

**EFFICACY OF ONLINE SURVEY ON KNOWLEDGE, ATTITUDE AND PRACTICES
AMONG YOUNG ADULTS TOWARDS FOOD AND NUTRITION LABELLING**

R. N. DEEPIKA

(20PFN007)

Thesis submitted to



**Avinashilingam Institute for Home Science and Higher Education for Women,
Coimbatore-641043**

**In Partial Fulfillment of the Requirement for the
Degree of Master of Science in Food Science and Nutrition**

May, 2022

**EFFICACY OF ONLINE SURVEY ON KNOWLEDGE, ATTITUDE AND PRACTICES
AMONG YOUNG ADULTS TOWARDS FOOD AND NUTRITION LABELLING**

R. N. DEEPIKA

(20PFN007)

Thesis submitted to

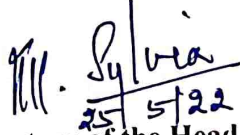


**Avinashilingam Institute for Home Science and Higher Education for Women,
Coimbatore-641043**

**In Partial Fulfillment of the Requirement for the
Degree of Master of Science in Food Science and Nutrition**

May, 2022


25.5.2022
Signature of the supervisor

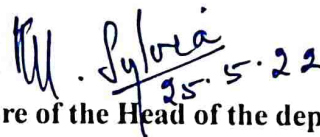

25/5/22
Signature of the Head of the Department

CERTIFICATE

This is to certify that the thesis entitled, "EFFICACY OF ONLINE SURVEY ON KNOWLEDGE, ATTITUDE AND PRACTICES AMONG YOUNG ADULTS TOWARDS FOOD AND NUTRITION LABELLING" submitted to Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore in partial fulfillment of the requirements for the award of the degree of Master of Science in Food Science and Nutrition, is a record of original research work done by **R. N. DEEPIKA** with Register Number 20PFN007 during the period of this study under the Supervision and Guidance of Dr (Mrs.) A. Thirumani Devi M.Sc (Madras), M.Phil.,(Bharathiyar), Ph.D., Professor and Former HOD, Department of Food Science and Nutrition, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore – 641043, Tamil Nadu, India.


25.5.2022

Signature of the Supervisor


25.5.22

Signature of the Head of the department


DECLARATION

This is to certify that the thesis entitled, “**EFFICACY OF ONLINE SURVEY ON KNOWLEDGE, ATTITUDE AND PRACTICES AMONG YOUNG ADULTS TOWARDS FOOD AND NUTRITION LABELLING**” submitted to Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore in partial fulfillment of the requirements for the award of the degree of Master of Science in **Food Science and Nutrition**, is a record of original research work done by **R. N. DEEPIKA** with Register Number **20PFN007** during the period of this study under the Supervision and Guidance of Dr (Mrs.) A. Thirumani Devi M.Sc (Madras), M.Phil., (Bharathiyar), Ph.D., Professor and Former HOD, Department of Food Science and Nutrition, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore – 641043, Tamil Nadu, India.



25.5.2022

Signature of the Supervisor



25/05/2022

Signature of the Candidate

ACKNOWLEDGEMENT

The investigator places her deep thanks and gratitude to GOD ALMIGHTY for showering his blessings as she could carry out the research work successfully.

The investigator records her sincere thanks to profound sense of gratitude Prof.S.P.Thyagarajan, Ph.D., M.D., D.Sc., FAMS., FNASc., FIMSA.,FABMS., FFTM (Glasgow, UK), Chancellor, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for providing the Infrastructural facilities to conduct the study and giving me an opportunity to study in our honored University.

The investigator gratefully records her sincere thanks to Dr. (Mrs.) Bharathi HariShankar, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for facilities provided and constant support to complete the research work.

The investigator extends her sincere thanks to Dr.(Mrs.) S. Kowsalya, M.Sc, M.Phil., Ph.D.,Registrar Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for giving this golden opportunity to undertake this course in our University.

The investigator gratefully acknowledge her heartfelt thanks to Dr. (Mrs.)Vasugi Raaja, M.Sc., M.Phil.,Ph.D., Dean, School of Home Science, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for her concern and guidance rendered during the course of the study.

The investigator acknowledges and expresses her respectful thanks and sincere gratitude to Dr. (Mrs) M. Sylvia Subapriya, M.Sc., M.Phil., B.Ed., Ph.D., Professor and Head, Department of Food Science and Nutrition, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for support and encouragement.

The investigator is deeply indebted and gives her immense pleasure and proud to offer gratitude to her guide Dr (Mrs.) A. Thirumani Devi, M.Sc (Madras), M.Phil., (Bharathiyar),Ph.D., Professor, Department of Food Science and Nutrition, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore for her stimulating support, constructive, suggestions, inspiring guidance and encouragement throughout the research period and also documenting the thesis.

The researcher owes her sincere thanks to all the Faculty Members of Department of Food Science and Nutrition Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for being supportive and understanding during the study period.

The researcher takes this opportunity to express her sincere thanks to all the subjects of this research for participating and cooperating with the investigator for the successful conduct of the study.

Last but not least, my whole hearted gratitude and gratefulness to my parents, brother, sisters and friends for their constant encouragement, good hold up, wish, devoted care and kind help rendered in various ways throughout the period of this investigation.

I am grateful to each and every soul who had helped me in one or other way in making this study a great success.

CONTENTS

CHAPTER NO	LIST OF CONTENTS	PAGE NO
	ACKNOWLEDGEMENT	
	LIST OF TABLES	
	LIST OF FIGURES	
	LIST OF APPENDICES	
I	INTRODUCTION	1 – 9
II	REVIEW OF LITERATURE A. Importance and benefits of food and nutrition label B. Purpose and consumer needs of food and nutrition labeling C. Basic product information on food and nutrition labeling D. Consumers to consider E. Consumers to consider and check the factors during food products purchasing F. International and national agencies involved in formulating food and nutrition labels G. Food and nutritional labeling regulations in India H. Evolution of food labeling I. Consumers, knowledge, attitude and practices towards food and nutritional labelling J. Impact of nutrition information on consumer buying behavior K. Socio-demographic factors associated with use of food labels L. Nutrition education to enhance the knowledge of food and nutrition labelling.	10 – 27
III	METHODOLOGY PHASE I: Selection of Area and Subjects PHASE II: Formulation of Tools to Conduct the Online Study PHASE III: Mapping of Subjects for further nutrition intervention Improve the Knowledge related Food and Nutrition Labeling	28 - 37

	PHASE IV: Nutrition Education to Enhance the Knowledge Related to Food and Nutrition Labeling and Effective Consumption of Food Products. PHASE V: Analysis and Interpretation of Data	
IV	RESULTS AND DISCUSSION A. Socio economic profile of the selected subjects B. Purchasing habits of the selected subjects C. Knowledge related to food and nutrition labels D. Attitude towards food and nutrition labelling E. Practice of the selected subjects on food and nutrition labels	38 – 64
V	SUMMARY AND CONCLUSION	65 – 74
	BIBLIOGRAPHY	75 – 84
	APPENDICES	83 – 89

LIST OF TABLES

TABLE NO	TITLE	PAGE NO
I	INCLUSION AND EXCLUSION CRITERIA OF SELECTED SUBJECTS	30
II	SOCIO ECONOMIC PROFILE OF THE SELECTED SUBJECTS	39
III	PURCHASING HABITS OF THE SELECTED SUBJECTS	41
IV	FOOD LABELLING IS AN IMPORTANT ATTRIBUTES FOR FOOD PRODUCTS	43
V	QUALITY OF INFORMATION ON FOOD AND NUTRITION LABEL	44
VI	CHECKING NUTRITIONAL INFORMATION IN THE LABEL	45
VII	AWARENESS TOWARDS FOOD AND NUTRITION LABEL OF THE FOOD PRODUCTS	46
VIII	NOTICING THE CONTENT OF FOOD LABEL BEFORE PURCHASING	46
IX	LABELED FOOD PRODUCTS ARE COSTLY	47
X	SUBJECTS VIEWS FOR SAFETY OF FOOD PRODUCTS	48
XI	REASONS FOR NOTING FOOD PRODUCTS LABEL	49
XII	LABELED FOODS ARE SAFE FOR CONSUMPTION	50
XIII	INFORMATION IN THE FOOD AND NUTRITION LABEL IS TRUSTED	51
XIV	QUANTITY AND QUALITY OF CORRECTED INFORMATION ON NUTRITION LABEL	52
XV	WHILE PURCHASING CHECK FOOD LABEL	54
XVI	CHECK THE PACKAGING ARE DAMAGED	56
XVII	FOOD AND NUTRITION LABEL INFORMATION INFLUENCE THE PURCHASING CAPACITY	57
XVIII	PURCHASING OF UNLABELED FOOD PRODUCTS	57

XIX	CHECKING THE QUALITY OF PRODUCT	58
XX	TIME CHECKING THE FOOD & NUTRITION LABEL	59
XXI	THE INFORMATION ON FOOD & NUTRITION LABEL HELPS TO PURCHASE THE PRODUCT	60
XXII	OBSERVATION OF THE WEIGHT OF THE FOOD PRODUCTS	61
XXIII	KNOWLEDGE ABOUT FSSAI	62
XXIV	STORAGE OF THE PRODUCTS AFTER OPENING THE PACKAGE	62
XXV	KEEPING THE FOOD LABEL UNTIL THE PRODUCT IS FULLY USED	63
XXVI	PROPERLY USED BEFORE EXPIRY DATE	64

