

Phase I-Market Survey

A market survey was carried out to evaluate the current status of labelling for processed/ ultra-processed packaged foods. Vadodara city was divided into four zones. For the market survey, one superstore from each zone of Vadodara city was randomly selected. The listing of 420 processed/ultra-processed foods was carried out. A total of 420 processed packaged foods were listed.

General Information on the processed packaged foods

Table 4.1 indicates the general information on the processed packaged foods. Information on whether the processed packaged foods had serving size mentioned was observed. Nearly half of the packs (56.2%) had serving size mentioned while the remaining (43.8%) did not show any serving size. The processed packaged foods were categorised into solids and liquids. Most of the packs (76.4%) belonged to the solid category while the remaining (23.6%) belonged to the liquid category. Information on whether the processed packaged foods had the veg/non veg symbol mentioned was observed. Majority of the packs (69.8%) had the veg/non veg symbol mentioned while the remaining (30.2%) did not show any veg/non veg symbol. On analysis whether the processed packaged foods had ingredients listed, it was found that all of the processed packaged foods (100%) had ingredients listed.

Sub categories of processed packaged foods available in supermarkets

A total of 420 processed packaged foods were listed. Out of 420 processed packaged foods, 321 were in the solid category and 99 were in liquid category. The processed packaged foods from the solid category were further divided into 29 sub-categories and the processed packaged foods from the liquid category were further divided into 8 sub-categories (Table 4.2).

Front of Pack Labelling related Information on processed packaged foods

Table 4.3 indicates the Front of Pack Labelling related information on the processed packaged foods. Information on whether the processed packaged foods had Front of Pack Label was observed. Majority of the packs (75.9%) didn't have Front of Pack Label while the remaining (24%) had Front of Pack Label. Information on whether the processed packaged foods had any claims mentioned on their front of pack was observed. Most of them (81.7%) had claims on their front of pack while the remaining (18.3%) did not show any claims on their front of pack. Information on the claims mentioned on the front of pack of the processed packaged foods was observed (Fig.4.1). Majority of them (8.3%) had calcium/iron/minerals as the claim mentioned on the front of pack of the processed packaged foods, followed by vitamins (8.1%), protein (6.7%), zero transfat (3.6%), fiber (3.3%), contains glucose/sucrose (2.3%), less fat (2.1%), energy (1.4%), no added sugar (0.7%), no cholesterol (0.7%), zero fat (0.5%), low sodium (0.2%), less added sugar (0.2%), rich in antioxidants (0.2%) and low GI (0.2%).

Table 4.1.General Information obtained from market survey regarding processed packaged foods (N=420)

Particulars	**n (%)**
Had serving size mentioned	
Yes	236 (56.2)
No	184 (43.8)
Categorisation of processed packaged foods	
Solids	321 (76.4)
Liquids	99 (23.6)
Had veg/non veg symbol mentioned	
Yes	293 (69.8)
No	127 (30.2)
Had ingredients list mentioned	
Yes	420 (100)
No	0 (0)

Table 4.2 Sub categories of processed packaged foods available in supermarkets (N=420)

Sr No.	**Particulars**	**n (%)**
	Solids	
1	Cornflakes, oats and muesli	10 (2.4)
2	Noodles, pasta and macaroni	40 (9.5)
3	Salty Biscuits	3 (0.7)
4	Sweet Biscuits	27 (6.4)

5	Sweet cream biscuits	16 (3.8)
6	Sweet cream wafers	13 (3.1)
7	Confectionary hard candy	4 (1.0)
8	Confectionary soft candy	2 (0.5)
9	Cakes (slices)	4 (1.0)
10	Canned fruits	5 (1.2)
11	Jams, marmalades and jellies	9 (2.1)
12	Cheese	3 (0.7)
13	Butter	3 (0.7)
14	Ready to cook foods (for eg:- instant noodles, instant pasta, instant dosa, instant idli, instant	28 (6.7)
15	Ready to use spice mixes (dry)	17 (4.0)
16	Ready to use spice mixes (paste)	2 (0.5)
17	Ready to make cake and ice cream mixes	10 (2.4)
18	Ready to eat sweets (for eg:- Rasgolla, Gulab Jamun, Soan Papdi, Kaju Katri, etc)	7 (1.7)
19	Soup powders	11 (2.6)
21	Pickles salty	8 (1.9)
22	Pickles sweet	3 (0.7)
23	Papads	4 (1.0)
24	Namkeen and savouries	47 (11.2)
25	Extruded puffed flavoured snacks (for eg:- Kurkure, Too Yum,etc)	9 (2.1)
26	Nachos	9 (2.1)
27	Potato Chips	17 (4.0)
28	Popcorn	4 (1.0)
29	Cereal and milk based baby foods	6 (1.4)
	Liquids	
30	Spreads and dips	16 (3.8)
31	Malted beverages	3 (0.7)
32	Soft drinks	9 (2.1)
33	Energy drinks	19 (4.5)
34	Juices	24 (5.7)
35	Squashes	11 (2.6)
36	Chutneys	4 (1.0)
37	Ketchups and sauces	13 (3.1)
Total		420 (100)

Information on RDA mentioned on the Front of Pack Label of the processed packaged foods was observed (Fig. 4.2). Most of them (75.9%) didn't have RDA related information mentioned on the Front of Pack Label of the processed packaged foods, followed by Calories/Energy (24%), Saturated fat (4.3%), Sugars/Total sugar (3.8%), Total fat (3.6%), Sodium (3.6%), Trans fat (0.5%), Added sugar (0.5%) and Salt (0.2%). Information on whether the processed packaged foods had other information mentioned on their front of pack was observed. Most of them (91.4%) didn't have other information mentioned on their front of pack while the remaining (8.6%) showed otherinformation. Information on the other information mentioned on the front of pack of theprocessed packaged foods was observed (Fig. 4.3). Majority of them (2.8%) had 100%suji/rawa or made from suji/rawa as the other information mentioned on the front of pack of the processed packaged foods, followed by no maida (2.1%), goodness of grains(1.9%), not fried/baked (1.7%), no gelatin (0.9%), gluten free (0.5%), 0% added sugar (0.2%), fortified (0.2%), real spinach (0.2%), supports immunity (0.2%) and vegan (0.2%).

Back of Pack Labelling related information on processed packaged foods

Table 4.4 indicates the Back of Pack Labelling related information on processed packaged foods. On analysis whether the processed packaged foods had Back of Pack Label, it was found that all of the processed packaged foods (100%) had Back of Pack Label. Information on the symbols and logos mentioned on the back of pack of the processed packaged foods were observed (Fig. 4.4). Most of them (42.8%) had Veg, FSSAI as the symbols and logos mentioned on the back of pack of the processed packaged foods, followed by FSSAI (42.1%), FSSAI, ISO (8.6%), None (2.4%), ISO (1.9%), Veg, FSSAI,ISO (1.4%), Non Veg , FSSAI, ISO (0.5%) and Non Veg, FSSAI (0.2%). Information on whether the processed packaged foods had allergen declaration mentioned was observed. Nearly half of them (50.2%) had allergen declaration

mentioned while the remaining (49.8%) did not show any allergen declaration. Information on whether the processed packaged foods had Nutrition Facts Panel mentioned was observed. All of the processed packaged foods (100%) had Nutrition Facts Panel mentioned. Information on whether the processed packaged foods had information on colours (additives) mentioned was observed. Most of them (72.4%) didn't have information on colours while the remaining (27.6%) had information on colours. Information on whether the processed packaged foods had information on flavours (additives) mentioned was observed. Majority of them (57.6%) had information on flavours mentioned while the remaining (42.4%) did not have information on flavours. Information on whether the processed packaged foods had information on preservatives mentioned was observed. Most of them (83.8%) didn't have information on preservatives mentioned while the remaining (16.2%) had information on preservatives. Information on whether the processed packaged foods had manufacture date mentioned was observed. All of the processed packaged foods (100%) had manufacture date mentioned. Information on whether the processed packaged foods had best before the date mentioned was observed. All of the processedpackaged foods (100%) had best before date mentioned. Information on whether the processed packaged foods had other information mentioned on the back of the pack wasobserved. Majority of them (96.9%) didn't have other information mentioned on their back of pack while the remaining (3.1%) showed other information on their back of pack. Information on the other information mentioned on the back of the pack of the processed packaged foods was observed (Fig. 4.5). Most of them (1.9%) had no MSG as the other information mentioned on the back of pack of the processed packaged foods, followed by 100% whole grain (0.5%), gluten free (0.5%) and no maida (0.2%).

Table 4.3 Front of Pack Labelling related information on processed packaged foods (N=420)

Particulars	n (%)
Had Front of Pack Label	
Yes	101 (24)
No	319 (75.9)
Had any claims mentioned on their front of pack	
Yes	77 (18.3)
No	343 (81.7)
Had other information mentioned on their front of pack:	
Yes	36 (8.6)
No	384 (91.4)

Table 4.4 Back of Pack Labelling related information on processed packaged foods (N=420)

Particulars	n (%)
Had Back of Pack Label	
Yes	420 (100)
No	0 (0)
Had allergen declaration mentioned	
Yes	211 (50.2)
No	209 (49.8)
Had Nutrition Facts Panel mentioned	
Yes	420 (100)
No	0 (0)
Had information on colours (additives) mentioned	
Yes	116 (27.6)
No	304 (72.4)
Had information on flavours (additives) mentioned	
Yes	242 (57.6)
No	178 (42.4)
Had information on preservatives mentioned	
Yes	68 (16.2)
No	352 (83.8)
Had manufacture date mentioned	
Yes	420 (100)
No	0 (0)
Had best before date mentioned	
Yes	420 (100)

No	0 (0)
Had other information mentioned on their back of pack	
Yes	13 (3.1)
No	407 (96.9)

Information related to nutrient claims and health claims mentioned on the processed packaged foods

Table 4.5 indicates the information related to nutrient claims and health claims mentioned on the processed packaged foods. Information on whether the processed packaged foods had any nutrient claims mentioned was observed. Majority of them (90.4%) didn't have any nutrient claims mentioned on their back of pack while the remaining (9.5%) showed nutrient claims. Information on the nutrient claims mentioned on the processed packaged foods was observed (Fig. 4.6). Most of them (4.3%) had calcium/iron/minerals as the nutrient claim mentioned on the back of pack of the processed packaged foods, followed by vitamins (3.6%), zero trans fat (3.3%), protein (2.1%), contains added sodium/potassium (2.1%), no cholesterol (1.9%), fiber (1.9%), low sodium (0.5%), energy (0.2%), less fat (0.2%), plant based energy (0.2%) and Beta Glucan (0.2%). Information on whether the processed packaged foods had any health claims mentioned was observed. Majority of them (96.7%) didn't have any health claims mentioned on their back of pack while the remaining (3.3%) showed health claims. Information on the health claims mentioned on the processed packaged foods was observed (Fig. 4.7). Most of them (2.4%) had supports immunity as the health claim mentioned on the back of pack of the processed packaged foods, followed by reduces blood pressure (0.9%), reduces cholesterol (0.7%), maintains weight/stay in shape (0.7%), brain development (0.7%), provides energy (0.5%), healthy bones (0.5%), fluids and electrolytes (0.5%), healthy muscles (0.5%), healthy blood (0.2%), height gain (0.2%) and weight gain (0.2%).

Table 4.5: Information related to nutrient claims and health claims mentioned on the processed packaged foods (N=420)

Particulars	**n (%)**
Had any nutrient claims mentioned	
Yes	40 (9.5)
No	380 (90.4)
Had any health claims mentioned	
Yes	14 (3.3)
No	406 (96.7)

Fig.4.1 Claims mentioned on the front of pack of the processed packaged foods (N=420)

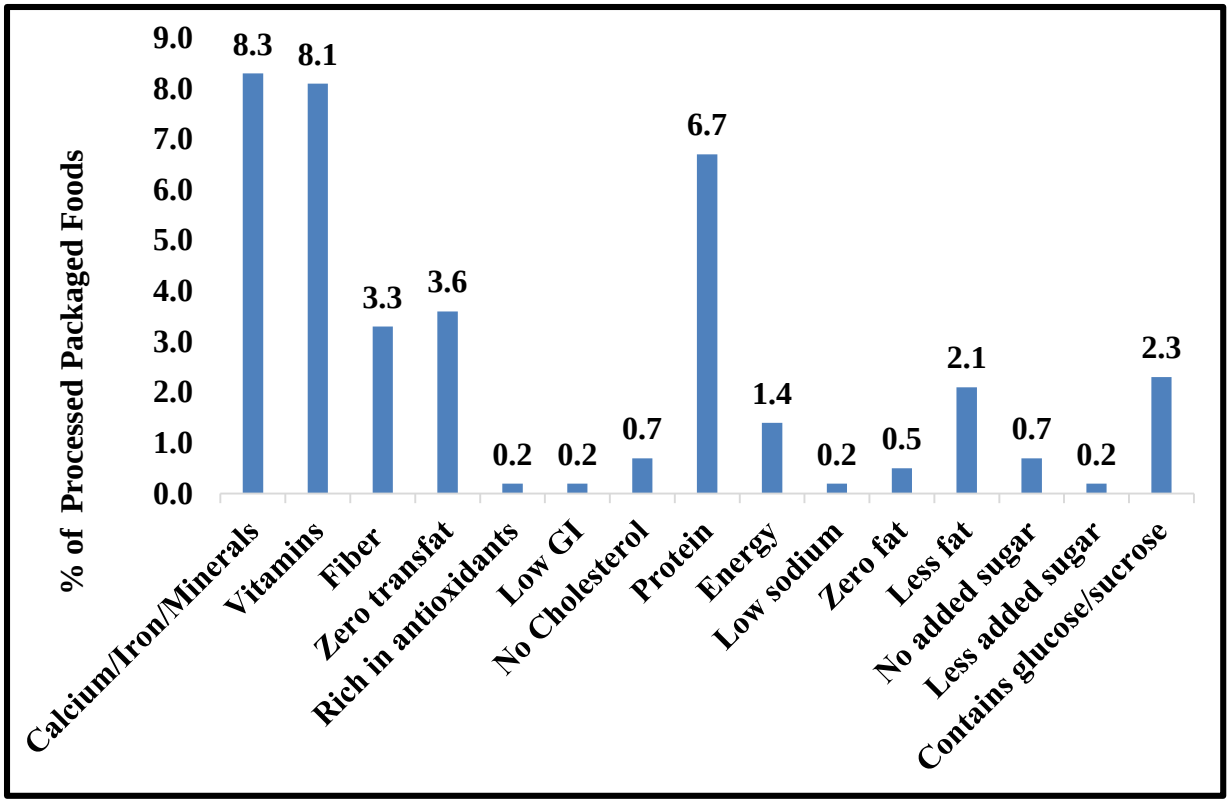


Fig. 4.2 RDA related information mentioned on the Front of Pack Label of theprocessed packaged foods (N=420)