LIST OF FIGURES

FIGURE NO	TITLE	PAGE NO
2.1	CONSUMER'S UNDERSTANDING AND USE OF INFORMATION ON FOOD LABEL	23
3.1	SELECTED AREA MAP	27
3.2	NUTRITION AWARENESS VIDEO	33
3.3	RESEARCH DESIGN	35
4.1	RATING OF KNOWLEDGE ON FOOD AND NUTRITION LABEL BEFORE AND AFTER NUTRITION EDUCATION	44
4.2	HEALTH ISSUES BECAUSE OF PURCHASING AND UTILIZING EXPIRED PRODUCTS	47
4.3	MODE OF PURCHASING FOOD PRODUCTS	50
4.4	PURCHASE OF EXPIRED PRODUCTS	52

LIST OF APPENDICES

APPENDIX NO	TITLE	PAGE NO
I	ETHICAL APPROVAL CERTIFICATE	83
II	QUESTIONNAIRE OF EFFICACY OF ONLINE SURVEY ON KNOWLEDGE, ATTITUDE AND PRACTICES AMONG YOUNG ADULTS TOWARDS FOOD AND NUTRITION LABELLING	84
III	FEED BACK FORM	89

I. INTRODUCTION

India is the world's second largest producer of food next to China, and has the potential of being the biggest with the food and agricultural sector. The food processing industry is one of the largest industries in India and it is ranked fifth in terms of production, consumption, export and expected growth. The food industry is on a high as Indians continue to have a feast. Fuelled by what can be termed as a perfect ingredient for any industry, the food sector has been witnessing a marked change in consumption pattern especially in terms of food.

Food Labeling is an important process in the food processing chain and should not be overlooked. The label is the first point of contact between a consumer and the producer. It is used to identify one product from another and also to make a decision over which product to purchase (Kristal et al, 1998). Food labels give you information about the elements of the food and can help you to decide what to choose as part of an overall healthy eating plan (US Food and Drug Administration; Guide to Nutrition Labeling and Education Act, 1994).

A food label, the information presented on food product, is one of the most important and direct means of communicating information to the consumer. The internationally accepted definition of a food label is any tag, brand, mark, pictorial or other descriptive matter, written, printed, stenciled, marked, embossed or impressed on, or attached to, a container of food or food product. This information, which includes items such as ingredients, quality and nutritional value, can accompany the food or be displayed near the food to promote its sale. Nutrition labeling, if applied correctly and if adequately used, understood and trusted by the consumer, can assist consumers in taking into account the nutritional content of the food product in their purchase decisions and consequently in making informed choices for healthy options and hence for a more healthy diet. It also contributes to consumer protection, as transparency offers consumers their right to know the nutrient content of a food very much like the food's country of origin or its sell-by date (Cowburn et al, 2005)

One of the main drivers for nutrition labeling is the increased prevalence of diet-related non-communicable diseases. These labels can be effective instruments in helping consumers to make healthful food choices. To maximize the potential of nutrition labels and health claims to improve public health, awareness campaigns and education programmes should be provided on

an ongoing basis to help consumers to understand and use labels appropriately. The Codex Alimentarius guidelines recommend the following types of nutrition labeling: Nutrient Declaration, Nutrient Reference Values, Quantitative declaration on ingredients (QUID), Nutrition Claims and Health Claim (Shine et al, 1997).

According to Food Safety and Standards Authority of India, 2011 a label serves the following three primary functions: i. it provides basic product information with respect to common name, list of ingredients, net quantity, shelf life, grade/ quality, vegetarian/ non vegetarian society logo, country of origin, name and address of manufacturer, dealer or importer and food standards agency. ii. It provides health, safety, nutrition information which includes instructions for safe storage, handling, nutrition information such as quantity of fats, proteins, carbohydrate, vitamins and minerals and preservatives, colours, if used any, quantity per serving of stated size of food (in the nutrition facts table) and specific information on products for special dietary use. iii. It acts as a vehicle for food marketing and promotion through promotional information and claims such as 'low fat', 'cholesterol free', 'high source of fibre', 'natural', 'organic', 'no preservatives added' and so on. KAP surveys are focused evaluations that measure changes in human knowledge, attitudes and practices in response to a specific situation. KAP studies tell us what people know about certain things, how they feel, and how they behave. Each study is designed for a specific setting and issue (Jackson and Sherri, 2018).

There were few attempts to address the consumer's awareness of nutritional aspects of food labeling use in the region. It was evident that even though consumers were aware of the importance of reading food labels; they regarded information on manufacturing date; expiry date and content of the package as the most important information on labels (Washi, 2012).

Nutrition information on food labels could be a cost-effective method of communicating nutrition information to consumers because the information appears at the point of sale for most packaged foods (Campos and Hammond, 2011).

Nutrition knowledge could be important for dietary choice in other ways, for example, by having direct effects on food choice, without food label information, or by impacting attitudes or beliefs. In addition, food label use could be a moderator of the association between nutrition knowledge and dietary behaviors (Fitzgerald et al, 2008, Satia and Neuhouser, 2015).

The success of a brand depends partly on its nutritional labeling. Nutritional labels are one of the main sources of information about the reliability of a food product. They attract consumers to the product. Nutritional and health claims have become a recognized way of communicating to the consumer the healthiness of foods that contain extra or reduced ingredients (Caswell, 2013).

Nutrition information is widely displayed on foods labels in developed countries due to higher consumption of packaged foods and increase in diet related diseases. It has been recognized as an important tool to protect consumers' health as it communicates nutrition information about products while buying. Nutrition labelling has been considered as legitimate tool to promote health in developing countries also. Consequently, its use has been seen in these countries too. But the nature and extent of disclosure of nutrition information on food labels can differ across countries as it is not mandatory to declare such information on packages in all the countries. Following studies reveal the prevalence of disclosure of nutrition information on food labels.

Moreover, a nutritional label is an attractive tool because, while it supports the goal of healthy eating, consumers retain their freedom of choice (Grunert and Wills, 2017). Nutrition knowledge could support the use of nutrition information on food label use in at least three ways. First, prior knowledge could enable consumers to pay attention to important information on a food label, and to ignore marketing features that do not reflect salient nutritional qualities, which in turn minimizes information overload. Second, prior nutrition knowledge can facilitate comprehension of, and memory for, food label nutrition information (e.g., determining whether 700 mg represents a little or a lot of sodium). Third, prior nutrition knowledge could support the application of the comprehended and remembered information to food choice (Lisa et al, 2015).

Gender is another factor determining nutritional label use and understanding. Women use labels more frequently than do men. (Drichoutis 2016). Consumers may not understand these label date definitions, and therefore may use food date labels to evaluate food safety, thus discarding a food that has passed its label date or rejecting a food in the absence of a date label in order to avoid foodborne illness (Davenport et al., 2019; Newsome et al., 2014; Qi & Roe, 2016 and Toma et al, 2017).

Consumption behavior of the society has changed a lot in the past few decades. It has shifted from home cooked foods to processed and packaged foods (Kumar and Pandit, 2018).

“Prepackaged or pre-packed food means food, which is placed in a package of any nature, in such a manner that the contents cannot be changed without tampering it and which is ready for sale to the consumer” (Food Safety and Standards Authority of India, 2012). Packaged food in India is accounted for approximately 6 percent of the total household spending (Jones et al., 2017). Although, it is at an early stage but consumption of these foods is rising rapidly. Nutrition transition from traditional foods to packaged foods has majorly been seen among high and middle income population (Popkin et al, 2012). There are number of factors that drive consumers to buy packaged foods such as convenience, rising disposable income, urbanization, lifestyle changes, growing distribution channels etc.

Increasing demand for packaged foods has lead to the growth of packaged foods market, thus changing the shape and size of food markets globally. In India, packaged foods segment is found as one of the fastest growing segments and processed food industry is ranked fifth for production, consumptions and exports of processed foods. Currently, the estimated value of packaged foods industry ranges between US\$ 10.87 billion to US\$ 13.05 billion. Processed food sector is growing at remarkable rate of about 15 percent from the past few years (Santra, 2018). No doubt, markets are expanding but at the same time increasing intake of processed foods and irrational food preferences is adversely effecting consumers’ health (IBEF, 2017).

Health status of an individual is mainly determined by his/her food choice as nutrition and health are closely related to each other. For a healthy life, nutrition in diet plays a very important role. It has positive impact on health and an individual can attain physical and mental growth by consuming nutritious diet. On the other hand, undernourished diet leads too many diet related diseases and imposes high economic and social cost to the societies. It was found by the Food and Agriculture Organization that at least 10.9 percent of the world population go to bed hungry or suffer undernourishment in terms of energy intake. Both developed and developing countries are currently facing the problem of obesity and under nutrition at the same time. But it is even more taxing that the proportion of obese people is increasing at a fast pace in South East Asia as compared to other countries around the globe. Overweight people have greater tendency to endure health problems in their later life (Consumers International, 2008).

There are number of factors that contribute to rising health issues. But availability of wide range of processed foods and rigorous marketing of junk foods to consumers is identified as one of the

important factors. Processed and packaged foods usually contain high content of sugar, salt and fat (Cairns, Angus and Hastings, 2009). It has been noticed that high fat diet and lesser consumption of fruits and vegetables are leading causes of many diet related diseases (Doll and Peto, 1981; Weisburger, 2002). This is an important issue from public health perspective as diet related noncommunicable diseases such as obesity, coronary heart diseases, blood pressure and diabetes are increasing globally (Drichoutis et al. 2006 and World Health Organization, 2011).

Rising issues related to health depict that people are not getting the right foods. It may be due to lack of sufficient information regarding quality and quantity of nutrients contained by the food. This problem can be resolved by filling the knowledge gap by conveying relevant information about the products. There are number of sources for communicating nutrition information to consumers such as advertising through television, radio, magazines, friends and family. But one of the best ways to provide nutrition information at the point of purchase is labelling. “Labelling includes any written, printed or graphic matter that is present on the label accompanying the food” (FSSAI, 2009). Thus, by conveying the information about the product, label acts like a bridge and fills the information gap between the two concerned parties i.e. producers and consumers (Loureiro and McCluskey, 2000). Nutrition labelling has been considered as a legitimate tool to support the goal of promoting healthy eating by public health community, government and food companies (Genannt Bonsmann et al., 2010, Vijaykumar et al. 2013 and Connoosamy et al. 2014).

Nutritional labels can be defined as the depiction of nutritional properties of a food that is used to inform customers about the nutrient value (Food and Agriculture Organization and World Health Organization, 1985). This information helps consumers to choose appropriate foods as per their needs. Also, knowledge based food choices increase consumption of nutrients which are good for health such as fibre, calcium, iron etc. and reduce consumption of negative nutrients such as fat, sodium, sugar etc. Moreover, reliability of a food product is confirmed from the nutritional labels as it is the only source of information that conveys nutrients value of a product while buying it.

Two key sources of nutrition information are available for consumers on a food package viz. nutrition facts panel and claims (Gracia et al. 2009). Nutrition facts panel contains a list of nutrients along with the quantity of nutrient contained by the products. For instance, content of

energy contained by a product is disclosed as per 100g/ml (solids/liquids) and per serving on the package. Nutrition facts panel is generally disclosed on the back of the food packages in a standard format. As it gives details about the nutrient content of a food, thus facilitates consumers to choose foods as per their dietary preferences. Moreover, it enables consumers to quantify the amount of healthy nutrients and helps them to fulfill their special dietary needs (Toma et al. 2017).

Another source of nutrition information on food labels is claim. Claim is defined as messages on the food labels using pictorial, symbolic and graphic representation to highlight the nutritional properties of the products. High in fibre, rich source of protein, low in transfat etc. are some examples of claims commonly depicted on food packages. These are not mandatory to declare on food labels but if any nutrients are used for marketing on food labels, it is obligatory to disclose its content in the nutrition information panel. Claims are displayed on the front as well as the back packages of the products. Short claims are generally exhibited on the front packs while long claims with details are depicted on back packages of the products. Appropriate use of claims on food labels allow consumers to choose food good for their health. The claims used on food packages are further identified as nutrition claims and health claims (IBEF, 2017). Basically Nutrition claims draw attention towards particular nutritional properties of a food that include content of nutrients such as energy, protein, fat, carbohydrates, vitamins and minerals. It is not limited to use of these nutrients only and rather includes other permitted listed nutrients also. Nutrition claims generally include two types of claim— nutrient content claim and nutrient comparative claim. Nutrient content claim is defined as a claim on the food labels that explains the level of a nutrient contained in a product. For example, high in (name of the nutrient), rich in (name of the nutrient), source of (name of the nutrient) etc. Nutrient comparative claim compares the levels of nutrient of two or more foods and describes the nutrient content in comparison to another food product. For example, reduced in (name of the nutrient), less than (name of the nutrient), more than (name of the nutrient) (Hawkes, 2014).

As claims highlight the nutritional properties of a food, they are widely used as marketing tools to attract consumers towards the foods. Presence of various types of claim such as health claims, nutrition claims, structure/function claims, statement claim etc. have been recorded on the

packaged foods (Legault et al., 2004; Colby et al., 2010; Manthena, Mythili and Rao, 2012 and Mayhew et al., 2016).

Nutrition labelling has gained more prominence in developed countries due to rapidly emerging health issues from poor diets. Consequently, majority of packaged foods marketed in those countries carry nutrition labels. Governments in many developing countries for instance, India and China, upon realizing the importance of nutrition in human health, have also made it obligatory to declare nutrition information on food labels (Ferguson, 2009).

In India, Food Safety and Standards Authority of India (FSSAI) regulates labelling of packaged food products since 2006. Initially, labelling of packaged food was restricted to only general information such as name of the food, price and quantity of the product, ingredients and manufacturers identity (Singla, 2010). But in 2009, FSSAI made it mandatory to label some nutrients on packaged foods. New guidelines have further been added and detailed provisions regarding disclosure of nutrients have been provided in the draft report of Regulations on labelling (claims), 2012. These regulations provide direction and form in which nutrition information such as nutrients and claims should appear on food packages. For example, it is directed that nutrition facts panel (NFP) should be displayed in particular format on the back of the packages listing nutrients such as energy, protein, carbohydrates etc. Some important guidelines are also provided by the National Institute of Nutrition (NIN) related to consumption of food for good health in the report Dietary Guidelines for Indians- A Manual, 2011. These regulatory authorities are playing dual responsibility. On one hand, they regulate marketing of nutrition information on food labels and on the other hand they educate consumers by providing guidelines for balanced diet. For instance, food pyramid given by NIN group's foods into four categories, foods that people should— eat adequately, eat liberally, eat moderately and eat sparingly. It defines various food groups that guide consumers about the consumption of combination of foods from these food groups that can help to maintain good health amongst individual (Mythili and Rao, 2012).

The above discussion clarifies that through food labelling nutrition information is communicated by marketers which the consumers can use. Dissemination of nutrition information is regulated by the Food Safety and Standards Authority of India. However, little or no empirical work has been done in India to understand the manner in which marketers provide nutrition information on

food packages and its conformance to regulations. More so, understanding about the use of this information by consumers is also limited. The present study has been drafted in the light of these issues. Specifically, firstly, marketers perspective has been addressed where the current practices of nutrition labelling prevailed in India have been evaluated against the regulations fixed by the FSSAI. Thereafter, various issues related to the consumer's perspective have been addressed where usage of disclosed nutrition information and its impact on consumers' behavior has been examined.

This study was focussed on how the consumers usage of the food and nutrition labels, to know about the Namakkal sub urban employed, unemployed, rural, urban, nutrition students and non-nutrition student's food and nutrition labelling related awareness, practice, knowledge, attitudes.

Nutritional problems broadly fall into two categories, i.e. those resulting from insufficient intake relative to nutritional needs and those resulting from excessive and unbalanced intake of food or a particular dietary component. The main problems in Africa and elsewhere in developing countries pertain to the first group. The concept and benefits of food labellings with proper nutritional knowledge are directly or indirectly involved to create awareness for promotion of health by having food safety and nutrition security.

Nutrition education is not just learning about foods and nutrients, but learning what to do and how to act to improve nutrition. The Nutrition Education and Consumer Awareness Team provides technical support to countries to develop policies and programmers to increase public awareness of the importance of eating well, foster food environments that enable healthy food choices and build the capacities of individuals and institutions to adopt food and nutrition practices that promote good health.

One of the principal aims of nutrition education must therefore be to provide people in rural and urban areas with adequate information, skills and motivation to procure and to consume appropriate diets. Such education should cover improvement of family food supplies and more efficient utilization of available food and economic resources to provide nutritious diets and better care for the most vulnerable groups. For those richer sectors of society where diseases of affluence are taking an increasing toll, nutrition education should be directed to proper food selection, consumption and lifestyle. (<https://www.fao.org/nutrition/education/en/>)

This study contributed the nutrition education for promoting healthful food choices among the selected adult consumers. This study examined the Nutrition Labeling and Education Act food labels. The purposes of the study were to examine knowledge, attitudes, and behaviors of the selected adult consumer regarding labels and relationships among these factors, and whether educational experience with labels was associated with label-reading knowledge, attitudes, and practices.

Food label education programs are important in helping consumers understand and use the nutrition label. Dietetics professionals can play an important role in educating others to be informed label readers. Continued and expanded label education programs are recommended. Emphasis should be placed on the concept that good nutrition does make a difference in health and that the food label is a useful tool for making good food choices. Special attention should be directed toward clarifying the terms and phrases used on labels and toward reassuring consumers of the truthfulness of the nutrition claims. In addition, college students need to understand their need for numerous nutrients instead of looking only at information about fat and calorie content of foods. With this knowledge, the selected subjects were able to use the label more effectively to meet their food safety nutrition needs and security. Educational information about the use of food labels should be offered to the general public at point-of-purchase outlets such as food markets, grocery stores, and discount warehouses. With these backdrops, the present study was executed with the following objective.

Objectives of the study are: To

- ♣ Elicit information related to socioeconomic, dietary and life style pattern of the selected subjects.
- ♣ Find out the habits and choice of purchasing food items of the selected subjects with reference to food labelling.
- ♣ Develop and validate nutrition education modules for enhancing the knowledge of nutrition labelling for food safety and nutrition security and
- ♣ Effect of implementing the nutrition education modules on healthy food choices on knowledge, attitude and practices among the selected subjects.