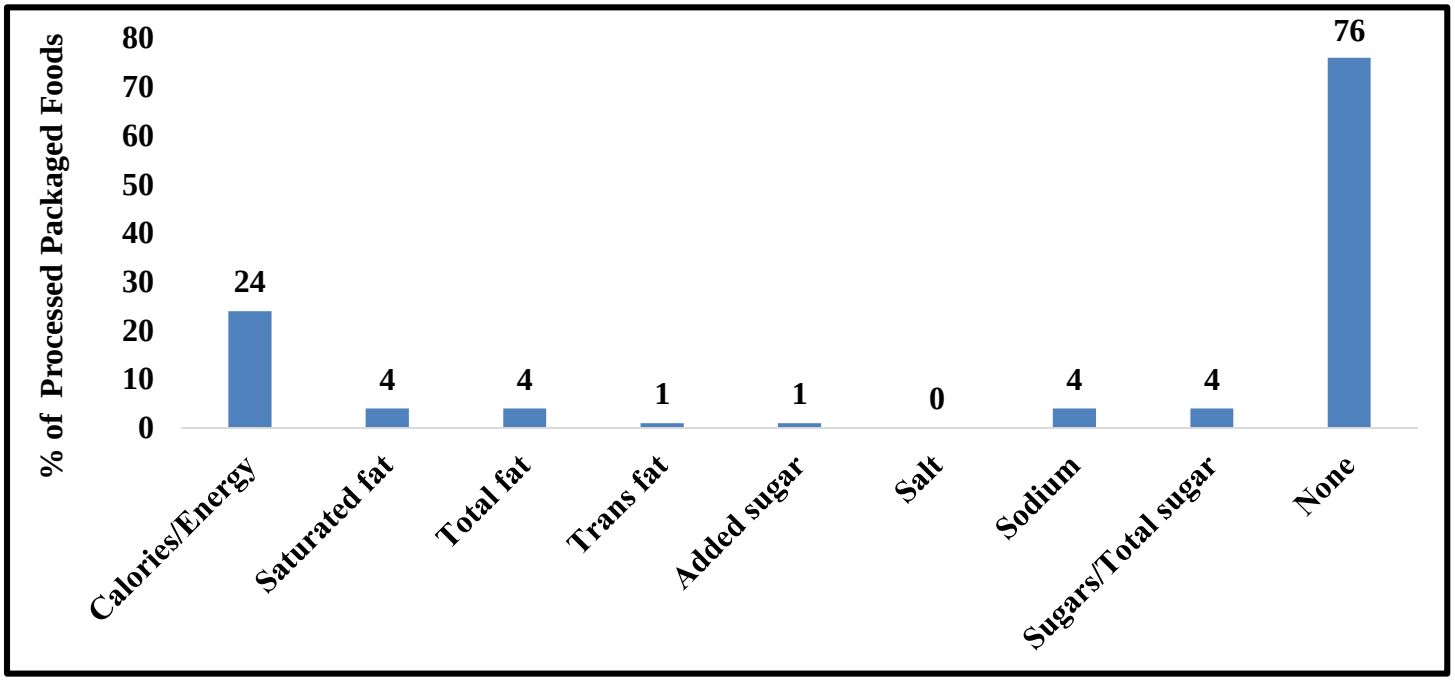


Fig 4.3 Other information mentioned on the front of pack of the processedpackaged foods (N=420)

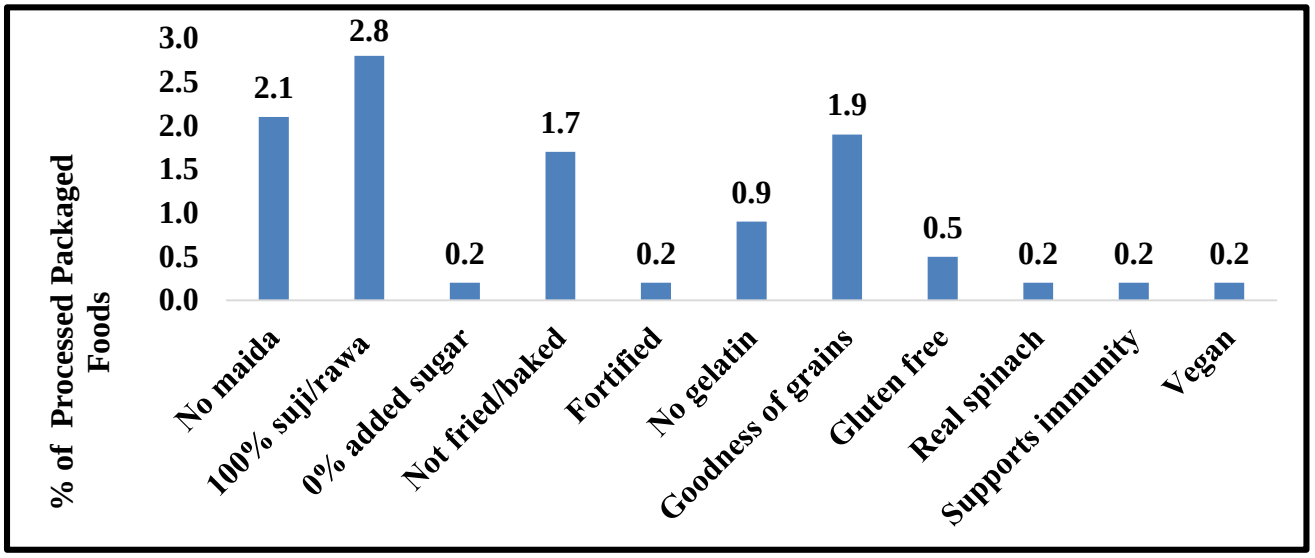


Fig 4.4 Symbols and logos mentioned on the back of the processed packaged foods (N=420)

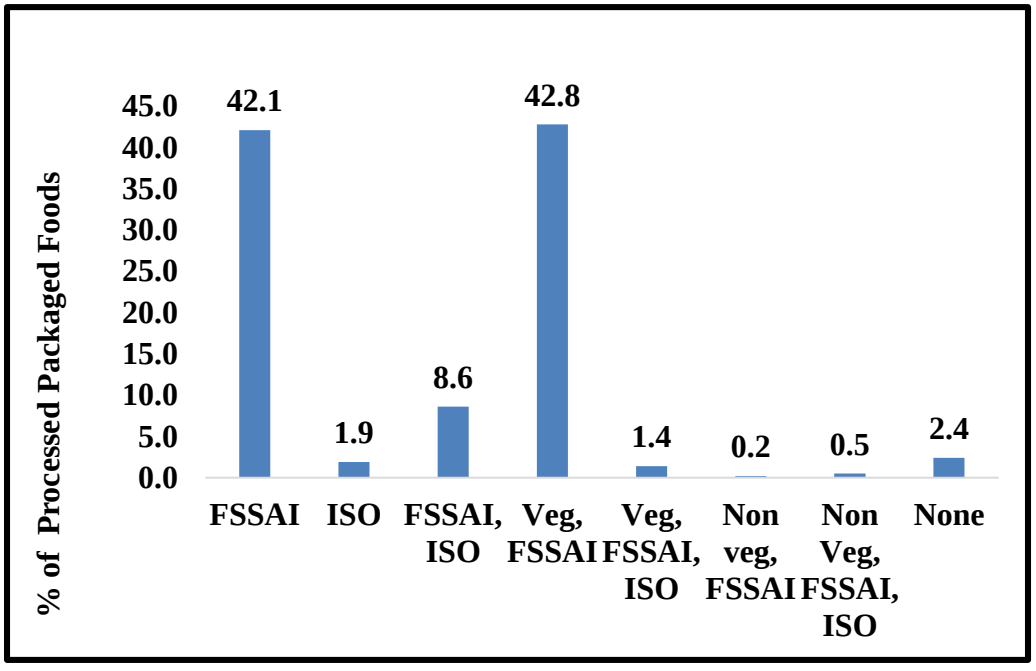


Fig.4.5 Other information mentioned on the back of pack of the processedpackaged foods (N=420)

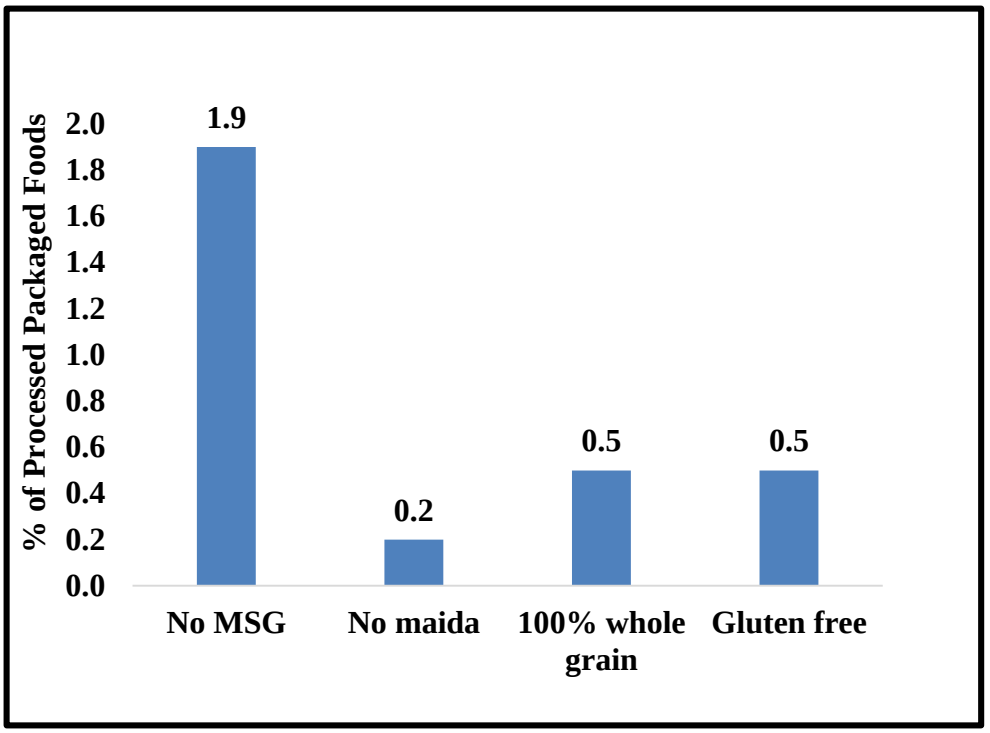


Fig. 4.6 Nutrient claims mentioned on the processed packaged foods (N=420)

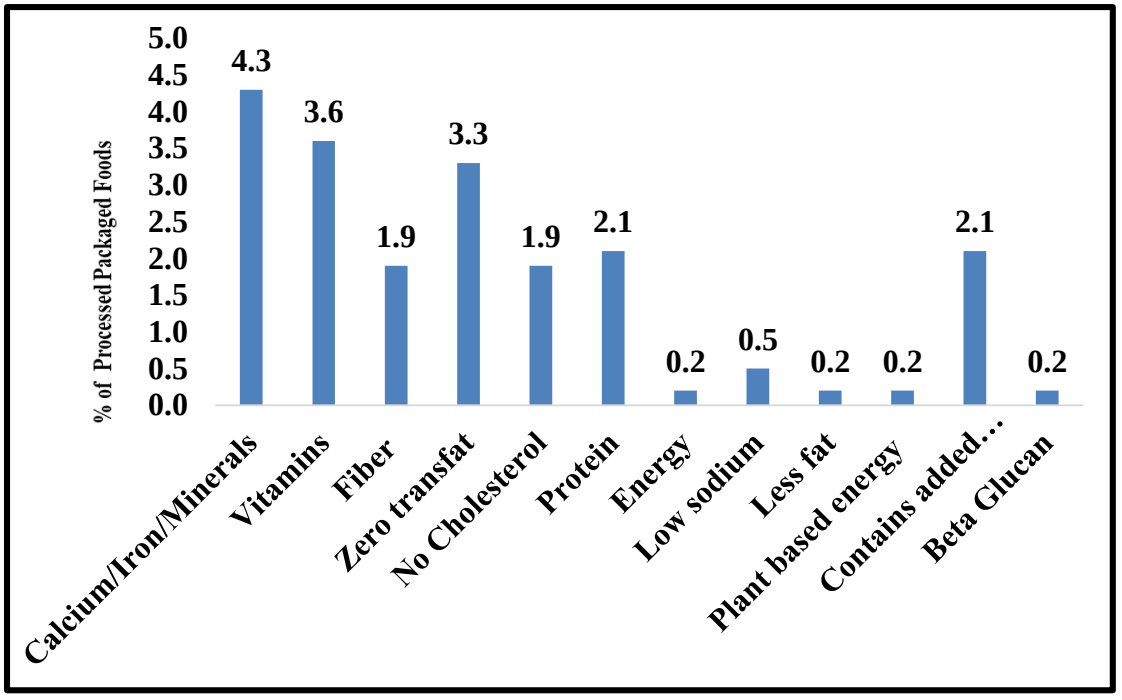
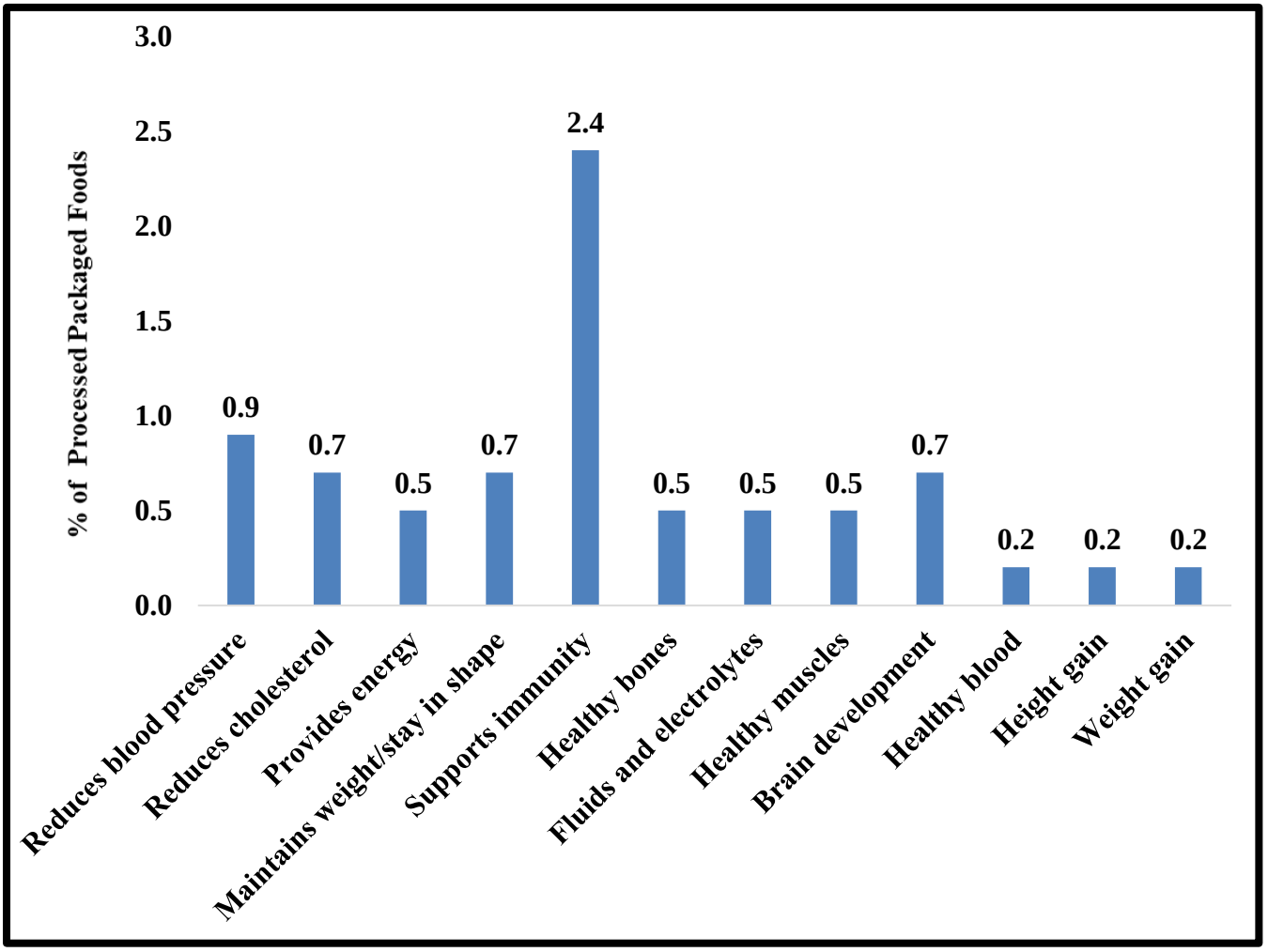


Fig. 4.7 Health claims mentioned on the processed packaged foods (N=420)



Phase II-Consumer Survey

For the consumer survey, snowball sampling (purposive sampling) was used. Data was collected online from 425 study participants (sample size calculation shown below) in the age group of 15-49 years residing in India. The study participants' general information, family history, medical history, frequency of consumption of processed/ultra-processed packaged foods, perceptions regarding the consumption of processed packaged foods as well as perceptions regarding back of pack labelling and front of pack labelling were collected.

Table 4.6 indicates the general information of the study participants. Majority of them (31.8%) were in the age group of 20-<25 years, followed by 15-<20 years (30.6%), 45-<50 years (11.5%), 25-<30 years (9.4%), 35-<40 years (5.9%), 30-<35 years (5.4%) and 40-<45 years (5.4%). Most of them were females (78.6%), followed by males (21.2%) and other (0.2%). Majority of them were unmarried (67.8%), followed by married (30.8%) and divorcee as well as widow/widower (1.4%). Most of them were Hindu (77.9%), followed by Muslim (12.2%), Jain (6.1%), Christian (2.1%), others (1.8%) and Sikh (0.5%). Majority of them had English as their language (66.1%), followed by Hindi (62.6%), Gujarati (58.3%) and others (15.3%). Most of them were graduate (45.6%), followed by professional (26.3%), higher secondary (23.5%), post high school diploma (4.2%) and middle school certificate (0.2%). Majority of them were students (60.4%), followed by those who were doing service (19%), those who had their own business (7.8%), those who were self-employed (5.9%), those who were housewives (5.4%) and those who were unemployed (1.4%). Most of them had nuclear families (66.3%), followed by joint families (30.1%) and extended families (3.5%).

Nutritional Status of the study participants

The age, gender, height, weight and BMI for 395 study participants was taken into consideration for finding the nutritional status of the study participants.According to table 4.7, mean height of males was found to be 1.72± 0.09m and for females was 1.59±0.08m. Mean BMI for males was 25.06±5.08 kg/m^2 and for the females was 23.18±5.17 kg/m^2. There was a significant difference in BMI values based on gender with males having a significantly higher BMI.

According to table 4.8, more than one third of the subjects were either overweight or obese. Around half of the subjects were normal. However around 15% of the subjects were underweight based on BMI values.

As shown in table 4.9, age showed a significant effect on BMI of the subjects. Around 15% of the subjects below the age of 25 years were either overweight or obese while around the same number were underweight in this age group too.

When data for purchase of processed packaged foods was analysed on the basis of BMI category, it was observed that a significantly higher number of obese people purchased processed packaged foods (Table 4.10).

Table 4.11 indicates the family history of the study participants. Majority of them (47.3%) responded as not applicable for diabetes, followed by father (24.5%), grandparents (23%), mother (19%), sibling (1.8%) and self (1.4%). Most of them (59%) responded as not applicable for Hypertension, followed by mother (22.1%), father (21.4%), grandparents (11.5%), self (3.5%) and sibling (1.4%). Majority of them (82.8%) responded as not applicable for Coronary Heart Disease, followed by grandparents (9.2%), father (7%), mother (2.5%), self (0.5%) and sibling (0.2%). Most of them (89.6%) responded as not applicable for Hyperlipidemia, followed by father (5.9%), mother (3.5%), grandparents (2.3%), sibling (0.5%) and self (0.2%). Majority of them (87.3%) responded as not applicable for Stroke, followed by grandparents (5.2%), father (5.2%), mother (1.9%), sibling (0.9%) and self (0%). Most of them (85.6%) responded as not applicable for Hypo/Hyperthyroidism, followed by mother (8.7%), grandparents (3%), father (2.1%), self (2.1%) and sibling (0.9%). Majority of them (85.6%) responded as not applicable for Asthma, followed by grandparents (6.1%), mother (3.8%), self (2.8%), father (2.6%) and sibling (1.6%). Most of them (84.9%) responded as not applicable for Cancer, followed by grandparents (8.5%), father (3.8%), mother (2.3%), sibling (0.7%) and self (0.2%). Majority of them (90.3%) responded as not applicable for any other diseases, followed by father (4.5%), self (3.5%), mother (2.8%), grandparents (2.3%) and sibling (1.2%).

Table 4.6: General information of the study participants (N=425)

Particulars	**n (%)**
Age	
15-<20	130 (30.6)
20-<25	135 (31.8)
25-<30	40 (9.4)
30-<35	23 (5.4)
35-<40	25 (5.9)
40-<45	23 (5.4)
45-<50	49 (11.5)
Gender	
Male	90 (21.2)
Female	334 (78.6)
Other	1 (0.2)
Marital Status	
Unmarried	288 (67.8)
Married	131 (30.8)
Divorcee Widow/Widower	6 (1.4)
Religion	
Hindu	331 (77.9)
Muslim	52 (12.2)
Sikh	2 (0.5)
Christian	9 (2.1)
Jain	26 (6.1)
Others	5 (1.8)
Language*	
English	281 (66.1)
Hindi	266 (62.6)
Gujarati	248 (58.3)
Others	65 (15.3)
Education	
Professional	112 (26.3)
Graduate	194 (45.6)
Post high school diploma	18 (4.2)
Higher secondary	100 (23.5)
Middle school certificate	1 (0.2)
Illiterate	0 (0)
Occupation	
Business	33 (7.8)
Service	81 (19)
Self employed	25 (5.9)
Student	257 (60.4)

Labourer	0 (0)
Retired	0 (0)
Unemployed	6 (1.4)
Housewife	23 (5.4)
Type of family	
Nuclear	282 (66.3)
Joint	128 (30.1)
Extended	15 (3.5)

*Value more than 100% due to multiple responses.

Table 4.7 Gender-wise mean values for Height, Weight and BMI (N=395)

Mean values	Gender			Total	ANOVA F value
	Male	Female	Others		
Height (m)	1.72± 0.09	1.59±0.08	1.6±0.00	1.61±0.10	86.04***
Weight (kg)	74.5±13.99	58.61±12.88	54.00±0.00	62.03±14.65	49.3***
BMI (kg/m^2)	25.06±5.08	23.18±5.17	21.09±0.00	23.58±5.20	4.58*

Significant p<0.05 ** Significant p<0.01 *** Significant p<0.001

Table 4.8 Prevalence of overweight, obese or underweight (N=395)

BMI Category	n (%)
Underweight	58 (14.7)
Normal	200 (50.6)
Overweight	93 (23.5)
Obese	44 (11.1)

Table 4.9 Age-wise N (%) for BMI (N=395)

BMI Category	Age-N (%)							Total	Chi Square
	15-<20	20-<25	25-<30	30-<35	35-<40	40-<45	45-<50		
Underweight	30 (7.6)	24 (6.1)	2 (0.5)	1 (0.3)	0 (0)	0 (0)	1 (0.3)	58 (14.7)	75.92***
Normal	57 (14.4)	77 (19.5)	12 (3.0)	10 (2.5)	8 (2.0)	13 (3.3)	23 (5.8)	200 (50.6)	
Overweight	21 (5.3)	19 (4.8)	14 (3.5)	8 (2.0)	14 (3.5)	7 (1.8)	10 (2.5)	93 (23.5)	
Obese	9 (2.3)	8 (2.0)	9 (2.3)	2 (0.5)	2 (0.5)	2 (0.5)	12 (3.0)	44 (11.1)	

*** Significant at p<0.001

Table 4.10 Purchase of processed packaged foods vs BMI (N=395)

BMI Category	Purchase of Processed Packaged foods-n (%)		Total	Chi square
	Yes	No		
Underweight	14 (13.0)	44 (15.3)	58 (14.7)	8.23*
Normal	51 (47.2)	149 (51.9)	200 (50.6)	
Overweight	23 (21.3)	70 (24.4)	93 (23.5)	
Obese	20 (18.5)	24 (8.4)	44 (11.1)	

*Significant at p<0.05

Table 4.11 Family History of the study participants* (N=425)

Disease	n (%)					
	Self	Mother	Father	Sibling	Grandparents	Not applicable
Diabetes	6 (1.4)	81 (19)	104 (24.5)	5 (1.8)	98 (23)	201 (47.3)
Hypertension	15 (3.5)	94 (22.1)	91 (21.4)	6 (1.4)	49 (11.5)	251 (59)
Coronary Heart Disease	2 (0.5)	11 (2.5)	30 (7)	1 (0.2)	39 (9.2)	352 (82.8)
Hyperlipidemia	1 (0.2)	15 (3.5)	25 (5.9)	2 (0.5)	10 (2.3)	381 (89.6)
Stroke	0 (0)	8 (1.9)	22 (5.2)	4 (0.9)	22 (5.2)	371 (87.3)
Hypo/Hyperthyroidism	9 (2.1)	37 (8.7)	9 (2.1)	4 (0.9)	13 (3)	364 (85.6)
Asthma	12 (2.8)	16 (3.8)	11 (2.6)	7 (1.6)	26 (6.1)	364 (85.6)
Cancer	1 (0.2)	10 (2.3)	16 (3.8)	3 (0.7)	36 (8.5)	361 (84.9)
Any other	15 (3.5)	12 (2.8)	19 (4.5)	5 (1.2)	10 (2.3)	384 (90.3)

*Value more than 100% due to multiple responses.

Table 4.12 indicates whether the study participants took medicines. Most of them (90.1%) didn't take medicines while the remaining (9.9%) took medicines.

Table 4.13 indicates whether the study participants had substance abuse. Majority of them (97.6%) didn't have substance abuse while the remaining (2.3%) had substance abuse.

Table 4.14 indicates the type of substance abused by the study participants. Most of them (90.8%) didn't give any response, followed by other substance abuse (7.3%), alcohol consumption (1.2%), smoking cigarettes (0.9%) and tobacco chewing (0.5%).

Table 4.15 indicates the frequency of consumption of processed packaged foods by the study participants. More than one-third (39.5%) never consumed cornflakes, oats and muesli. More than one-third (38.5%) consumed noodles, pasta and macaroni monthly. More than one-fourth (27%) consumed salty biscuits monthly. More than one-fourth (25.4%) consumed sweet biscuits monthly. More than one-fourth (27.2%) never consumed sweet cream biscuits. More than one-third (35.8%) never consumed sweet cream wafers. More than one-third (34.8%) never consumed confectionary hard candy. Less than one third (32.7%) never consumed confectionary soft candy. Less than half (46.5%) consumed cake (slices) monthly. More than half (57.9%) never consumed canned fruits. More than one-third (39.8%) never consumed jams, marmalades and jellies. More than one-fourth (28%) consumed cheese monthly. More than one fourth (29.4%) consumed butter weekly. More than one-fourth (26.1%) consumed ready to cook foods, such as instant noodles, instant pasta, instant dosa, instant idli, instant idli, instant poha, instant upma and instant dhokla monthly. Less than one-fourth (24%) never consumed ready to use spice mixes (dry). More than one-third (38.5%) never consumed ready to use spice mixes (paste). More than half (52%) never consumed ready to make cake and ice-cream mixes. More than one-fourth (29.1%) consumed ready to eat sweets, such as rasgolla, gulab jamun, soan papdi and kaju katri monthly. Less than half (46.5%) never consumed soup powders. More than one-third (37.1%) never consumed salty pickles (packaged). Less than half (49.4%) never consumed sweet pickles (packaged). Less than one-fourth (24.2%) consumed papads monthly. Less than one-fourth (24.2%) consumed namkeens and savouries weekly. More than one-fourth (26.8%) consumed extruded puffed flavoured snacks, such as Kurkure and Too Yum monthly. Less than one-third (31%) never consumed nachos. Less than one-third (30.1%) consumed potato chips monthly. Less than one-third (33.1%) consumed

popcorn monthly. More than half (57.4%) never consumed cereal and milk based baby foods. More than one-third (35.8%) never consumed spreads and dips. More than half (50.8%) never consumed malted beverages. More than one-fourth (26.6%) consumed soft drinks monthly. More than half (53.6%) never consumed energy drinks. More than one-fourth (25.4%) consumed juices monthly. More than half (56.7%) never consumed squashes. Less than one-third (31%) never consumed chutneys (packaged). More than one-fourth (26.6%) consumed ketchups and sauces weekly.

Table 4.16 indicates whether the study participants' purchased processed packaged foods. Majority of them (72.2%) purchased processed packaged foods while the remaining (27.8%) did not purchase processed packaged foods.

Table 4.17 indicates reasons to purchase processed packaged foods. Less than half (45.9%) of the subjects agreed to convenience being one of the reasons for purchasing processed packaged foods, less than half (41.1%) agreed that affordability was one of the reasons, more than half (55.8%) agreed that taste was one of the reasons, less than two-third (61.4%) agreed that ease of availability was one of the reasons and less than half (42.3%) neither agreed nor disagreed that larger servings were one of the reasons.

Table 4.18 indicates important factors that affect the purchasing of processed packaged foods. Less than half (49.2%) considered the safety of the processed packaged foods as a very important factor that affected the purchasing of processed packaged foods, less than half (46.8%) considered the nutrient content of the processed packaged foods as a very important factor, less than half (40%) considered the price of the processed packaged foods as a somewhat important factor, less than two-third (61.2%) considered the shelf life of the processed packaged foods as a very important factor, more than one-third (37.9%) considered the ease of preparing the processed packaged foods as a very important factor and less than two-third (61.9%) considered the taste of the processed packaged foods as a very important factor.

Table 4.12 Information on whether the study participants took medicines (N=425)

Particulars	n (%)
Yes	42 (9.9)
No	383 (90.1)

Table 4.13 Information on whether the study participants had substance abuse (N=425)

Particulars	n (%)
Yes	10 (2.3)
No	415 (97.6)

Table 4.14 Information on the type of substance abused by the study participants* (N=425)

Particulars	n (%)
Smoking cigarettes	4 (0.9)
Alcohol consumption	5 (1.2)
Tobacco chewing	2 (0.5)
Others	31 (7.3)
Didn't give any response	386 (90.8)

*Value more than 100% due to multiple responses.

Table 4.15 Information on frequency of consumption of processed packaged foods by the study participants (N=425)

Sr No.	Food items	n (%)							
		Daily	Alternate days	Weekly	Fortnightly	Monthly	Once in 3 months	Rarely/ Occasionally	Never
1	Cornflakes, oats and muesli	18 (4.2)	16 (3.7)	56 (13.2)	5 (1.2)	67 (15.8)	12 (2.8)	83 (19.5)	168 (39.5)
2	Noodles, pasta and macaroni	2 (0.5)	12 (2.8)	90 (21.1)	33 (7.8)	164 (38.5)	35 (8.2)	46 (10.8)	43 (10.1)
3	Salty Biscuits	19 (4.5)	33 (7.8)	88 (20.7)	21 (4.9)	115 (27)	19 (4.5)	53 (12.5)	77 (18.1)
4	Sweet Biscuits	36 (8.5)	32 (7.5)	107 (25.1)	17 (4)	108 (25.4)	14 (3.3)	41 (9.6)	70 (16.4)
5	Sweet cream biscuits	9 (2.1)	17 (4)	59 (13.9)	12 (2.8)	111 (26.1)	28 (6.6)	73 (17.1)	116 (27.2)
6	Sweet cream wafers	3 (0.7)	11 (2.6)	50 (11.8)	14 (3.3)	79 (18.5)	37 (8.7)	79 (18.5)	152 (35.8)
7	Confectionary hard candy	6 (1.4)	17 (4)	54 (12.7)	23 (5.4)	81 (19)	23 (5.4)	73 (17.1)	148 (34.8)
8	Confectionary soft candy	6 (1.4)	18 (4.2)	56 (13.1)	18 (4.2)	96 (22.5)	25 (5.9)	67 (15.7)	139 (32.7)
9	Cakes (slices)	2 (0.5)	9 (2.1)	23 (5.4)	18 (4.2)	198 (46.5)	49 (11.5)	91 (21.4)	35 (8.2)
10	Canned fruits	7 (1.6)	12 (2.8)	23 (5.4)	9 (2.1)	47 (11)	22 (5.17)	59 (13.9)	246 (57.9)
11	Jams, marmalades and jellies	3 (0.7)	10 (2.3)	24 (5.6)	18 (4.2)	77 (18.1)	32 (7.5)	92 (21.6)	169 (39.8)
12	Cheese	17 (4)	27 (6.3)	110 (25.9)	34 (8)	119 (28)	34 (8)	45 (10.6)	39 (9.2)
13	Butter	38 (8.9)	29 (6.8)	125 (29.4)	35 (8.2)	108 (25.4)	25 (5.9)	33 (7.8)	32 (7.5)