II. REVIEW OF LITERATURE

The review of literature pertaining to the present study on “EFFICACY OF ONLINE SURVEY ON KNOWLEDGE, ATTITUDE AND PRACTICES AMONG YOUNG ADUTLS TOWARDS FOOD AND NUTRITION LABELING” is given under following headings.

- A. Importance and benefits of food and nutrition label
- B. Purpose and consumer needs of food and nutrition labeling
- C. Basic product information on food and nutrition labeling
- D. Consumers to consider
- E. Consumers to consider and check the factors during food products purchasing
- F. International and national agencies involved in formulating food and nutrition labels
- G. Food and nutritional labeling regulations in India
- H. Evolution of food labeling
- I. Consumers, knowledge, attitude and practices towards food and nutritional labelling
- J. Impact of nutrition information on consumer buying behavior
- K. Socio-demographic factors associated with use of food labels
- L. Nutrition education to enhance the knowledge of food and nutrition labelling.

A. Importance and benefits of food and nutrition label

Food labeling is also an important tool in pre-packaged food trading. Manufacturers of pre-packaged foods use labelling information for marketing of their products. However, consumers use this information in making food choices. A study by (Katarzyna et. al, 2010) had showed that the consumers found the knowledge about food from different sources of the media. The most important source providing the biggest information about pre-packaged foods is food label.

Labelling of food is an important aspect in food processing chain. It is the first point of contact between a consumer and the producer. It helps us in identifying one product from another and also about purchasing decision of the product. The label should be attractive and eye catching while at the same time being informative. Important information like ingredients list, manufacturers address, veg & non-veg logo, nutritional information, cost etc. should to be there in the label. It also helps to judge whether the product if fresh or stale through best before date, any allergenic component in the product and also to evaluate the health or nutrition claim of 25 the product. Dirty, confused, untidy label will not help consumers in buying the product.

Therefore, every food processor should aim to label their products with the best label they can obtain or afford in relation to the value of the product and as per law. The food label helps in following ways:

- Choosing trusted brand or manufacturer by comparing different brands of products. Vegetarian and non-vegetarian logo identification.
- Product freshness through best before date and date of manufacturer.
- Identification of ingredient list might be allergic to ingredients like egg, wheat, milk, peanuts & soya.
- The presence of other ingredients like trans fats, saturated fat, high salt, preservatives, artificial colours, sweeteners etc. which are harmful for health.
- Helps in choosing the food products giving desirable nutrients like protein, vitamins, fibre, calcium, zinc, iron, iodine etc.
- Through nutritional information it provides number of calories and other nutrients present in the packed food.
- Helps in selecting appropriate serving size with requirement levels.

B. Purpose and consumer needs of food and nutrition labelling

Any effort to improve the nutrition content information on food labels must begin with a set of assumption about the purpose labels should serve and the audience that they should be designed to inform and assist food selection. According to the agencies, the purpose of food labeling is to enable consumer to select and use products that meet their industrial needs and preference. To achieve this purpose, labeling must provide sufficient information to enable the public to identify foods and their characteristics, includes ingredients and nutrition value. Effective labeling must present the information so that consumer can understand and use it in deciding what foods to buy. The agencies guiding principles in recommending specific changes have been health importance, the consumer right to know, and economic protection (Porter and Wellman, 2020).

Nutrition labels describe the nutrient content of a food and are intended to guide the consumer in food selection. The nutrition information provided must be selected on the basis of consistency with dietary recommendations. Selection of the specific nutrients or food components to be listed should further take into account label space, the analytical feasibility of measuring the particular nutritional component within the food matrix, and the relative costs of such analyses. Nutrition

information provided on labels should be truthful and not mislead consumers. At the same time, labelling regulations should provide incentives to manufacturers to develop products that promote public health and assist consumers in following dietary recommendations. It is likely that in many countries, there would be some segments of the population that would benefit from information about the composition of foods. In these cases, countries should consider the need to provide for appropriate labelling and its presentation relative to existing guidelines and approaches. As nutrition-labelling efforts have evolved, different approaches and legal requirements have been established. These create difficulties in developing and harmonizing nutrition information listings, which have broad international applications. For these reasons, the Codex Guidelines on Nutrition Labeling play an important role to provide guidance to member countries when they want to develop or update their national regulations and to encourage harmonization of national standards with international standards. These Guidelines are based on the principle that no food should be described or presented in a manner that is false, misleading or deceptive. The Guidelines include provisions for voluntary nutrient declaration, calculation and presentation of nutrient information. The Guidelines on Claims establish general principles to be followed and leave the definition of specific claims to national regulations. Definitions are provided for a number of claims (nutrient content, comparative claims, nutrient function claims) as well as general requirements concerning consumer information in relation with claims. Nutrition labeling by itself cannot solve nutrition problems. It should be seen as one of the elements of nutrition policy and should be envisaged in the larger perspective of consumer education, which in its turn is part of an overall development policy. Exchange of information at the regional and sub regional level is important, as each country can learn from the experience of others and regional co-ordination and co-operation can be developed (Wijngaart, 2022).

Increasing consumer interest in nutrition has led to an increased interest in nutrition labelling. Finds that over half (58 per cent) of the sample surveyed read nutrition labels. Nutrition labelling was found to have an impact on consumer purchase decisions. Of those consumers who read nutritional labels, 81 per cent use them in their evaluation of food products. Consumers have to deduce information from nutrition labels in their current format. Survey findings reinforce previous work carried out in this area, particularly in the context of consumer categorization of food products as “good” or “bad”. For example, consumer avoidance of “negative” nutrients is apparent throughout the survey. The majority of respondents, who read labels, indicated that they

search out information on nutrients they wish to avoid. In general, since time allocated to shopping for food products is limited, the format of nutritional labelling needs further consideration and improvement. The concept of nutrition should be incorporated into food companies' marketing strategy (Shine, O'Reilly and O'Sullivan, 1997).

C. Basic product information on food and nutrition labeling

To assure that the nutrition information provided on a food label is conveyed in a manner that will allow the majority of consumers to use it successfully, a number of criteria need to be considered, including literacy of users, computational abilities, knowledge of English, and knowledge of the specialized vocabulary of nutrition labeling. The actual label presentation scheme needs to make it possible for consumers to understand the nutrition contents of individual food products, compare nutrition contents across product categories, and choose among relevant food alternatives (Institute of Medicine (US) Committee on the Nutrition Components of Food Labeling, 1990).

D. Consumers to consider and check the factors during food products purchasing

Food consumption patterns in India are rapidly changing from cereal-based food products to high-value food products and slowly from fresh, unprocessed, unbranded food products to processed, packaged and branded products. A strong economic growth has brought with it a new set of consumers with sufficient disposable income, who are more conscious of the latest trends in health and hygiene, particularly in the, fast growing cities. To reap the benefits of the changing buying behavior of the consumers and their capability for buying quality food and grocery items, modern organized retail formats are growing at a phenomenal pace throughout the country. This has induced big national and multi-national corporations to invest into organized retailing. In the emerging Indian retail environment, this study provides insights on consumers' preferences of food and grocery products in terms of product and market characteristics with the help of primary survey data. Findings of the study clearly indicate that vegetables and fruits are most frequently purchased from nearby markets as compared to grocery products. High consumer ratings on the product attribute of freshness/cleanliness along with price and quality suggests that food retailing needs to be customized as per their requirements. Apart from this, the study also addresses issues related to a diversified set of market characteristics for efficient management of organized retailing of food and grocery products. Results of the factor analysis of various market attributes clearly indicate that consumers prefer a convenient marketplace with additional service

facilities. Market attributes like entertainment for children, basic amenities and affordability of the marketplace are also considered to be important by the consumers. The study provides strategic inputs to the upcoming food retail markets regarding the products that can be offered at a marketplace and the required physical environment of the market (Ali *et al.*, 2010).

E. International and national agencies involved in formulating food and nutrition labels

The Committee was cognizant of the larger environment within which U.S. food labeling reform was being considered. Sensitivity to the trends and developments in other countries is very important in an exceedingly world where trade and national economies rely on the flexibility of companies to sell goods on the international market. This Appendix briefly discusses the present guidelines of the European Community, the Codex Alimentarius Commission, and therefore the results of an off-the-cuff survey conducted to rise understand things in specific countries.

According to Edalati *et al.*, (2020) after 2000, the “Food and Drug Administration” became the main decision maker in developing nutrition labelling. Based on the interviewer's opinions, few consultations with food sector organizations, academia, as well as the ISIRI was done before finalizing and formulation of FoP nutrition traffic light guidance. Also, the low level of coordination with non-health sector, including “Iran Broadcasting organization" was sensed as a major factor for not implementing the supporting strategies such as the advertising law which mandated showing the nutrition traffic light labelling in TV food advertisements. No specific NGO and civil society members were involved in food labelling policy formulation and process.

F. Food and nutritional labeling regulations in india

1. Every prepackaged food shall carry a label containing information as required here under unless otherwise provided, namely, —
2. The particulars of declaration required under these Regulations to be specified on the label shall be in English or Hindi in Devanagari script:
Provided that nothing here in contained shall prevent the use of any other language in addition to the language required under this regulation.
3. Pre-packaged food shall not be described or presented on any label or in any labelling manner that is false, misleading or deceptive or is likely to create an erroneous impression regarding its character in any respect;
4. Label in pre-packaged foods shall be applied in such a manner that they will not become separated from the container;

5. Contents on the label shall be clear, prominent, indelible and readily legible by the consumer under normal conditions of purchase and use;

6. Where the container is covered by a wrapper, the wrapper shall carry the necessary information or the label on the container shall be readily legible through the outer wrapper and not obscured by it.