14	Ready to cook foods (for eg:- instant noodles, instant pasta, instant dosa, instant idli, instant poha, instant upma, instant dhokla, etc)	11 (2.6)	27 (6.3)	66 (15.5)	26 (6.1)	111 (26.1)	20 (4.7)	55 (12.9)	109 (25.6)
15	Ready to use spice mixes (dry)	61 (14.3)	30 (7)	69 (16.2)	15 (3.5)	85 (20)	19 (4.5)	44 (10.3)	102 (24)
16	Ready to use spice mixes (paste)	26 (6.1)	18 (4.2)	49 (11.5)	16 (3.8)	74 (17.4)	20 (4.7)	58 (13.6)	164 (38.5)
17	Ready to make cake and ice cream mixes	4 (0.9)	10 (2.35)	15 (3.5)	11 (2.6)	67 (15.8)	28 (6.6)	69 (16.2)	221 (52)
18	Ready to eat sweets (for eg:- Rasgolla, Gulab Jamun, Soan Papdi, Kaju Katri, etc)	1 (0.2)	9 (2.1)	32 (7.5)	20 (4.7)	124 (29.1)	36 (8.5)	86 (20.2)	117 (27.5)
19	Soup powders	3 (0.7)	8 (1.9)	20 (4.7)	18 (4.2)	72 (16.9)	28 (6.6)	78 (18.3)	198 (46.5)
21	Pickles salty	19 (4.5)	20 (4.7)	48 (11.2)	17 (4)	71 (16.7)	30 (7)	62 (14.6)	158 (37.1)
22	Pickles sweet	11 (2.6)	13 (3)	39 (9.2)	11 (2.6)	61 (14.3)	23 (5.4)	57 (13.4)	210 (49.4)
23	Papads	34 (8)	30 (7)	81 (19)	25 (5.9)	103 (24.2)	32 (7.5)	59 (13.9)	61 (14.3)
24	Namkeen and savouries	36 (8.5)	46 (10.8)	103 (24.2)	27 (6.3)	93 (21.9)	24 (5.6)	42 (9.9)	54 (12.7)
25	Extruded puffed flavoured snacks (for eg:- Kurkure, Too Yum, etc)	13 (3)	29 (6.8)	69 (16.2)	32 (7.5)	114 (26.8)	30 (7)	59 (13.9)	79 (18.6)
26	Nachos	7 (1.6)	24 (5.6)	40 (9.4)	15 (3.5)	113 (26.6)	27 (6.3)	67 (1.6)	132 (31)
27	Potato Chips	12 (2.8)	36 (8.5)	81 (19)	26 (6.1)	128 (30.1)	36 (8.5)	57 (13.4)	49 (11.5)
28	Popcorn	6 (1.4)	13 (3)	49 (11.5)	28 (6.6)	141 (33.1)	33 (7.8)	80 (18.8)	75 (17.6)

29	Cereal and milk based baby foods	16 (3.7)	17 (4)	22 (5.1)	14 (3.3)	37 (8.7)	23 (5.4)	52 (12.2)	244 (57.4)
30	Spreads and dips	7 (1.6)	14 (3.3)	32 (7.5)	25 (5.9)	97 (22.8)	35 (8.2)	63 (14.8)	152 (35.8)
31	Malted beverages	5 (1.2)	11 (2.6)	32 (7.5)	14 (3.3)	47 (11)	31 (7.3)	69 (16.2)	216 (50.8)
32	Soft drinks	1 (0.2)	19 (4.5)	55 (12.9)	23 (5.4)	113 (26.6)	32 (7.5)	74 (17.4)	108 (25.4)
33	Energy drinks	2 (0.5)	13 (3)	24 (5.6)	9 (2.1)	49 (11.5)	26 (6.1)	74 (17.4)	228 (53.6)
34	Juices	10 (2.3)	32 (7.5)	63 (14.8)	24 (5.6)	108 (25.4)	41 (9.6)	56 (13.1)	91 (21.4)
35	Squashes	3 (0.7)	12 (2.8)	21 (4.9)	9 (2.1)	47 (11)	29 (6.8)	63 (14.8)	241 (56.7)
36	Chutneys	14 (3.3)	23 (5.4)	61 (14.3)	23 (5.4)	84 (19.8)	27 (6.3)	61 (14.3)	132 (31)
37	Ketchups and sauces	14 (3.3)	32 (7.5)	113 (26.6)	31 (7.3)	93 (21.9)	19 (4.5)	55 (12.9)	68 (16)

Table 4.16 Information on whether the study participants purchased processed packaged foods (N=425)

Particulars	**n (%)**
Yes	307 (72.2)
No	118 (27.8)

Table 4.17 Reasons to purchase processed packaged foods (N=425)

Particulars	n (%)				
	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
It's convenient	39 (9.1)	42 (9.9)	117 (27.5)	195 (45.9)	32 (7.5)
Affordable	35 (8.2)	71 (16.7)	131 (30.8)	175 (41.1)	13 (3)
Tasty	35 (8.2)	29 (6.8)	78 (18.3)	237 (55.8)	46 (10.8)
Easily available	30 (7)	19 (4.5)	57 (13.4)	261 (61.4)	58 (13.6)
The servings are larger	34 (8)	105 (24.7)	180 (42.3)	90 (21.2)	16 (3.8)

Table 4.18 Important factors that affect the purchasing of processed packaged foods (N=425)

Important factors that affect the purchasing of processed packaged foods	n (%)			
	Not at all important	**Not too important**	**Somewhat important**	**Very important**
How safe is the processed packaged food to eat?	45 (10.6)	63 (14.8)	108 (25.4)	209 (49.2)
Nutrient content of the processed packaged food.	35 (8.2)	64 (15)	127 (29.9)	199 (46.8)
Price of the processed packaged food.	29 (6.8)	65 (15.3)	170 (40)	161 (37.9)
Shelf life of the processed packaged food.	26 (6.1)	43 (10.1)	96 (22.6)	260 (61.2)
How easy is the processed packaged food to prepare?	36 (8.5)	72 (16.9)	156 (36.7)	161 (37.9)
Taste of the processed packaged food.	23 (5.4)	31 (7.3)	108 (25.4)	263 (61.9)

Table 4.19 indicates the information that the study participants looked for while purchasing processed packaged foods. Most of them (82.1) looked for manufacture and best before date while purchasing processed packaged foods, followed by ingredients list (75.8%), price (73.4%), type of food like veg/non-veg (70.3%), brand (65.2%), taste

(63.3%), back of pack label (63.2%), front of pack label (61.4%), nutrition facts panel (58.9%), method of cooking/instructions (54.8%), pack size (50%), nutrition quality symbols (42.6%), discount/offer on the product (36.8%), recommended by someone (36%), information about allergens if any (30.8%), its popular (28.7%), attractive package (26.1%), their medical need (24.2%) and advertisement (24.2%).

Table 4.20 indicates the general perception of the study participants on processed packaged foods. Majority of them (51.5%) considered them unhealthy, followed by not sure (42.3%) and healthy (6.1%).

Table 4.21 indicates the perception of the study participants on whether the processed packaged foods are high in fat. Most of them (80.2%) considered processed packaged foods high in fat while 19.8% did not consider processed packaged foods high in fat (Fig.4.8).

Table 4.22 indicates the perception of the study participants on whether the processed packaged foods are high in salt. Most of them (77.1%) considered processed packaged foods high in salt while 22.8% did not consider processed packaged foods high in salt (Fig. 4.9).

Table 4.23 indicates the perception of the study participants on whether the processed packaged foods are high in sugar. Most of them (74.1%) considered processed packaged foods high in sugar while 25.9% did not consider processed packaged foods high in sugar (Fig. 4.10).

Table 4.24 indicates the effects that the study participants thought processed packaged foods had on an individual's health. Majority of them (90.8%) considered overweight and obesity as an effect caused by processed packaged foods, followed by diabetes (61.6%), hypertension (48.9%), heart attack (44.7%), stroke (42.1%), cancer (38.8%) and didn't effect (6.8%).

Table 4.25 indicates the perceptions of the study participants on whether the processed packaged foods that are high in fat can cause diseases or health problems. Most of them (80.2%) considered that processed packaged foods that are high in fat can cause disease or health problems while 17.9% did not consider that processed packaged foods that are high in fat can cause disease or health problems (Fi. 4.11).

Table 4.26 indicates the perceptions of the study participants on whether the processed packaged foods that are high in salt can cause diseases or health problems. Most of them (76.4%) considered that processed packaged foods that are high in salt can cause disease or health problems while 23.5% did not consider that processed packaged foods that are high in salt can cause disease or health problems (Fig. 4.12).

Table 4.27 indicates the perceptions of the study participants on whether the processed packaged foods that are high in sugar can cause diseases or health problems. Most of them (80.2%) considered that processed packaged foods that are high in sugar can cause disease or health problems while 19.8% did not consider that processed packaged foods that are high in sugar can cause disease or health problems (Fig. 4.13).

Table 4.19 Information that the study participants looked for while purchasing the processed packaged foods* (N=425)

Information that the study participants looked for while purchasing the processed packaged foods	n (%)
Front of Pack Label	261 (61.4)
Back of Pack Label	269 (63.2)
Nutrition Facts Panel	250 (58.9)
Nutrition Quality Symbols	181 (42.6)
Ingredients List	322 (75.8)
Method of cooking/Instructions	233 (54.8)
Attractive package	111 (26.1)
Its popular	122 (28.7)
Advertisement	103 (24.2)
Recommended by someone	153 (36)
Brand	277 (65.2)
Pack size	212 (50)
Discount/offer on the product	156 (36.8)
Their medical need	103 (24.2)
Information about allergens, if any	131 (30.8)
Taste	269 (63.3)
Price	312 (73.4)
Type of food (veg/non-veg)	299 (70.3)
Manufacture and best before date	349 (82.1)

*Value more than 100% due to multiple responses.

Table 4.20 Study participants' general perception of processed packaged foods (N=425)

General perception of processed packaged foods	n (%)
Healthy	26 (6.1)
Unhealthy	219 (51.5)
Not sure	180 (42.3)

Table 4.21 Study participants' perception on whether processed packaged foods are high in fat (N=425)

Processed packaged foods are high in fat	n (%)
Yes	341 (80.2)
No	84 (19.8)

Table 4.22 Study participants' perception on whether processed packaged foods are high in salt (N=425)

Processed packaged foods are high in salt	n (%)
Yes	328 (77.1)
No	97 (22.8)

Table 4.23 Study participants' perception on whether processed packaged foods are high in sugar (N=425)

Processed packaged foods are high in sugar	n (%)
Yes	315 (74.1)

No	110 (25.9)

Table 4.24 Effects that processed packaged foods had on an individual's health* (N=425)

Effects that processed packaged foods had on an individual's health	**n (%)**
May cause overweight and obesity	386 (90.8)
May lead to diabetes	262 (61.6)
May lead to hypertension	208 (48.9)
May lead to heart attack	190 (44.7)
May lead to stroke	179 (42.1)
May lead to cancer	165 (38.8)
Do not effect	29 (6.8)

*Value more than 100% due to multiple responses.

Table 4.25 Processed packaged foods that are high in fat can cause diseases or health problems (N=425)

Processed packaged foods that are high in fat can cause diseases or health problems	**n (%)**
Yes	341 (80.2)
No	76 (17.9)

Table 4.26 Processed packaged foods that are high in salt can cause diseases or health problems (N=425)

Processed packaged foods that are high in salt can cause diseases or health problems	**n (%)**

Yes	325 (76.4)
No	100 (23.5)

Table 4.28 indicates the frequency of the study participants seeing the processed packaged foods being advertised. Majority of them (34.6%) very often saw the processed packaged foods being advertised, followed by quite often (33.1%), from time to time (19.8%) and rarely (12.5%).

Table 4.29 indicates the places where the study participants see the processed packaged foods being advertised. Most of them (90.1%) saw the processed packaged foods being advertised on television, followed by internet (74.1%), public places like hoardings (62.1%), newspaper (52%) and radio (16.5%).

Table 4.30 indicates the effects on the study participants when they see processed packaged foods being advertised. Majority of them (59.5%) had no effects/neutral when they saw processed packaged foods being advertised, followed by they wanted to eat it even if they were not hungry (16.2%), they chose that product rather than other product (12.2%) and they bought it (12%).

Table 4.27 Processed packaged foods that are high in sugar can cause diseases or health problems (N=425)

Processed packaged foods that are high in sugar can cause diseases or health problems	n (%)
Yes	341 (80.2)
No	84 (19.8)

Table 4.28 Frequency of seeing processed packaged foods being advertised (N=425)

Frequency of seeing processed packaged foods being advertised	n (%)
Rarely	53 (12.5)
From time to time	84 (19.8)
Quite often	141 (33.1)
Very often	147 (34.6)

Table 4.29 Places where the processed packaged foods are seen being advertised* (N=425)

Particulars	n (%)
Television	383 (90.1)
Radio	70 (16.5)
Internet	315 (74.1)
Newspaper	221 (52)

Public places (hoardings)	264 (62.1)

*Value more than 100% due to multiple responses.

Table 4.30 Effects on the study participants when they see processed packaged foods being advertised (N=425)

Particulars	**n (%)**
They choose this product rather than other product	52 (12.2)
They want to eat it even if they are not hungry	69 (16.2)
They buy it	51 (12)
No effects/Neutral	253 (59.5)

Fig. 4.8 Study participants' perception on whether processed packaged foods are high in fat (N=425)

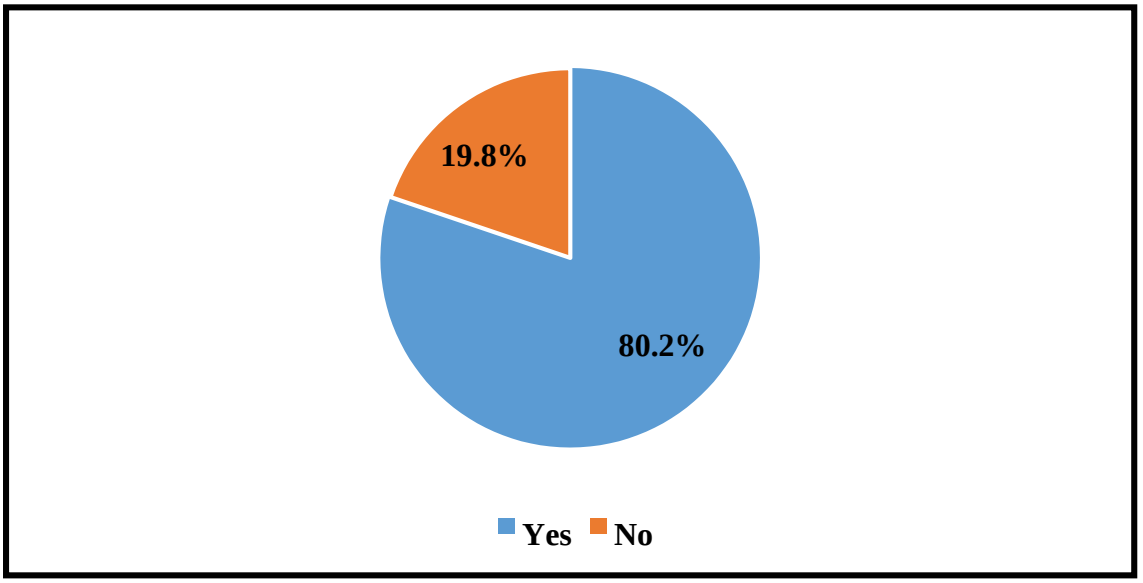


Fig. 4.9 Study participants' perception on whether processed packaged foods are high in salt (N=425)

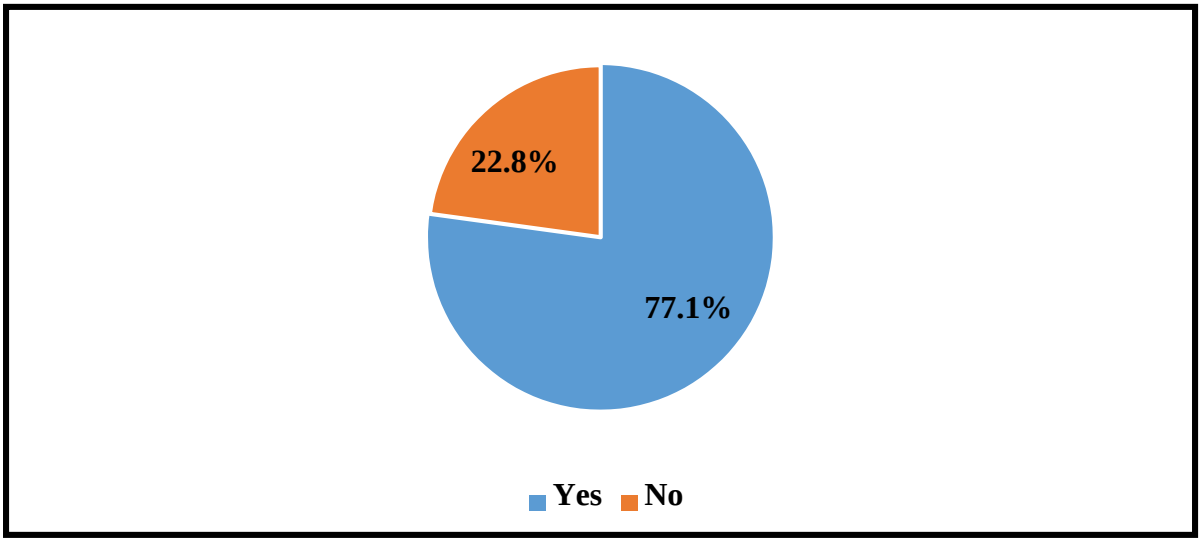


Fig 4.10 Study participants' perception on whether processed packaged foods are high in sugar (N=425)

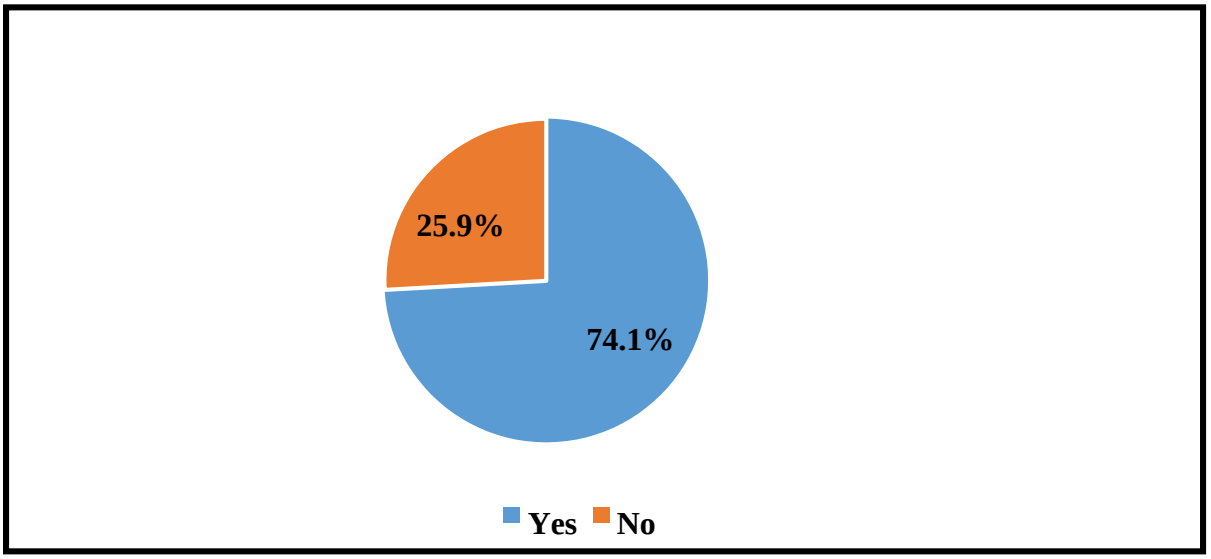


Fig. 4.11 Processed packaged foods that are high in fat can cause diseases or health problems (N=425)

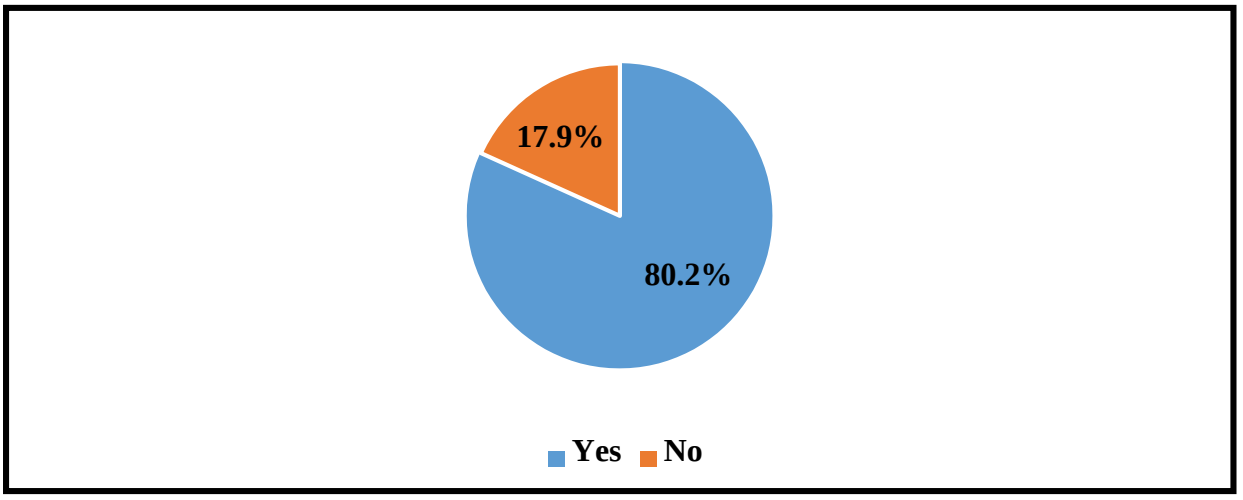


Fig. 4.12 Processed packaged foods that are high in salt can cause diseases or health problems (N=425)

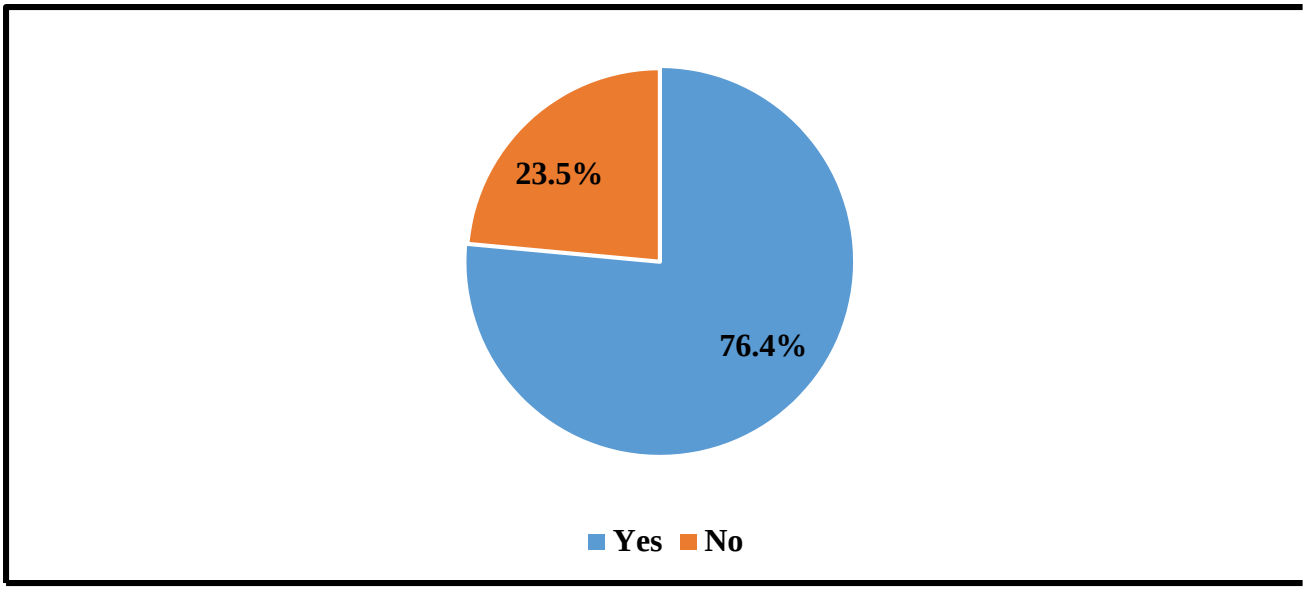


Fig. 4.13 Processed packaged foods that are high in sugar can cause diseases or health problems (N=425)

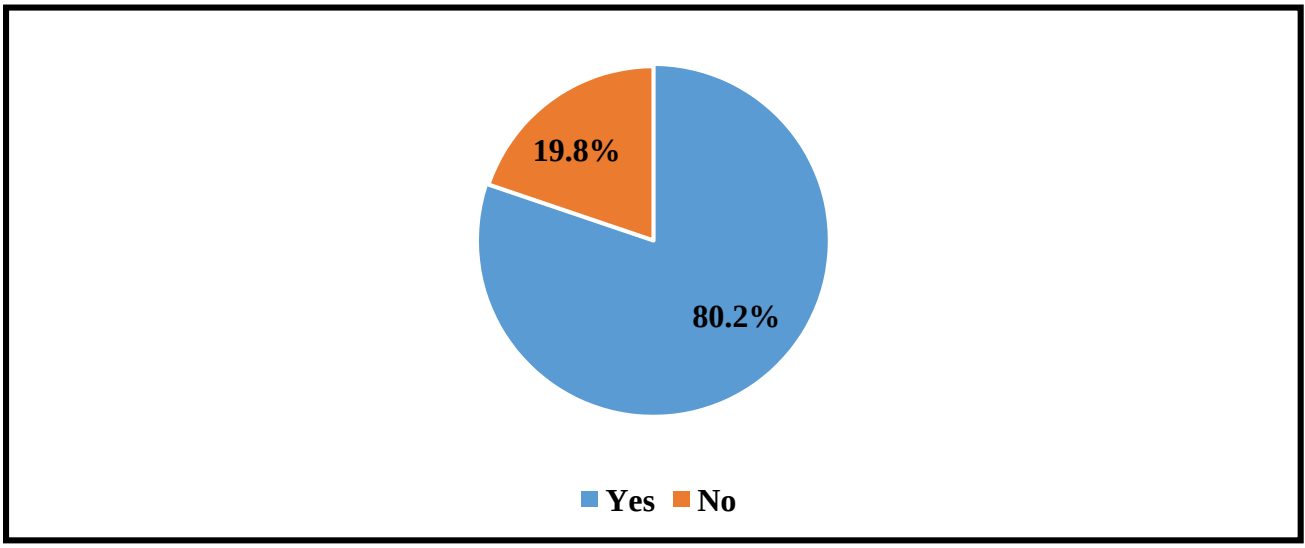


Table 4.31 indicates the perception of the study participants regarding Back of Pack Label. Most of them (82.3%) thought that the Back of Pack Label informed them that the processed packaged food is high in fat. Majority of them (71%) thought that the Back of Pack Label informed them that the processed packaged food is high in salt. Most of them (75.8%) thought that the Back of Pack Label informed them that the processed packaged food is high in sugar. Majority of them (58.1%) thought that the Back of Pack Label made them concerned about the health consequences of consuming the processed packaged foods. Most of them (50.3%) didn't think that the Back of Pack Label discouraged them from consuming the processed packaged food. Majority of them (56.2%) didn't think that the Back of Pack Label made the processed packaged food unpleasant to them. Most of them (68.5%) thought that the Back of Pack Label was easy for them to understand. Majority of them (60%) thought that the Back of Pack Label grabbed their attention. Most of them (87.8%) thought that they understood what the Back of pack Label meant. Majority of them (76.9%) thought that the Back of Pack Label had taught them something. Most of them (60.4%) thought that whatever the Back of pack Label said was true. Majority of them (85.4%) thought that they liked to have the Back of Pack Label on the processed packaged foods.

Table 4.32 indicates the perception of the study participants regarding the extent of information provided by Back of Pack Label. Most of them (57.6%) thought that the Back of Pack Label somewhat informed them that the processed packaged food is high in fat. Majority of them (54.3%) thought that the Back of Pack Label somewhat informed them that the processed packaged food is high in salt. Most of them (52.5%) thought that the Back of Pack Label somewhat informed them that the processed packaged food is high in sugar. Majority of them (47%) thought that the Back of Pack Label somewhat made them concerned about the health consequences of consuming the processed packaged foods. Most of them (44.2%) thought that the Back of Pack Label somewhat discouraged them from consuming processed packaged food. Majority of them (43.8%) thought that the Back of Pack Label somewhat made the processed packaged food unpleasant to them. Most of them (46.1%) thought that the Back of Pack Label was somewhat easy for them to understand. Majority of them (41.4%) thought that the Back of Pack Label somewhat grabbed their attention. Most of them (45.6%) thought that they very much understood what

Table 4.31 Participants' perception regarding Back of Pack Label (N=425)

SR NO.	Questions regarding Back of Pack Label	n (%)	
		Yes	No
1	It informs them that the processed packaged food is high in fat.	350 (82.3)	75 (17.6)
2	It informs them that the processed packaged food is high in salt.	302 (71)	123 (28.9)
3	It informs them that the processed packaged food is high in sugar.	322 (75.8)	103 (24.2)
4	It makes them concerned about the health consequences of consuming the processed packaged foods.	247 (58.1)	178 (41.9)
5	It discourages them from consuming the processed packaged food.	211 (49.6)	214 (50.3)
6	It makes the processed packaged food unpleasant to them.	186 (43.8)	239 (56.2)
7	It is easy for them to understand it.	291 (68.5)	134 (31.5)
8	It grabs their attention.	255 (60)	170 (40)
9	They understand what it means.	373 (87.8)	52 (12.2)
10	It has taught them something.	327 (76.9)	98 (23)
11	They think that what it says is true.	257 (60.4)	168 (39.5)
12	They like to have it on the processed packaged foods.	363 (85.4)	62 (14.6)

Table 4.32 Participants' perception regarding extent of information provided by Back of Pack Label (N=425)

SR NO.	Questions regarding Back of Pack Label	n (%)		
		Very much	**Somewhat**	**Very little**
1	It informs them that the processed packaged food is high in fat.	125 (29.4)	245 (57.6)	55 (12.9)
2	It informs them that the processed packaged food is high in salt.	100 (23.5)	231 (54.3)	94 (22.1)
3	It informs them that the processed packaged food is high in sugar.	126 (29.6)	223 (52.5)	76 (17.9)
4	It makes them concerned about the health consequences of consuming the processed packaged foods.	106 (24.9)	200 (47)	119 (28)
5	It discourages them from consuming the processed packaged food.	82 (19.3)	188 (44.2)	155 (36.5)
6	It makes the processed packaged food unpleasant to them.	67 (15.8)	186 (43.8)	172 (40.5)
7	It is easy for them to understand it.	146 (34.3)	196 (46.1)	83 (19.5)
8	It grabs their attention.	127 (29.9)	176 (41.4)	122 (28.7)
9	They understand what it means.	194 (45.6)	188 (44.2)	43 (10.1)
10	It has taught them something.	143 (33.6)	205 (48.2)	77 (18.1)
11	They think that what it says is true.	111 (26.1)	216 (50.8)	98 (23)
12	They like to have it on the processed packaged foods.	236 (55.5)	149 (35)	40 (9.4)

the Back of Pack Label meant. Majority of them (48.2%) thought that the Back of Pack Label somewhat taught them something. Most of them (50.8%) thought that they somewhat thought whatever the Back of Pack Label said was true. Majority of them (55.5%) thought that they very much liked to have the Back of Pack Label on the processed packaged foods.

Table 4.33 indicates the perception of the study participants regarding Front of Pack Label. Most of them (57.1%) thought that the Front of Pack Label would inform them that the processed packaged food is high in fat. Majority of them (56%) thought that the Front of Pack Label would inform them that the processed packaged food is high in salt. Most of them (58.6%) thought that the Front of Pack Label would inform them that the processed packaged food is high in sugar. Majority of them (60%) thought that the Front of Pack Label would make them concerned about the health consequences of consuming the processed packaged food. Most of them (50.1%) thought that the Front of Pack Label would discourage them from consuming the processed packaged foods. Majorityof them (59%) didn't think that the Front of Pack Label would make the processed packaged food unpleasant to them. Most of them (78.1%) thought that the Front of PackLabel would be easy for them to understand. Majority of them (80.2%) thought that theFront of Pack Label would grab their attention. Most of them (80%) thought that they would be able to understand what the Front of Pack Label means. Majority of them (70.3%) thought that the Front of Pack Label would have taught them something. Mostof them (62.6%) thought that they would think that whatever the Front of Pack Label says is true. Majority of them (82.1%) thought that they would like to have the Front ofPack Label on the processed packaged foods.