(FSSAI guidelines, https://www.fssai.gov.in/upload/uploadfiles/files/Packaging_Labelling_Regulations.pdf)

G. Evolution of food labeling

Food is one of the most basic necessities of life and for an individual's healthy living it is important that he/she acquires elaborate information on what is being consumed. This notion was identified as the primary reason behind drawing attention towards labelling of foods. For many it was seen as a policy tool for motivating change in consumer behaviour and for others as an encouragement of good production practices. Thus, food labelling implies a consumer's right to adequate and safe food, right to information and right to health. Thousands of years ago, the International Food Trade has existed which helped in trade of food internationally. It has grown exponentially, and helps in possible travel of quantity and variety of food across the globe today. An intergovernmental body i.e. Codex Alimentarius Commission (CAC) with over 170 members, within the framework of the Joint FAO/WHO Food Standards Programme established by the Food and Agriculture Organization (FAO) of the United Nations and the World Health Organization (WHO). Its purpose is to protect the consumers health and fair practices in the food trade. The CAC also promotes coordination of all work done in the field of food standards by global private and government organizations. Countries can be grouped into two broad categories based on their statutory regulations on nutrition labelling: 1. Mandatory: Those which make nutrition labeling mandatory even in the absence of a nutrition or health claim. These include European Union (EU) member states, United States, Canada, Mexico, Argentina, Brazil, Chile, Colombia, Ecuador, Paraguay, Uruguay, Israel, 19 India, Indonesia, China, Hong Kong, South Korea, Malaysia, Taiwan, Australia and New Zealand. They define which nutrients must be listed and on what basis (e.g. per 100 g/per serving). They also allow voluntary initiatives to provide additional nutrition information. 2. Voluntary: Countries which provide state-approved guidelines to be followed voluntarily. These include Gulf Cooperation Council countries, Venezuela, Turkey, Singapore, Philippines, Thailand, Japan, Kenya, Mauritius, Nigeria and

South Africa. It has to define what all nutrients should be listed and on what basis, labelling is not mandatory unless a health or nutrition claim is made or unless the food is for special dietary use. (Steve Osborn and Wayne Morley, 2016)

H. Consumers, knowledge, attitude and practices towards food and nutritional labelings

In many parts of the world, food companies, consumers, and governments are re-examining the provision of nutrition information on food labels. It is important that the nutrition information provided be appropriate and understandable to the consumer and that it impacts food-choice behaviors. Potentially, food labeling represents a valuable tool to help consumers make informed decisions about their diet and lifestyle. Food information organizations worldwide have been following consumer trends in the use of this information as well as consumer attitudes about food, nutrition, and health. This paper summarizes a workshop that examined consumer attitudes gathered regionally with the aim of establishing commonalities and differences. (Wills *et al.*, 2009)

The results from this study may be used to shed light on current explanations regarding differences in the attributed importance of qualifying and disqualifying nutrients. The level of understanding nutritional labels among different population groups can be determined, thus providing a good starting point for addressing barriers to label usage. Moreover, these results can be used to design communication strategies and help health professionals to stress the importance of both qualifying and disqualifying nutrients. The Kano model can be used to classify information on nutritional panel labeling that may contribute to consumer satisfaction. (Cannoosamy *et al.*, 2014)

Food is an essential component of human existence but it must be healthy and nutritionally balanced to perform its functions effectively. Hence emphasis is placed on labelling of pre-packed foods at global and national levels. Nigeria operates a mandatory food labelling system. The sector regulator, the National Agency for Food and Drug Administration and Control (NAFDAC) has, over the years, issued successive regulations on labelling of pre-packaged foods, the latest being the Pre-Packaged Food, Water and Ice (Labelling) Regulations 2019 which repealed and replaced the Pre-Packaged Food (Labelling) Regulations 2005 and Bottled Water Labelling Regulations 1996 (NAFDAC Web, 2019). This study examined the knowledge, attitude and practice towards food labels among consumers in Enugu State, Nigeria. Among the issues covered were the laws regulating food labelling in Nigeria; level and sources of

knowledge about food labels; attitude of consumers in Enugu State towards food labels; how uneducated consumers cope with accessing food label information; and willingness of consumers to purchase or consume unlabeled food products. The study was a cross-sectional, descriptive survey involving consumers and sellers of pre-packaged foods in two Local Government Areas in Enugu State, namely Enugu East (urban) and Nkanu (rural) using both qualitative and quantitative methods. Data from the survey showed that 30 consumers, representing 14.9% of the consumers in the study were not aware of the laws that require mandatory food labelling in Nigeria. Similarly, many consumers in both the In-depth Interviews (IDIs) and Focus Group Discussions (FGDs) displayed lack of awareness of such laws. The study further revealed a correlation between the level of knowledge and attitude towards food labels on one hand and the level of education, geographical location and socio-economic standing of consumers on the other. Intensive enlightenment programs to educate consumers on the need to read and be guided by food labels are recommended. (Monye *et al.*, 2020)

Nutritional labeling provides consumers with the information that can be used to make informed and healthier food choices. It is particularly useful for people who are on special diets to select suitable foods for their health conditions. Considering the significant role of consumers' awareness about food labels in making healthy food choices, 430 consumers (60% were female) were interviewed while shopping at various grocery stores in the Kingdom of Bahrain to assess their knowledge, attitudes and practices using a questionnaire. Consumer's responses showed little awareness for reading the food label. Although, 65% of the consumers buy prepackaged food, only 42% read the food label. The majority of the consumers (92%) read the basic information like production and expiry dates; 60% believed that food labels are useful tools for consumers. In addition, they reported that amount of fat and sugar were the most important items to be looked at when they buy the product for the first time. In summary, this study was important to enlighten consumers about the importance of reading the food labels. In addition, it also has an educative health and nutrition implications to help consumers make an informed choice when buying pre-packaged foods. A lot of work is needed to raise the level of awareness of the consumers about the nutrition aspects of reading food labels in order to assist them to make their best healthy food choices. (Wahab, 2018)

The food nutrition label provides the nutrition information that helps consumers on food choices and used to give us information so that customer can choose between foods. This study was

aimed to determine the association between knowledge, attitude and practices on food label use and to determine the factors that influence the use of food labels during making food purchasing decision among university students. A cross-sectional study of undergraduate students at UiTM Puncak Alam in the Kuala Selangor district of Malaysia was conducted in June until July 2011. Three hundred twenty-nine students ($n = 329$) volunteered to complete a Food Label Use Questionnaire (FLUQ) which included question about sociodemographic, level of knowledge about food and nutrition, attitude and practices related to using food labels and factors affecting the use of food labelling. Hypothesis testing was completed using independent t-test, Pearson chi-square and descriptive analysis in which the statistically significant level was set at $\alpha = 0.05$. The results show that, only 21.6% of the students "often" use the food label during food purchasing decision. These study shows that the practices by read the nutrition information were significantly associated with the use of food label ($p < 0.05$). The important aspect during buying food product was expiry date (98.5%), taste (95.7%), price (92.4%) and nutrient content (90.5%) were significantly associated with the use of food label. The student's attitude which is do not know how to use nutritional information label ($p = 0.028$) and label was not attractive ($p = 0.037$) were significantly associated on food label use. (Nurliyana *et al.*, 2011)

i. Knowledge of nutrition information

Nutrition knowledge is not limited to knowledge associated with nutrition and health alone but rather, it also includes knowledge of dietary recommendations, diethealth and diet-disease relationships. Importance of nutrition knowledge in food choices has been recognized from several studies. It was found that knowledge enhanced the effectiveness of food labels and determined food choices of the consumers (Kim, Nayga and Capps, 2001; van Trijp, 2009; Grunert, Wills and Fernández-Celemín, 2010). Moreover, nutrition knowledge increased the benefits arising from nutritional labels and decreased the cost of processing them (Drichoutis, Lazaridis and Nayga, 2005). Miller and Cassady (2015) indicated that nutrition knowledge facilitated usage of labels in three ways i.e. consumers with prior knowledge pay attention to nutrition information, understand them and apply the information while choosing foods. Nutrition information displayed on food labels is generally technical and requires specialized knowledge on part of consumers to understand it in the same sense. Consumers are interested in nutrition information on food labels, but they do not possess required knowledge to use them effectively (Levy, Fein and Stephenson, 1993; Buton, Biswas and Netemeyer, 1994). For

example, Grunert and Wills (2007) found that consumers are aware about calories but for other nutrients, the awareness is quite low. Consumers have been found to be knowledgeable regarding dietary recommendations of experts concerning information about fruits, vegetables and fats but knowledge is quite less regarding sweet foods and calories from fat. Moreover, many consumers (58.2%) are also not aware about diet-disease relationship (Cannoosamy, Pugo-Gunsam and Jeewon, 2014). When consumers' nutrition knowledge was assessed through knowledge on individual nutrients, Marietta, Welshimer and Anderson (1999) found that consumers possessed less knowledge about the terms „reduced calorie“, „good source“ and „serving size“. Contrary to this, when consumers were asked directly to express their knowledge about food labels, 80 percent respondents said they were aware about food labels (Darkwa, 2014). Consequently, it is recognized from the above results that consumers overstated the level of knowledge possessed by them.