Table 4.34 indicates the perception of the study participants regarding extent of information provided by Front of Pack Label. Most of them (42.1%) thought that the Front of Pack Label would somewhat inform them that the processed packaged food is high in fat. Majority of them (40.2%) thought that the Front of Pack Label would somewhat inform them that the processed packaged food is high in salt. Most of them (41.9%) thought that the Front of Pack Label would inform them that the processed packaged food is high in sugar. Majority of them (42.8%) thought that the Front of Pack Label would somewhat make them concerned about the health consequences of consuming processed packaged foods. Most of them (41.9%) thought that the Front of

Pack Label would somewhat discourage them from consuming the processed packaged foods. Majority of them (42.8%) thought that the Front of Pack Label would very little make the processed packaged food unpleasant to them. Most of them (46.1%) thought that the Front of Pack Label would be very much easy for them to understand. Majority of them (49.4%) thought that the Front of Pack Label would very much grab their attention. Most of them (44.5%) thought that they would somewhat be able to understand what the Front of Pack Label means. Majority of them (45.4%) thought that the Front of Pack Label would have somewhat taught them something. Most of them (53.1%) thought that they would somewhat think whatever the Front of Pack Label says is true. Majority of them (46.8%) thought that they would very much like to have the Front of Pack Label on the processed packaged foods.

Table 4.35 indicates the comparison between Back of Pack Label and Front of Pack Label. Most of them (55.3%) considered the Back of Pack Label as the best way of informing them about the health effects of consuming processed packaged foods while the remaining (44.7%) considered the Front of Pack Label as the best way of informing them about the health effects of consuming processed packaged foods.

Table 4.33 Participants' perception regarding Front of Pack Label (N=425)

SR NO.	Questions regarding Front of Pack Label	n (%)	
		Yes	**No**
1	It would inform them that the processed packaged food is high in fat.	243 (57.1)	182 (42.8)
2	It would inform them that the processed packaged food is high in salt.	238 (56)	187 (44)
3	It would inform them that the processed packaged food is high in sugar.	249 (58.6)	176 (41.4)
4	It would make them concerned about the health consequences of consuming the processed packaged foods.	255 (60)	170 (40)
5	It would discourage them from consuming the processed packaged foods.	213 (50.1)	212 (49.9)
6	It would make the processed packaged food unpleasant to them.	174 (40.9)	251 (59)
7	It would be easy for them to understand it.	332 (78.1)	93 (21.9)
8	It would grab their attention.	341 (80.2)	84 (19.8)
9	They would be able to understand what it means.	340 (80)	85 (20)
10	It would have taught them something.	299 (70.3)	126 (29.6)

11	They would think that what it says is true.	266 (62.6)	159 (37.4)
12	They would like to have it on the processed packaged foods.	349 (82.1)	76 (17.9)

Table 4.34 Participants' perception regarding extent of information provided by Front of Pack Label (N=425)

SR NO.	Questions regarding Front of Pack Label	n (%)		
		Very much	**Somewhat**	**Very little**
1	It would inform them that the processed packaged food is high in fat.	104 (24.5)	179 (42.1)	142 (33.4)
2	It would inform them that the processed packaged food is high in salt.	105 (24.7)	171 (40.2)	149 (35)
3	It would inform them that the processed packaged food is high in sugar.	104 (24.5)	178 (41.9)	143 (33.6)
4	It would make them concerned about the health consequences of consuming the processed packaged foods.	111 (26.1)	182 (42.8)	132 (31)
5	It would discourage them from consuming the processed packaged foods.	88 (20.7)	178 (41.9)	159 (37.4)
6	It would make the processed packaged food unpleasant to them.	70 (16.5)	173 (40.7)	182 (42.8)
7	It would be easy for them to understand it.	196 (46.1)	166 (39)	63 (14.8)
8	It would grab their attention.	210 (49.4)	163 (38.3)	52 (12.2)
9	They would be able to understand what it means.	185 (43.5)	189 (44.5)	51 (12)
10	It would have taught them something.	142 (33.4)	193 (45.4)	90 (21.1)
11	They would think that what it says is true.	100 (23.5)	226 (53.1)	99 (23.3)
12	They would like to have it on the processed packaged foods.	199 (46.8)	167 (39.3)	59 (13.9)

Table 4.35 Comparison between Back of Pack Label and Front of Pack Label- study participants' responses (N=425)

Sr No.	Question	n (%)	
		Back of Pack Label	Front of Pack Label
1	The best way of informing them about the health effects of consuming processed packaged foods.	235 (55.3)	190 (44.7)

SUMMARY AND CONCLUSIONS

The present study was a cross-sectional study. It was undertaken to list the processed/ultra-processed packaged foods available in one superstore from each zone of Vadodara city, to know the consumers' frequency of consumption of processed/ultra-processed packaged foods, to evaluate the consumers' perceptions regarding the consumption of processed/ultra-processed packaged foods, to evaluate the consumers' perceptions regarding back of pack labelling and front of pack labelling, and to develop a manual for capacity building of consumers to facilitate them for making healthier choices.

The broad objective of the study was to evaluate consumers' perception and understanding of Food Labels for processed and ultra-processed packaged foods. The specific objectives of the study were:

- To evaluate the current status of labelling for processed/ ultra-processed packaged foods
- To conduct a consumers' survey for assessing their perception towards labelling and consumption of processed/ ultra-processed packaged foods
- To develop a manual for capacity building of consumers to make healthier choices.

The study was divided into three phases:

- Phase I-Market Survey
- Phase II-Consumer Survey
- Phase III-Development of Manual.

The **phase I** of the study included the market survey where:

- One superstore from each zone of Vadodara city was randomly selected.
- Listing of all processed and packaged foods across all brands was done.
- Assessment of labelling for each food was done.

The **phase II** of the study included consumer survey where:

- Purposive sampling (Snowball sampling) was done.

- Information was collected on socio-economic status, medical history, perception towards consumption of processed packaged foods and frequency of consumption of processed packaged foods, awareness regarding BoP and FoP labels.

The **phase III** of the study included the manual development.

- A manual for capacity building of consumers was developed to facilitate them for making healthier choices.

Highlights of the study

In Phase I-Market Survey, a total of 420 processed packaged foods were listed. Out of 420 processed packaged foods, 321 were in the solid category and 99 were in liquid category. The processed packaged foods from the solid category were further divided into 29 sub-categories and the processed packaged foods from the liquid category were further divided into 8 sub-categories.

- All of the processed packaged foods had ingredients list mentioned while most of the processed packaged foods had serving size and veg/non-veg symbol mentioned.
- Only 24% of the processed packaged foods had front of pack label mentioned. Very few packs had claims mentioned on their front of pack. Around 16.4% of the packs had minerals and vitamins as the claims mentioned on their front of pack.
- Only 24% of the processed packaged foods had Calories/Energy as the RDA related information mentioned on their front of pack. Very few packs had other information mentioned on their front of pack.
- Around 4.9% of the packs had no maida and 100% suji/rawa or made from suji/rawa as the other information mentioned on their front of pack.
- All of the processed packaged foods had Back of Pack Label mentioned. Around 42.8% of the packs had Veg and FSSAI as their symbols and logos mentioned on their back of pack. Half of the packs had allergen information mentioned.
- All of the packs had Nutrition Facts Panel mentioned. Very few packs had information on colours while half of the packs had information on flavours and

only 16.2% had information on preservatives mentioned. All of the packs had manufacture date and best before date mentioned.

- Very few packs had other information mentioned on their back of pack. Around 2.1% of the packs had no MSG and No maida as the other information mentioned on their back of pack.
- Only 9.5% of the packs had nutrient claims mentioned. Around 7.9% of the packs had minerals and vitamins as the nutrient claims. Only 3.3% of the packs had health claims mentioned. Around 2.4% of the packs had supports immunity as the health claim.

In Phase II-Consumer Survey, 425 subjects were enrolled in the study.

- Majority of the subjects were in the age group of 20-<25 years of age. Most of the subjects were females.
- Majority of the subjects were unmarried. Most of the subjects were Hindu. Majority of the subjects had English as their language.
- Most of the subjects were graduate. Majority of the subjects were students. Most of the subjects had nuclear families.
- The mean height, weight and BMI of the males was found to be higher than the females. Half of the subjects had normal BMI. Around 19.5% of the subjects that were in age group 20-<25 years were found to have a normal BMI. Around 51.9% of the subjects that were in the normal BMI purchased processed packaged foods. Most of the study participants did not have any major health concern.
- Nearly two third of the subjects reported of their parents or grandparents having diabetes. Around half of them reported of their parents or grandparents having hypertension. Occurrence of other health issues was comparatively low.
- Very few subjects took medications and had substance abuse. Around 2.1% of the subjects had smoking cigarettes and alcohol consumption as their substance abuse.
- More than one-fifth of the subjects were consuming cornflakes, oats and muesli at least once a week while around one-fourth subjects consumed noodles, pasta and macaroni at least once a week.
- A higher percentage of subjects consumed salty/sweet biscuits at least once a week.

- A lesser number of people however reported sweet cream biscuits/wafers. Around 15% subjects reported to be consuming confectionary hard candy at least once a week while around one fifth of the subjects reported consuming confectionary soft candy.
- Consumption of cheese and butter was reported by 36% and 44% at least once a week respectively. Ready to cook foods were consumed by nearly one fourth of the subjects atleast once a week.
- Around one third of the subjects were using ready to use spice mixes (dry) atleast once a week while around 14% used it on a daily basis.
- Ketchups and sauces were consumed by more than one third of the subjects atleast once a week.
- Consumption of namkeens and savouries were very high with almost one fifth of the subjects reporting to consume it on atleast alternate days. One fourth of the subjects reported consuming extruded puffed flavored foods atleast once a week while One third of the people had potato chips at the same frequency.
- Consumption of malted beverages and soft drinks was comparatively lesser however, around one fourth of the subjects reported having juices at least once a week.
- Majority of the subjects purchase processed packaged foods. Most of thesubjects reported availability followed by taste and convenience as major reasons for purchase of Processed Packaged Foods. Taste followed by shelf life were considered as more important factors influencing purchase of Processed Packaged Foods compared to food safety and nutrient content.
- Around 63.2% of the subjects looked for Back of Pack Label while purchasing processed packaged foods, and around 61.4% of the subjects looked for Front of Pack Label while purchasing processed packaged foods. Half of the subjects reported processed packaged foods as unhealthy.
- Majority of the subjects reported that the processed packaged foods were high in fat, salt and sugar. Most of the subjects reported overweight and obesity as an effect that processed packaged foods had on an individual's health.
- Majority of the subjects reported that the processed packaged foods that are high in fat, salt and sugar can cause diseases or health problems.

- Majority of the subjects very often saw the processed packaged foods being advertised. Around 90.1% of the subjects saw the processed packaged foods being advertised on television while 16.5% saw them being advertised on radio.
- Majority of the subjects had no effects/neutral when they saw processed packaged foods being advertised.
- Participants' perceptions were analyzed to see how much they could understand from BOPLs. It was observed that although they reported of information being received from BOPL, the extent of information understood was low.
- Participants' perceptions were analyzed to see how much they could understand from FOPLs. It was observed that although they reported of information being received from FOPL, the extent of information understood was low.
- Around 55.3% of the study participants considered the Back of Pack Label as the best way of informing them about the health effects of consuming processed packaged foods while only 44.7% considered the Front of Pack Label as the best way of informing them about the health effects of consuming processed packaged foods.
- As shown in Fig 5.1 most of the study participants (82.1%) looked for manufacture date and best before date while purchasing processed packaged foods, followed by ingredients list (75.8%), price (73.4%), type of food like veg/non-veg (70.3%), brand (65.2%), taste (63.3%), BOPL (63.2%) and FOPL (61.4%).

In **Phase III-Development of Manual**, the manual was developed for the consumers to make them understand the meaning of processed/ultra-processed foods, the transitioning packaged food consumption patterns, the role of food labels in reducing consumption of processed/ultra-processed foods, the information present on the processed packaged foods, Back of Pack Labels and Front of Pack Labels.

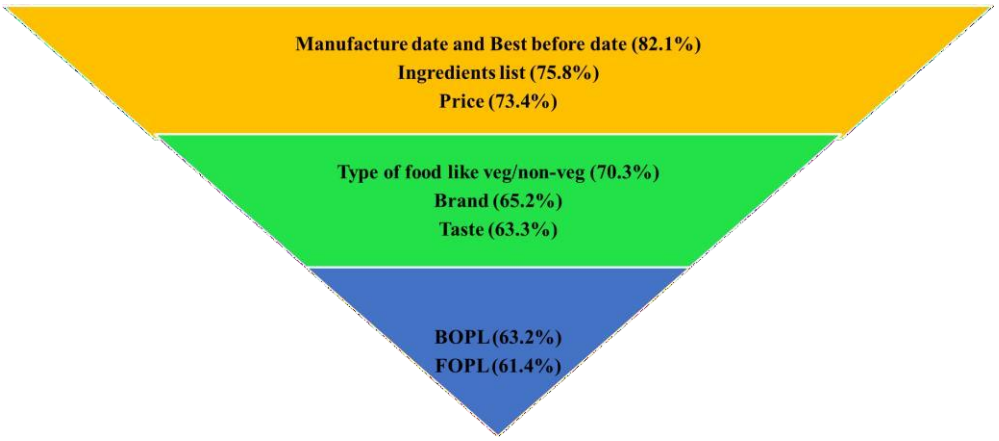
Conclusion

- Overall unhealthy food consumption is increasing especially amongst young children.
- There is a strong need to educate consumers about labels so that they can understand the information behind it and use it for making healthier food choices.

Recommendation

Future long-term studies need to be conducted on consumer education and behaviour change using strategic communication.

Fig 5.1: Desired information while purchasing the processed packaged foods



Limitations of the present study

- Inability to Connect with People as data was collected using online platform
- A manual was developed to help consumers make healthy choices. However, due to paucity of time and intervention could not be carried out using the same.

Generalisability

Since snowball, sampling was used for collection of data. Therefore, there are chances of bias as people using smartphones and having access to online forms could only answer the questions.

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Appendix I

Ethical Compliance Certificate

Institutional Ethics
Committee for Human
Research
(IECHR)

FACULTY OF FAMILY AND COMMUNITY SCIENCES
THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA

Ethical Compliance Certificate 2022 – 2023

This is to certify that Ms. Arushi Loiwal's study titled, "**Evaluating consumers' Perceptions and Understanding of Food Labels for processed/ultra-processed packaged foods**" from Department of Foods and Nutrition has been approved by the Institutional Ethics Committee for Human Research (IECHR), Faculty of Family and Community Science, The Maharaja Sayajirao University of Baroda. The study has been allotted the ethical approval number **IECHR/FCSc/MSc/2022/31.**

Prof Mini Sheth
Member Secretary
IECHR

Prof Shagufa Kapadia
Chairperson
IECHR

Appendix II

Informed Consent Form

Study title: Evaluating consumers' perception and understanding of front of pack labels

Research Guide
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Purpose of the study

Worldwide, poor diets are responsible for more deaths than any other risk factor, and are the leading cause of non-communicable diseases (NCDs). In India, over the past several decades due to diet/nutrition transformation, the problem of diet-related NCDs is growing, which affects all population groups (rich-poor and young-old population). There has been a significant growth in availability, accessibility, and consumption of ultra-processed foods (ready-to-eat or ready-to-heat) that are high in fat, salt, and sugar. Evidence suggests excessive consumption of these foods is associated with increased risk of obesity and related NCDs.

Front of Pack Labelling has been successfully implemented in few countries and can be one of the effective strategies to address NCDS. Since FoPL regulations have been announced in India by FSSAI in September 2022, there is a strong need to understand consumers' perception towards the need of FoPL and also the understanding of FoPL in India. Thus, the present study is designed to evaluate the consumers' views towards consumption of processed packaged foods and to evaluate consumers' perception and understanding of FoPL.