Level of knowledge determines the extent of processing of information by the consumers. With higher knowledge consumers not only used labeled information more (Andrews, Burton and Netemeyer, 2000; Kim, Nayga and Capps, 2001b) but also utilized more specific nutrition information (Brucks, Mitchell and Staelin, 1984). On the other hand, with restricted knowledge, consumers processed only simple nutritional messages. Besides this, it has been noticed that too detailed and scientific messages led to misinterpretation and confusion (Williams, 2005). Interestingly, consumers with more knowledge were found to be less skeptical regarding nutrition information on labels (Moorman, 1998). Effect of demographic variables has also been seen on consumers' nutrition knowledge. For example, Cannoosamy, Pugo-Gunsam and Jeewon (2014) found gender, age and education as the determinants of nutrition knowledge. Not only association was found between income and knowledge but positive effect of income was also seen (Nayga, 2000; Drichoutis, Lazaridis and Nayga, 2005). In addition to this, it was recognised that nutrition knowledge differed by personal factors. For instance, females were more knowledgeable than males, individuals who were on special diet and more educated, possessed more knowledge. Different directions have been shown in literature regarding the impact of age on knowledge i.e. negative relationship between age and knowledge (Kim, Nayga and Capps, 2001b), positive relationship between age and knowledge (Kenkel, 1990) and no effect at all (Gould and Lin, 1994). Furthermore, Grunert, Wills and Fernández-Celemín (2010) revealed that older respondents had less nutrition knowledge than the younger ones.

Previous studies suggest that demographic variables affect nutrition knowledge and nutrition knowledge in turn affects other variables i.e. consumers' understanding and use. Ares, Giménez and Gámbaro (2008) found that lack of nutrition knowledge limits consumer understanding of health claims. Several studies have revealed the direct and indirect impact of nutrition knowledge on consumer use of labels (Levy and Fein, 1998; Kim, Nayga and Capps, 2001b; Misra, 2007) while limited studies have shown no impact on label usage (Nayga, 2000). It may be due to absence of understanding of nutrition information, as knowledge was found to be positively associated with consumer understanding (Drichoutis et al., 2008; Norazmir et al., 2012). As a result, nutrition knowledge was found to be an important determinant of consumer understanding and use of nutrition labels (Grunert and Wills, 2007). It is also recognized from the literature that even though consumers possessed nutrition knowledge still they were not interested in reading information on food labels. So, it was pointed out that other factors such as motivation and attitude towards food labels are also important determinants in application of nutrition knowledge. So, in this study, the impact of motivation and attitude has also been studied considering that knowledge and attitude were significantly correlated (Marietta, Welshimer and Anderson, 1999) and motivation predicts knowledge about nutrition information (Millar and Cassady, 2012).

ii. Practices of nutrition label:

Nutrition labelling is gaining lot of attention globally as its use contributes in the achievement of social goals i.e. improvement in public health status. Due to increase in prevalence of diet related diseases, consumers are now shifting to healthy food choices and using nutrition information displayed on food labels for managing their diets. Previous studies have highlighted that consumers' use nutrition labelling on packaged foods (Satia, Galanko and Neuhouser 2005; Aygen, 2012; Besler, Buyuktuncer and Uyar 2012) although the extent of usage of nutrition labelling differs across countries and products (Grunert et al., 2010). It was also found that consumer's actual acquisition of nutrition information was quite low as compared to their reported use (Jacoby, Chestnut and Silberman, 1977; Cruz-Gongora et al., 2012). For instance, a study conducted by Grunert et al. (2010) in European countries using observation and interview method in the stores revealed that nutrition information was looked at by only seventeen percent shoppers. It was concluded in the study that consumers were not able to actually process information in real shopping environment. Consumers' use of nutrition labeling was also found

to be quite low in other countries. A study conducted by Cruz-Gongora et al. (2012) on Mexican consumers revealed that only 17 percent respondents reported that they use nutrition information panel from back of the food packages while buying foods. Similar results have been found from the study conducted in India by Singla (2010) that highlighted limited use of nutrition information on food labels while choosing foods, although consumers consulted food labels for making comparison between brands. This depicts that the reported use of labels is found to be less in these countries. The foremost reasons for not using nutrition information are— lack of interest, shortage of time, inability to understand technical terms, lack of trust and small font size (Shine, O'Reilly and O'Sullivan, 1997b, Unusan, 2004; Mannell et al., 2006; Singla, 2010 and Besler, Buyuktuncer and Uyar, 2012)

Researchers have also studied about the information most often looked at by the consumers from nutrition labels. Shine, O'Reilly and O'Sullivan (1997b), Higginson et al. (2002), Mannell et al. (2006) and Grunert et al. (2010) showed that the nutrients—calories and fat were most frequently looked for by the consumers for purchasing foods. The finding of Aygen (2012) was slightly different as it was reported that information for energy and protein was mostly used for buying decisions. Other nutrients commonly claimed to be consulted by respondents were—carbohydrates, fiber, vitamin, minerals, saturates and sugar (Higginson et al., 2002; Mannell et al., 2006) A range of studies have examined the role of demographic variables on label use but no consistency is seen in the literature regarding significance of differences across demographics. Some studies found the impact of age, income, marital status, household size, working status and having children, while others did not (Nayga, 1996; Misra, 2007; Besler et al., 2012; Grunert et al., 2010; Singla, 2010; Cannoosamy, PugoGunsam and Jeewon, 2014). For example, contradictory results have been found regarding the impact of age. Govindasamy and Italia (1999) and Kim, Nayga and Capps (2001a) revealed that younger consumers processed more nutritional information as compared to older consumers whereas contrary results were shown by others i.e. nutrition labels were more likely to be used by older consumers (Nayga, 1996; Coulson, 2000; Lin and Lee, 2003). Aygen (2012) reported significant but negative impact of income on label use while positive impact was found in a study conducted by McLean-Meyinnse (2001). Consensus has been found in the literature about positive impact of gender and education because most of the studies have confirmed that use of nutrition information was significantly higher for females and educated consumers (Nayga, 1996; Govindasamy and Italia,

1999; Satia, Galanko and Neuhouser, 2005; Drichoutis, Lazaridis and Nayga, 2006). Time spent for groceries also had positive impact on label usage i.e. nutritional labels were mostly used by shoppers spending more time in shopping (Nayga, Lipinski and Savur 1998). Similarly, Grunert and Wills (2007) reported that time pressure limits the use of nutritional labels by shoppers.

Nutrition knowledge and label use are significantly related and knowledge also has positive impact on label use (Drichoutis, Lazaridis and Nayga, 2005; Cannoosamy, Pugo-Gunsam and Jeewon, 2014). Misra (2007) too found positive association between these two variables. But at the same time, it is interesting to note that although knowledge is a prerequisite of label use but knowledge alone does not impact use of labels as this relationship is found to be mediated by attitude. Moreover, higher knowledge and positive attitude towards nutrition increased the use of labels. Similar results were reported by Marietta, Welshimer and Anderson (1999). It was found that positive attitude towards nutrition information was not only significant predictor but also had large impact on label use out of other independent contributors such as age, sex, knowledge and previous education experience. Attitude was recognized as a significant contributor to „intention to use food labels“ (Vijaykumar et al., 2013).

I. Impact of nutrition information on consumer buying behavior

Nutrition labelling has been considered as an important source of communication of information for consumers which can lead to better food choices and healthier diet. For example, reduction in intake of calories, sodium and cholesterol and increase in intake of fiber was seen in consumers who used food labels (Kim, Nayga and Capps, 2001). Shine, O'Reilly and O'Sullivan (1997) also found positive impact of nutrition labelling use on consumers purchase decisions. Nutrition labelling was found to be highly important among other factors such as price, brand, quality, label and packaging. Thus, about fifty two percent consumers were willing to pay extra price for products carrying nutrition labelling (Prathiraja and Ariyawardana, 2003). Similarly, ingredients and nutrition panels were also found to be highly important by Indian consumers as forty six percent and thirty four percent consumers respectively always checked this information while buying foods (Kumar and Pandit, 2008). There are two main sources of nutrition information on food labels for consumers at the point of purchase i.e. nutrition facts panel and nutrition marketing (claims) (Gracia, Laureiro and Nayga, 2009). There are number of ways in which consumers can process this information i.e. both the sources can be used independently or together while choosing a product. Alternatively, one could influence the other and produce

interaction affect. For example, Mitra et al. (1999) investigated whether influence of nutrition panel and health claims on perception of products varied with education level. The results revealed that both these sources influenced perception of consumers regarding products healthfulness when checked independently. Interestingly, when the impact of both sources was checked together (nutrition panel and health claims), only nutrition facts panel was found to affect consumers' perception. Presence of health claims did not influence consumer interpretation of nutrition panel. Moreover, no difference was found in the impact of information sources on less or more educated consumers.

The literature highlights widespread interest of consumers in these sources but no consensus has been found regarding the impact of these sources on buying behavior and the preferred source of information in food choices. When the impact of presence of claims was evaluated in presence of nutrition facts panel, it was found that facts panel displayed on back of packages was valued more as compared to claims (Keller et al., 1997; Gracia, Laureiro and Nayga, 2009). But contradictory results were revealed in both the studies regarding the impact of claims. Keller et al. (1997) reported that presence of nutritional claims on front of packages had no positive impact on purchase intention of consumers and consumers relied more on information provided in the nutrition facts panel for product evaluations. Similar results were reported by Garretson and Burton (2000) when the impact on purchase intention was investigated. Information regarding fat in the nutrition panel affected purchase intention but no influence of presence of health claims was seen. Contrary to this, according to Gracia, Laureiro and Nayga (2009), nutritional claims were also valued by consumers even though higher importance was accredited to the nutrition facts panel. It was revealed that consumers were ready to pay twice the amount for a product with nutrition facts panel against a product containing „light“ claim. Different results have been reported by Roe, Levy and Derby (1999) who found that consumers were positive about health claims and more weightage was given to claims than the nutrition facts panel. Moreover, consumers truncated information search and viewed only the front panel in the presence of health claims. But, it was also revealed that these claims created halo effects about the presence of nutrients.

The manner in which nutrition labelling influences dietary choices of an individual also depends upon trust in the communicated information. It has been recognized that consumers hesitate to trust information presented on food labels (Chan, Patch and Williams, 2005). Specifically,

consumers are more concerned about the accuracy of health claims displayed on the packages (Garretson and Burton, 2000). As consumers are skeptical about health claims (Tan and Tan, 2007), the relationship between skepticism and use of claims was found to be negative but on the other hand, positive relationship was revealed between skepticism and use of nutrition labels (Szykman, Bloom and Levy, 1997). The results indicate that when consumers are doubtful regarding the correctness of health claims, they use nutritional labels instead of claims. Similar results have been reported by Garretson and Burton (2000) who found that consumers posed lesser trust in a claim when incongruent (dissimilar) information for fat was given on a product but it had no effect on trust in the nutrition panel data. Although trust associated with nutrition labelling mainly depends upon the sources of communicated information but some other factors such as demographics also affect this relationship. For example, nutrition information was trusted by women more than men (Urala, Arvola and Lähteenmäki, 2003). Contradictory results were reported by Aygen (2012) while measuring perceived trustworthiness of claims who found that males showed more trust in claims such as „light“, „healthy“, „extra skimmed“ and „100% natural“ as compared to females.

J. Socio-demographic factors associated with use of food labels

Gender → Studies have shown gender variation in the use of food labels. While most studies have pointed towards women being more interested in reading food labels than men, findings have not been very consistent. Recent studies by Sharf et al 2011; Besler et al 2012 and Saha et al, 2013 have found women paying more attention towards food labels than men. Females have been reported as more diet and weight conscious and hence draw more attention towards the sugar, fat and caloric content of a packed food. A study by Worsley in 2003 conducted on South Australians to assess their trust in various sources of nutritional information, found that majority of women trusted the nutritional information given through food labels. However, many studies have reported no major role of gender towards motivation of reading food labels (Nayga 2000; Vijaykumar et al 2013). In fact, a study conducted by Ali and Kapoor, 2009 reported a higher likelihood of males reading the food labels than females in India.

Age → Age has been also found as a major factor affecting one's interest in reading food labels. Evidence suggests a link between a person's age and his/her ability to understand the food label content. Therefore, many studies have shown a positive food label reading habit among the middle aged group. According to a study conducted by Gorton et al, 2009, participants within the

age-group of 25-39 years had higher odds of reading food labels as compared to those within the age-group of 18-24 years. Similarly, in another study by Sinclair et al, 2013, those within the age-group of 25- 34 years were found to be more significantly able to understand the food labels than those within a higher age group of 35-64 years. Contrastingly, a study by Satia, Galanko & Neuhouser 2005 reported an increase in food label use with increase in age, where population in the age group of 50 to 70 years were found to be more health conscious regarding dietary cholesterol and fat intakes. However, many studies report no particular association between age and reading of food labels (Hess, Visschers and Siegrist 2012).

Education→ Higher educational status has been found to be strongly associated with more frequent use of food labels. A well-educated consumer tends to search for more food related information and thus use food labels (Katona and Mueller 1995). A Consumer with a higher educational status also tends to better understand food and nutrition related terminology present on food labels. In a study by Jacobs et al, 2010, participants with a higher educational status were better able to perform food label reading tasks than those with a comparatively lower educational status. Similarly, in a study by Bleich and Wolfson, 2015, a higher use of nutrition facts panel, ingredients list and serving size was reported for participants having an educational level above high school education.

It must be pointed out here that it cannot be concluded that those with a lower educational level are less likely to use food labels. Evidence suggests that consumers with a lower educational status do read food labels but the information that they look for differs from those with a comparatively higher educational status. A study by Ali and Kapoor, 2009 reported consumers with a low educational level concentrated mostly on the price information on the food label, those between high school and graduate preferred to look for ingredients list, instructions for preparation and any precautions for children. 32 It was also reported that consumers with an education level equivalent to graduation or above were found to be interested in reading health-risk, serving size and vegetarian/non-vegetarian indication related information.

Income status→ Higher income status has shown a positive role towards use of food labels. Studies have reported that consumers with a lower income status in most cases concentrate on price and flavor on a food label while buying pre-packed food (Pettigrew & Pescud 2013). A rise in interest in other components of a food label like ingredient list, serving size, nutrition acts etc.

has been seen with a rise in income levels (Barreiro-Hurlé, Gracia & De-Magistris 2010). Researchers have also associated a higher income status with a higher educational status.

Area of residence— Few studies support any relation between a consumer’s residential area and their use of food labels. A study by Chopera et al, 2014 reports a higher consideration for net weight/volume among rural consumers whereas urban consumers held high importance for ingredients and date of expiry. According to a study by Ali and Kapoor, 2009, consumers from urban areas considered information regarding nutritional quality as more important, while rural consumers mostly concentrated on the product’s serving size, manufacturing details and indications of vegetarian/non-vegetarian.

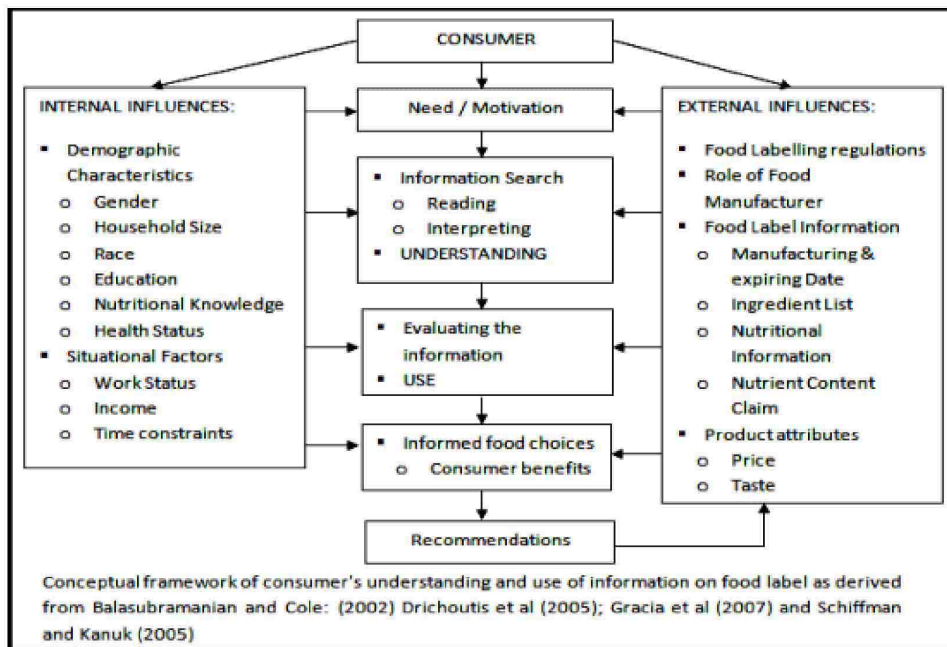


Figure 2.1 Consumer’s understanding and use of information on food label

K. Nutrition education to enhance the knowledge of food and nutrition labelling

Nutrition education is stated as any combination of learning experiences intended to facilitate the voluntary acceptance of eating and other nutrition-related behaviors beneficial to health and well-being (Contento et al., 1995). Such a definition suggests that behavioral change is the appropriate outcome criterion for evaluating the effectiveness of nutrition education. However, Behavioral change has been elaborated quite contrarily in various studies. Nutrition education

helps individuals, families, and communities make informed choices about food and lifestyles that support their physiological health, economic, and social well-being (USDA, 2012).

The evaluation measures described in the present review thus include not only physiologic parameters and nutrient intakes but also evaluation of the more proximal effects of nutrition education: food intakes and behaviors, including intakes of specific foods such as high-fat foods, fruits, and vegetables, and some composite index of food intake, food score, or actual behaviors, such as taking the skin off chicken, eating small portions, salting food, making fruits available and visible at home, or having one's serum cholesterol level checked.

The manner in which nutrition education is presented to individuals or groups prominently affects the outcomes. Not only is a learner-centered approach required, but also application of adult learning principles is necessary to impact older adolescents and adults. Individual counselling can be more easily tailored to the needs and situation of each learner. Recently, the more sophisticated tool used in Nutrition education is mass media. Mass media has extended beyond broadcast and print media to include the variety of opportunities available on the Internet and through other technology like cellular phones. The dissemination of hypothetical nutrition information from unreliable sources is one of the serious challenge posed by mass media. Hypothetical nutrition information is also spread by Advertisers or commercial interesters. People need support to the discrete fact from fiction when they search for nutrition-related information on internet sources such as search engines (McNulty J. 2013).