Protocol of the study

This survey is a part of Masters dissertation. The information collected will be purely for research work. The personal information will be kept strictly confidential. We request you to kindly spare your valuable time and complete the questionnaire.
The survey is conducted to assess the following:-

1. Socio-economic status and medical history of the consumers.
2. Consumers' perception towards consumption of processed packaged foods.
3. Frequency of consumption of processed packaged foods by the consumers.
4. Awareness among the consumers regarding Back of Pack Labelling and Front of Pack Labelling.

The survey is an attempt to assess the most frequently consumed processed foods among the consumers along with their perceptions regarding consuming these foods as well as their awareness regarding food labelling.

Participants' statement

I confirm that I have read and understood the above information and have/had the opportunity to ask questions.

I understand that my participation in this study is voluntary and I am free to reject being a part of the study, without giving any reason.

I understand that my identity will not be revealed in any information to third parties or published.

I have been told that no money will be offered to me for participating in the study

I voluntarily agree to participate in the study conducted by Ms Arushi V Loiwal from the Dept of Foods and Nutrition, Faculty of Family and Community Sciences, the Maharaja Sayajirao University of Baroda.

I_____give my consent to participate in the study.

(Name of the participant)

Date:

Place: **Signature of the participant**

Appendix III
QUESTIONNAIRE

BACKGROUND INFORMATION:

1) Name:-
2) Date of Birth:-
3) Age:-
4) Gender:-

a) Male b) Female c) Other

5) Place of residence (city/town/village):-
6) Mobile No.:-
7) Email Id:-
8) Marital Status:-
   a) Unmarried
   b) Married
   c) Divorcee
   d) Widow/Widower
9) Religion:-
   a) Hindu
   b) Muslim
   c) Sikh
   d) Christian
   e) Jain
   f) Others
10) Language:-
   a) English
   b) Hindi
   c) Gujarati
   d) Others
11) Education :-
   a) Professional
   b) Graduate
   c) Post-High School Diploma
   d) Higher secondary
   e) Middle school certificate
   f) Illiterate
12) Occupation:-
   a) Business
   b) Service
   c) Self-employed
   d) Student
   e) Labourer
   f) Retired
   g) Unemployed
   h) Housewife
13) No. of Family Members:-
14) Type of Family:-
   a) Nuclear
   b) Joint
   c) Extended
15) Monthly Family Income (in Rs.) (Approx.):-

MEDICAL AND FAMILY HISTORY:

1) Family History:-

TYPE	SELF	MOTHER	FATHER	SIBLING	GRANDPARENTS
Diabetes					
Hypertension					
Coronary Heart Disease					
Hyperlipidemia					
Stroke					

Hypo/Hyperthyroidism					
Asthma					
Cancer					
Any other					

2) Are you on medications presently?
a) Yes b) No
3) If yes, then specify which medications are you taking presently?
4) Do you have any addictions, such as smoking cigarettes, alcohol consumption, tobacco chewing, etc?
   a) Yes b) No
5) If yes, then which addictions do you have?
   a) Smoking cigarettes c) Tobacco chewing
   b) Alcohol consumption d) Others
6) What is your height (in feet)?
7) What is your weight (in kg)?

FREQUENCY OF CONSUMPTION OF PROCESSED PACKAGED FOODS

Sr No.	Food items	Frequency of consumption of processed packaged foods							
		Daily	Alternate days	Weekly	Fortnightly	Monthly	Once in 3 months	Rarely/ Occasionally	Never
1	Cornflakes, oats and muesli								
2	Noodles, pasta and macaroni								
3	Salty Biscuits								
4	Sweet Biscuits								
5	Sweet cream biscuits								
6	Sweet cream wafers								
7	Confectionary hard candy								
8	Confectionary soft candy								
9	Cakes (slices)								
10	Canned fruits								
11	Jams,marmalades and jellies								

12	Cheese								
13	Butter								
14	Ready to cook foods (g) (for eg:- instant noodles, instant pasta, instant dosa, instant idli, instant poha, instant upma, instant dhokla,etc)								
15	Ready to use spice mixes (dry)								
16	Ready to use spice mixes (paste)								
17	Ready to make cake and ice cream mixes								
18	Ready to eat sweets (g) (for eg:- Rasgolla, Gulab Jamun,Soan Papdi, Kaju Katri,etc)								
19	Soup powders								
21	Pickles salty								
22	Pickles sweet								
23	Papads								
24	Namkeen and savouries								
25	Extruded puffed flavoured snacks (for eg:- Kurkure, Too Yum,etc)								
26	Nachos								
27	Potato Chips								
28	Popcorn								
29	Cereal and milk based baby foods								
30	Spreads and dips								

31	Malted beverages								
32	Soft drinks								
33	Energy drinks								
34	Juices								
35	Squashes								
36	Chutneys								
37	Ketchups and sauces								

CONSUMERS' PERCEPTION TOWARDS CONSUMPTION OF PROCESSED PACKAGED FOODS:

1) Do you purchase processed packaged foods?

a) Yes

b) No

2) Why do you purchase processed packaged foods?

Reason	Don't agree at all	Don't agree very much	Tend to agree	Agree very much
It's convenient				
Affordable				
Tasty				
Easily available				
The servings are larger				

3) When you purchase the processed packaged foods, how important are the following factors:-

Sr No.	Factor	Not at all important	Not too important	Somewhat important	Very important
a)	How safe is the processed packaged food to eat?				
b)	Nutrient content of the processed packaged food				
c)	Price of the processed packaged food				
d)	Shelf life of the processed packaged food				

e)	How easy is the processed packaged food to prepare?				
f)	Taste of the processed packaged food				

4) What information do you look for while purchasing the processed packaged food?

a) Front of Pack Label
b) Back of Pack Label
c) Nutrition Facts Panel
d) Nutrition quality symbols
e) Ingredients List
f) Method of cooking/instructions
g) Attractive package
h) Its popular
i) Advertisement
j) Recommended by someone
k) Brand
l) Pack size
m) Discount/offer on the product
n) Your medical need
o) Information about allergens if any
p) Taste
q) Price
r) Type of food (veg/ non-veg)
s) Manufacture and best before date

5) How do you see processed packaged foods?

a) Healthy
b) Unhealthy
c) Not sure

6) Can you name some of the processed packaged foods that are healthy?
7) Can you name some of the processed packaged foods that are unhealthy?
8) Do you know that processed packaged products are high in fat?

a) Yes
b) No

9) If yes, can you name some of the processed packaged foods that are high in fat?
10) Do you know that processed packaged foods are high in salt?

a) Yes
b) No

11) If yes, can you name some of the processed packaged foods that are high in salt?
12) Do you know processed packaged foods are high in sugar?

a) Yes
b) No

13) If yes, can you name some of the processed packaged foods that are high in sugar?
14) According to you, what effect do processed packaged foods have on an individual's health?

a) May cause overweight and obesity
b) May lead to diabetes
c) May lead to hypertension
d) May to heart attack
e) May lead to stroke
f) May lead to cancer
g) Do not effect

15) Do you know that processed packaged foods that are high in fat can cause diseases or health problems?

a) Yes
b) No

16) If yes, can you name the diseases or health problems caused by eating processed packaged foods that are high in fat?
17) Do you know that processed packaged foods that are high in salt can cause diseases or health problems?

a) Yes
b) No

18) If yes, can you name the diseases or health problems caused by eating processed packaged foods that are high in salt?
19) Do you know that processed packaged foods that are high in sugar can cause

diseases or health problems?

a) Yes b) No

20) If yes, can you name the diseases or health problems caused by eating processed packaged foods that are high in sugar?

21) In your daily life, how frequently do you see processed packaged foods being advertised?

a) Rarely c) Quite often

b) From time to time d) Very often

22) Where do you see processed packaged foods being advertised?

a) On television d) Newspaper

b) On radio e) Public places (Hoardings)

c) On the internet

23) When you see processed packaged foods being advertised, what do you feel?

a) You choose this product rather than another product

b) You want to eat it even if you are not hungry

c) You buy it

d) No effects/Neutra

CONSUMERS' PERCEPTION REGARDING BACK OF PACK LABEL:

1) Does Back of Pack Label inform you that the processed packaged food is high in fat?
a) Yes b) No
2) How much does Back of Pack Label inform you that the processed packaged food is high in fat?
a) Very much b) Somewhat c) Very little
3) Does Back of Pack Label inform you that the processed packaged food is high in salt?
a) Yes b) No
4) How much does Back of Pack Label inform you that the processed packaged food is high in salt?
a) Very much b) Somewhat c) Very little
5) Does Back of Pack Label inform you that the processed packaged food is high in sugar?
a) Yes b) No
6) How much does Back of Pack Label inform you that the processed packaged food is high in sugar?
a) Very much b) Somewhat c) Very little
7) Does Back of Pack Label make you concerned about the health consequences of consuming the processed packaged food?
a) Yes b) No
8) How much does the Back of Pack Label make you concerned about the health consequences of consuming the processed packaged foods?
a) Very much b) Somewhat c) Very little
9) Does Back of Pack Label discourage you from consuming the processed packaged food?
a) Yes b) No
10) How much does the Back of Pack Label make you discouraged from consuming the processed packaged food?
a) Very much b) Somewhat c) Very little
11) Does the Back of Pack Label make the processed packaged food unpleasant to you?
a) Yes b) No
12) How much does the Back of Pack Label make the processed packaged food unpleasant to you?
a) Very much b) Somewhat c) Very little
13) Is Back of Pack Label easy to understand?
a) Yes b) No
14) How much is the Back of Pack Label easy to understand?
a) Very much b) Somewhat c) Very little
15) Does Back of Pack Label grab your attention?
a) Yes b) No
16) How much does the Back of Pack Label grab your attention?
a) Very much b) Somewhat c) Very little
17) Do you understand what the Back of Pack Label means?
a) Yes b) No
18) How much do you understand what the Back of Pack Label means?
a) Very much b) Somewhat c) Very little
19) Has the Back of Pack Label taught you anything?
a) Yes b) No
20) How much has the Back of Pack Label taught you?
a) Very much b) Somewhat c) Very little
21) Do you think what Back of Pack Label says is true?

a) Yes b) No

22) How much do you think what the Back of Pack Label says is true?

a) Very much b) Somewhat c) Very little

23) Do you like to have the Back of Pack Label on the processed packaged foods?

a) Yes b) No

24) How much do you like to have the Back of Pack Label on the processed packaged foods?

a) Very much b) Somewhat c) Very little

CONSUMERS' PERCEPTION REGARDING FRONT OF PACK LABEL:

1) Will the Front of Pack Label inform you that the processed packaged food is high in fat?

a) Yes b) No

2) How much would the Front of Pack Label inform you that the processed packaged food is high in fat?

a) Very much b) Somewhat c) Very little

3) Will the Front of Pack Label inform you that the processed packaged food is high in salt?

a) Yes b) No

4) How much would the Front of Pack Label inform you that the processed packaged food is high in salt?

a) Very much b) Somewhat c) Very little

5) Will the Front of Pack Label inform you that the processed packaged food is high in sugar?

a) Yes b) No

6) How much would the Front of Pack Label inform you that the processed packaged food is high in sugar?

a) Very much b) Somewhat c) Very little

7) Will the Front of Pack Label make you concerned about the health consequences of consuming the processed packaged food?

a) Yes b) No

8) How much would the Front of Pack Label make you concerned about the health consequences of consuming the processed packaged foods?

a) Very much b) Somewhat c) Very little

9) Will the Front of Pack Label discourage you from consuming the processed packaged food?

a) Yes b) No

10) How much would the Front of Pack Label make you discouraged from consuming the processed packaged food?

a) Very much b) Somewhat c) Very little

11) Will the Front of Pack Label make the processed packaged food unpleasant to you?

a) Yes b) No

12) How much would the Front of Pack Label make the processed packaged food unpleasant to you?

a) Very much b) Somewhat c) Very little

13) Will the Front of Pack Label be easy to understand?

a) Yes b) No

14) How much would the Front of Pack Label easy to understand?

a) Very much b) Somewhat c) Very little

15) Will the Front of Pack Label grab your attention?

a) Yes b) No

16) How much would the Front of Pack Label grab your attention?

a) Very much b) Somewhat c) Very little

17) Will you understand what the Front of Pack Label means?

a) Yes b) No

18) How much would you understand what the Front of Pack Label means?

a) Very much b) Somewhat c) Very little

19) Will the Front of Pack Label teach you anything?

a) Yes b) No

20) How much would the Front of Pack Label teach you anything?

a) Very much b) Somewhat c) Very little

21) Will you think what the Front of Pack Label says is true?

a) Yes b) No

22) How much would you think what the Front of Pack Label says is true?

a) Very much b) Somewhat c) Very little

23) Will you like to have the Front of Pack Label on the processed packaged foods?

a) Yes b) No

24) How much would you like the Front of Pack Label on the processed packaged foods?

a) Very much b) Somewhat c) Very little

25) What according to you is the best way of informing you about the health effects of consuming processed packaged foods?

a) Back of Pack Label

b) Front of Pack Label

Appendix IV

Manual

KNOW YOUR FOOD LABELS

A GUIDE

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THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA

What are processed packaged foods?

The processed packaged foods are those foods that are high in total fat, saturated fats, trans fats, salt, sodium, total sugar and added sugar. These foods are usually low in carbohydrates, proteins, monounsaturated fats, polyunsaturated fats, vitamins, minerals and fibre.

How the consumption patterns are changing leading to poor health?

Nowadays, the consumption patterns of people have shifted from consuming healthy diets to unhealthy diets which is leading to poor health. An unhealthy diet is the diet that does not maintain or improve overall health. An unhealthy diet does not provide the body with essential nutrition such as macronutrients and micronutrients, adequate fibre, energy and fluid. An unhealthy diet is rich in sugar, salt and fats. An unhealthy diet is one of the major risk factors for a range of chronic diseases, including cardiovascular diseases, cancer, diabetes and other conditions linked to obesity.

What is a Food Label?

The information on a food product that is visible to the consumer, or average person, is called a food label. A food label is defined as any tag, brand, mark, or visual representation of a food or any other descriptive information that is printed, stencilled, stamped, embossed, or otherwise imprinted on, affixed to, a food container or food product.

To encourage the sale of the food, this information may also be placed on or around the product. The term "label" refers to any tag, brand, mark, pictorial, or other descriptive material that is printed, stencilled, marked, embossed, or impressed on or connected to a food container. Any written, printed, or graphic material that appears on the label, is attached to the food, or is exhibited next to the food is referred to as "labelling". This includes material intended to promote the sale or disposal of the food.

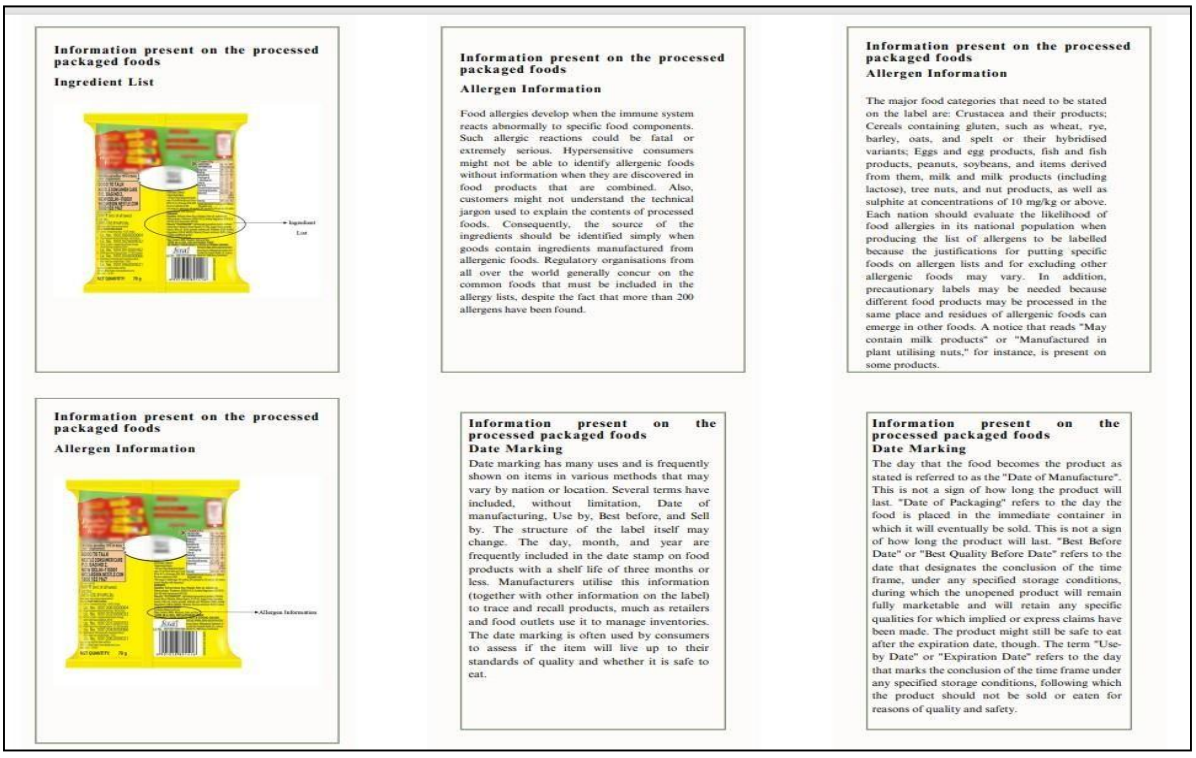
How can labelling help?

Labelling can help people understand the amount of nutrients present in the processed packaged foods. Labelling can help reduce the consumption of the processed packaged foods by informing the people about the amount of harmful nutrients present in these foods. The labelling provides the information on the amount of energy, carbohydrates, proteins, fats, vitamins and minerals present in the processed packaged foods. The labelling also provides the information on the amount of sugars, salt/sodium, transfat, saturated fat and cholesterol.

Information present on the processed packaged foods

Ingredient List

The ingredient list provides information to customers about the ingredients that went into making the food item. It is advised that a list of components with specific names be required on the product label, with the exception of goods with a single ingredient (for instance, milk, salt). The ingredients may be listed in the reconstituted food in proportional order if the food is dehydrated or condensed. Ingredients of the product when produced in accordance with the label's instructions must be mentioned. Since broad class names can be more helpful, they may be used in the components list. For instance, "milk protein" can be used to indicate milk products containing at least 50% protein, while "sugar" can be used to describe all varieties of sucrose.



Information present on the processed packaged foods

Ingredient List

Information present on the processed packaged foods

Allergen Information

Food allergies develop when the immune system reacts abnormally to specific food components. Such allergic reactions could be fatal or extremely serious. Hypersensitive consumers might not be able to identify allergenic foods without information when they are discovered in food products that are combined. Also, customers might not understand the technical jargon used to explain the contents of processed foods. Consequently, the source of the ingredients should be identified simply when goods contain ingredients manufactured from allergenic foods. Regulatory organisations from all over the world generally concur on the common foods that must be included in the allergy lists, despite the fact that more than 200 allergens have been found.

Information present on the processed packaged foods

Allergen Information

The major food categories that need to be stated on the label are: Crustacea and their products; Cereals containing gluten, such as wheat, rye, barley, oats, and spelt or their hybridised variants; Eggs and egg products, fish and fish products, peanuts, soybeans, and items derived from them, milk and milk products (including lactose), tree nuts, and nut products, as well as sulphite at concentrations of 10 mg/kg or above. Each nation should evaluate the likelihood of food allergies in its national population when producing the list of allergens to be labelled because the justifications for putting specific foods on allergen lists and for excluding other allergenic foods may vary. In addition, precautionary labels may be needed because different food products may be processed in the same place and residues of allergenic foods can emerge in other foods. A notice that reads "May contain milk products" or "Manufactured in plant utilising nuts," for instance, is present on some products.

Information present on the processed packaged foods

Allergen Information

Information present on the processed packaged foods
Date Marking

Date marking has many uses and is frequently shown on items in various methods that may vary by nation or location. Several terms have included, without limitation, Date of manufacturing, Use by, Best before, and Sell by. The structure of the label itself may change. The day, month, and year are frequently included in the date stamp on food products with a shelf life of three months or less. Manufacturers utilise this information (together with other information on the label) to trace and recall products, much as retailers and food outlets use it to manage inventories. The date marking is often used by consumers to assess if the item will live up to their standards of quality and whether it is safe to eat.

Information present on the processed packaged foods
Date Marking

The day that the food becomes the product as stated is referred to as the "Date of Manufacture". This is not a sign of how long the product will last. "Date of Packaging" refers to the day the food is placed in the immediate container in which it will eventually be sold. This is not a sign of how long the product will last. "Best Before Date" or "Best Quality Before Date" refers to the date that designates the conclusion of the time frame, under any specified storage conditions, during which the unopened product will remain fully marketable and will retain any specific qualities for which implied or express claims have been made. The product might still be safe to eat after the expiration date, though. The term "Use-by Date" or "Expiration Date" refers to the day that marks the conclusion of the time frame under any specified storage conditions, following which the product should not be sold or eaten for reasons of quality and safety.

Information present on the processed packaged foods

Date Marking

Information present on the processed packaged foods

Veg Symbol

Packaged vegetarian foods should have a symbol that consists of a green colour-filled circle inside a square green.

Information present on the processed packaged foods

Non-veg Symbol

All packaged foods that are "Non-Vegetarian" must have a symbol that is a brown colour-filled triangle inside a square with a brown outline. If a food contains only egg as a non-vegetarian ingredient, then the manufacturer may provide a declaration that the product contains only egg and add the non-vegetarian symbol.

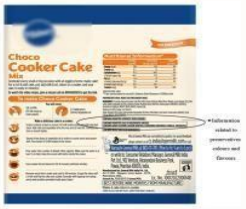
Information present on the processed packaged foods

Information related to preservatives, colours, and flavours

The preservatives are added to the food product to increase its shelf life. Colours are added to the food product to improve its appearance. A remark like "CONTAINS PERMITTED PRESERVATIVES" should be included just below the list of ingredients on the label should be mentioned. Just below the list of ingredients on the label, a remark like "CONTAINS PERMITTED NATURAL COLOUR(S)" should be mentioned and indicate that colouring matter has been included. A remark like "CONTAINS ADDED FLAVOR" should appear right below the list of ingredients on the label if an additional flavouring agent is used.

Information present on the processed packaged foods

Information related to preservatives, colours, and flavours



Information present on the processed packaged foods

Name and Complete Address of the Manufacturer

Every food package must include the manufacturer's name and complete address. While importing food, the name and complete address of the importer in India must be listed on the package.

Information present on the processed packaged foods

Serving Size

The serving size is given as the number of servings per container/packet or the weight/volume in g/ml.

Information present on the processed packaged foods

Net Weight/Net Quantity

The net weight/net quantity of the packet is the total amount of product contained in the packet.

Information present on the processed packaged foods

Instructions for Use

To guarantee the proper use of the food, the label should, if necessary, give instructions for use, including reconstitution.

Health Claim

Health claim means any representation that states, suggests, or implies that a relationship exists between a food or a constituent of that food and health. Examples of health claims are as follows:- supports immunity, reduces blood pressure, reduces cholesterol, maintains weight/stay in shape, brain development, provides energy, healthy bones, fluids and electrolytes, healthy muscles, healthy blood, height gain and weight gain.

Nutrient Claim

Nutrient claim means any representation which states, suggests or implies that a food has particular nutritional properties including but not limited to the energy value and to the content of protein, fat and carbohydrates, as well as the content of vitamins and minerals. Examples of nutrient claims are as follows:- calcium/iron/minerals, vitamins, zero trans fat, protein, contains added sodium/potassium, no cholesterol, fibre, low sodium, energy, less fat, plant based energy and Beta Glucan.

Know more about the health claims mentioned on the processed packaged foods

1) Supports immunity: The health claim "supports immunity" means that the food product can help the body to fight against any infection or disease that is caused by a pathogen or a foreign substance.
2) Reduces blood pressure: The health claim "reduces blood pressure" means that the food product can help in decreasing the risk of developing high blood pressure which is also known as hypertension.
3) Reduces cholesterol: The health claim "reduces cholesterol" means that the food product can help in decreasing the risk of developing high levels of cholesterol in blood which is also known as hypercholesterolemia.
4) Maintains weight/stay in shape: The health claims "maintains weight" or "stay in shape" mean that the food product can help in weight management and keeping a person fit and fine. This in turn can reduce the risk of developing obesity which can further lead to reduction in the risk of developing diseases such as Diabetes Mellitus, Hypertension, and Cardio-Vascular Diseases.
5) Provides energy: The health claim "provides energy" means that the food product can provide the body with energy which can help a person in completing his/her daily tasks.
6) Healthy bones: The health claim "healthy bones" means that the food product can help in keeping the bones strong and can reduce the risk of developing osteopenia and osteoporosis.

Know more about the health claims mentioned on the processed packaged foods

7) Brain development: The health claim "brain development" means that the food product can help in the normal growth of the brain as well as the nervous system and help in reducing the risk of developing neurological disorders.
8) Fluids and electrolytes: The health claim "fluids and electrolytes" means that the food product can maintain the fluid and electrolyte balance in the body and can help in controlling the conditions such as dehydration and diarrhoea.
9) Healthy muscles: The health claim "healthy muscles" means that the food product can help in keeping the muscles strong and can reduce the risk of developing muscular disorders.
10) Healthy blood: The health claim "healthy blood" means that the food product can help blood perform its normal functions, for example, to supply oxygen as well as nutrients to the cells and to remove carbon dioxide as well as metabolic waste products from the cells.
11) Height gain: The health claim "height gain" means that the food product can help in increasing height and reduce the risk of developing stunting (low height for age).
12) Weight gain: The health claim "weight gain" means that the food product has can help in increasing weight and reduce the risk of developing underweight (low weight for age).

Know more about the nutrient claims mentioned on the processed packaged foods

1) Calcium/iron/minerals: The nutrient claim "calcium/iron/minerals" means that the food product contains minerals that can help in maintaining bones and muscles, transporting oxygen to all parts of the body, help in normal functioning of heart and brain, development and growth of cells, help in blood clotting and support the immune system.
2) Vitamins: The nutrient claim "vitamins" means that the food product contains vitamins that can help in preventing night blindness, help in growth and repair of cells and tissues, help in maintaining bones and teeth, help in normal functioning of brain and nervous system, help in absorption of minerals, help in wound healing, help in protecting the cells from free radicals, support the immune system and help in blood clotting.
3) Zero trans fat: The nutrient claim "zero trans fat" means that the food product contains less than 0.2g of trans fat per 100g of solids or 100ml of liquids. Trans fat is the worst type of fat which should not be consumed as part of our diet. It increases the risk of developing obesity, diabetes mellitus, hypertension and cardio-vascular diseases.
4) Protein: The nutrient claim "protein" means that that the product provides protein which helps in the growth of muscle mass and maintenance of normal bones.
5) Contains added sodium/potassium: The nutrient claim "contains added sodium/potassium" means that the food product provides additional sodium/potassium which maintain fluid and electrolyte balance in the body, maintain osmotic pressure, maintain blood volume, maintain blood pressure, maintain proper functioning of muscles as well as control muscle contractions and maintain proper functioning of nervous system as well as control nerve impulses.
6) No cholesterol: The nutrient claim "no cholesterol" means that the food product contains not more than 5mg of cholesterol per 100g of solids or 100ml of liquids. It can help in reducing the risk of developing cardio-vascular diseases. Non-vegetarian products contain cholesterol so this claim can be mentioned on them. Vegetarian products do not contain cholesterol so this claim should not be mentioned on them.

Know more about the nutrient claims mentioned on the processed packaged foods

7) Fibre: The nutrient claim "fibre" means that the food product contains fibre which helps in normalizing bowel movements, helps in maintaining bowel health, helps in lowering cholesterol levels, helps in controlling blood sugar levels, helps in achieving healthy weight and helps to live longer by reducing the risk of developing cardio-vascular diseases and certain types of cancers.
8) Low sodium: The nutrient claim "low sodium" means that the food product contains low sodium which can help in reducing the risk of developing hypertension.
9) Energy: The nutrient claim "energy" means that the food product provides energy which helps in maintaining the body's essential functions, helps in enabling physical activity and movement and helps in growth and repair of cells and tissues.
10) Less Fat: The nutrient claim "less fat" means that the food product contains less fat which helps in reducing the risk of developing obesity, diabetes mellitus, hypertension and cardio vascular diseases.
11) Plant based energy: The nutrient claim "plant based energy" means that the food product provides energy to the person from plant based sources which helps to get him/her going.
12) Beta Glucan: The nutrient claim "beta glucan" means that the food product contains beta glucan which is a soluble fibre that helps in reducing cholesterol and helps in improving immunity.

Nutrition Information

The Nutrition Information also known as Nutrition Facts Tables or Nutrition Facts Panel is provided at the back of pack of food products. It provides a detailed information regarding the nutrient composition of food product. It provides the amount (in grams or millilitres) of the nutrients along with their %DV (% Daily Value) per 100g or per serving of the food products. It is provided for energy/calories, carbohydrates, proteins, total fat, mono unsaturated fat, poly unsaturated fat, saturated fat, trans fat, cholesterol, minerals, vitamins, total sugars, sodium and fibre.

Nutrition Information

Front of Pack Label

A Front of Pack Labelling (FOPL) is a labelling provided at the front of pack of food products. The FOPL provides a brief information regarding the nutrient composition of food product. The FOPL gives the amount and %GDA (%Guideline Daily Amounts) of nutrient information per serving of the food product. The FOPL provides information regarding energy, total sugars, total fat, saturated fats and sodium.

Front of Pack Label

Different types of Front of Pack Labels across the world

Warning Labels

On the front of packages, there are Warning Labels (WLs) for energy and nutrients that are thought to be present in unhealthy amounts. Goods without numerical FOPL systems are thought to be less healthy than those with WLs. The World Health Organization has acknowledged that interpretive FOPL, like WLs, can aid in the development of better food environments because they are easier for consumers of all literacy levels to understand and because they inadvertently encourage businesses to sell healthier goods. WLs should be utilised as a tool in the design and implementation of various regulatory initiatives connected to the prevention and control of overweight and obesity, according to the Pan American Health Organization. WLs have recently been adopted as a tool for nutrition policy in Chile, Israel, Peru, and Uruguay; Brazil, Canada, and Mexico are all considering WLs.

Different types of Front of Pack Labels across the world

Guideline Daily Amounts

The Guideline Daily Amounts (GDAs), which displays energy and the amount of essential nutrients of concern (saturated fat, other fat, sugar, and sodium) on the front of the package, is one FOPL strategy that the industry prefers. Since 2014, GDAs have been required on the front of packaged foods in Mexico. For several items, the American sector voluntarily adopts a similar method called Facts Up Front. US consumers claim that the GDA format is easier for them to understand than the NFTs when it comes to nutrition information. In contrast to the GDA, US consumers demonstrate indications of stronger nutrition awareness when using other systems (such as traffic lights). Also, there is evidence that Mexicans have a limited understanding of GDA structured material.

Different types of Front of Pack Labels across the world

Health Star Rating

All nutrient information is combined into a single dimension of healthiness known as the Health Star Rating (HSR). In Australia and New Zealand, the food industry voluntarily implemented the HSR in 2014. Depending on how overall healthy a product is, ratings range from half a star to five stars. According to studies, the HSR may be more successful than the GDA at influencing consumers to make healthier decisions.

Different types of Front of Pack Labels across the world

Multiple Traffic Lights

In order to swiftly convey whether a product includes somewhat low (green), average (yellow), or high (red) quantities of potentially dangerous nutrients, the Multiple Traffic Lights (MTLs) colour code each nutrient. It has been demonstrated that consumers who use the MTLs report serving calories with greater accuracy than those who use the GDA, HSR, or a single traffic light. Also, Europeans are very accepting of MTLs.

Different types of Front of Pack Labels across the world

Nutri-score

Summary indicator systems give a general score indicating how healthy or unhealthy a product is. The finest illustration is the French Nutri Score FOPL. A five-item scale of product healthfulness is provided by the traffic light colour coding, which ranges from dark green to dark red and corresponds to the letters A to E. The letters are present to improve label visibility, particularly for those who have trouble seeing colour.

Appendix V

Plagiarism Report

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Sources included in the report

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