Nutrition education offers a great opportunity for individuals to learn about the essentials of nutrition for well being and to improve the quality of their diets (Robinson et al., 2004). Nutrition education influences the attitude of youngsters and enhances the knowledge and skills required for them to understand on temporary food and nutrition issues. Studies have shown that educational institutions are the most effective and efficient ways to reach a large segment of the population including young people and their families. The beneficiaries can act as mediators by spreading the message to a large segment of the population (Vijayapushpam et al., 2008).

Nutrition education through interactive computer-assisted instruction tools where the child could see, hear, participate and interact makes it more effective and purposeful in the management of childhood obesity (Puhl & Latner, 2007). The information gathered can be useful in the construction of nutrition education programmes and to give dietary advice (Gordon, 2009).

III. METHODOLOGY

The methodology of present study entitled **Efficacy of Online Survey on Knowledge, Attitude and Practices among Young Adults towards Food and Nutrition Labeling** is discussed under following heads:

PHASE I: Selection of Area and Subjects

PHASE II: Formulation of Tools to Conduct the Online Study

PHASE III: Mapping of Subjects for further nutrition intervention to improve the Knowledge related Food and Nutrition Labeling

PHASE IV: Nutrition Education to Enhance the Knowledge Related to Food and Nutrition Labeling and Effective Consumption of Food Products.

PHASE V: Analysis and Interpretation of Data.

PHASE I Selection of Area and Subjects

A. Selection of area

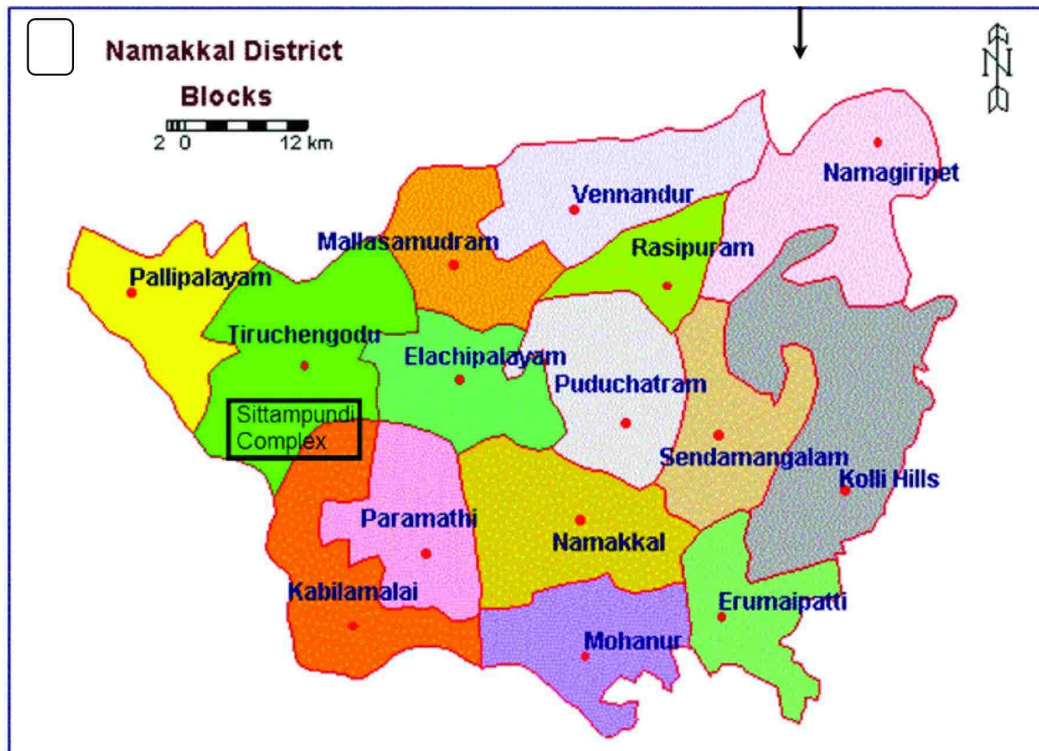
Food labels carry information that will help us to make food choices. Labels will list additives, ingredients and nutrition information such as fat and protein content. Foods that have a shelf life of less than two years must carry a 'use-by' or 'best before' date. Food labels can help people with food allergies, and may also make nutrition and health claims. A food label also list the country of origin of the food product and many more.

Namakkal is one of districts of Tamil Nadu in India. This area was selected on the basis of easy accessibility, availability of adequate number of subjects and the cooperation rendered towards the study by the selected subjects, assessment of knowledge, attitude and practices survey related food and nutrition labelling was carried out among the selected subjects in Suburban area of Namakkal and the collected data was properly recorded.

The selected subjects for the study were willing to know about the food and nutrition labelling and their knowledge were to implement in their daily life practices. 85. R. Komarapalayam, Gurusamipalayam, Kurukupuram, Kalyani, Erikadu, Nattamangalam, Kolunchipatti, Thagram,

Thindamangalam, Agaravaram are rural area of Namakkal. Rasipuram, Namakkal, Andagalore Gate, Pachal, Vaiyappamalai are sub urban area of Namakkal District were the study area where adequate number of subjects were available to conduct the study in an effective manner.

Figure 3.1 Selected Area Map



B. Selection of subjects

Probability sampling technique was used and in which researchers choose samples from a larger population using a method based on the theory of probability. This sampling method considers every member of the population and forms samples based on a fixed process. Cluster sampling is a method where the researchers divide the entire population into sections or clusters that represent a population. Clusters are identified and included in a sample based on demographic parameters like age, sex, location, income and purchasing choice and so on. Rapport with subject is an important venture of the study. So, get along with the sample to ensure full co-operation carry out the study. Subsequent to establishing rapport with the student, they were oriented about the study.

The study subjects were selected randomly, considering the inclusion and exclusion criteria.

Table I
Inclusion and exclusion criteria of selected subjects

Inclusion criteria	Exclusion criteria
Age above 20 years and less than 35 years adults of both genders.	Age less than 20 years and more than 35 years.
Namakkal population	Not able to read and write.
Subjects Nutrition & Non- nutrition Working & Non working background.	Not willing to involve and non cooperative.
Subjects from Rural & Urban area of Namakkal.	Other than Namakkal.

The selected 213 subjects were in the age group of 20- 35 years with nutrition and non nutrition background of both employed and unemployed adult women available in the selected study area.

PHASE II: Formulation of Tools to Conduct the Online Study

In this present study, primary data collection method was used to conduct the present study. In the primary data collection questionnaire was used to collect the data.

A questionnaire is a research instrument consisting of a series of questions for the purpose of gathering information from respondents. Questionnaires can be thought of as a kind of written interview. They can be carried out face to face, by telephone, computer or post. Questionnaires provide a relatively cheap, quick and efficient way of obtaining large amounts of information from a large sample of people. Data can be collected relatively quickly because the researcher would not need to be present when the questionnaires were completed. This is useful for large populations when interviews would be impractical. Questionnaire used had both open and closed questions for collection of data.

Closed questions structure the answer by only allowing responses which fit into pre-decided categories. Closed questions can also provide ordinal data (which can be ranked). This often involves using a continuous rating scale to measure the strength of attitudes or emotions. They can be economical. This means they can provide large amounts of research data for relatively low costs. Therefore, a large sample size can be obtained which should be representative of the population, which a researcher can then generalize from. (Saul McLeod, 2018)

Open questions allow people to express what they think in their own words. Open-ended questions enable the respondent to answer in as much detail as they like in their own words. Rich qualitative data is obtained as open questions allow the respondent to elaborate on their answer. This means the research can find out why a person holds a certain attitude. (Saul McLeod, 2018)

With these short background information, questionnaire was specially designed for effective collection of data related to the present study.

Questionnaires had the following categories.

- A. **General information** includes subject Name, Date of the survey and the area where purchased product based on food groups and details related to food and nutrition labels.
- B. **Social demographic information** includes Gender, Age, Education qualification, Occupation, income and purchasing capacity.
- C. **Food labelling, nutrition labelling** includes importance, purchasing habits, understanding the information, uses, awareness, purchasing choice, reason for reading thought about label, health issues, Trust towards food labels, Use of claims and product storage through the label about food and nutrition labelling.

PHASE III Mapping of Subjects to Improve the Knowledge Related to Food and Nutrition Labelling

A. Online survey

Online surveys are the most cost-effective and can reach the maximum number of people in comparison to the other mediums. The performance of these surveys is much more widespread than the other data collection methods. The present survey is conducted in online. The prepared Google form posted in the social media like WhatsApp, Instagram, Telegram were used to collect the data related to conducted food and nutrition labelling. In the population voluntary they were participating in the survey. The respondent completed the questionnaire properly instructions were given along with the Google form.

B. Data collection

Data are the basic input of any decision-making process. The processing of data gives statistical importance to the study and be classified into primary and secondary data (Reddy 2000).

According to Paneer Selvam (2005) data are the basic input in any decision-making process. The processing of data gives statistics of the study.

C. Nutrition education to enhance knowledge of the selected subjects towards food and nutrition labelling

- ❖ Knowledge: In present study knowledge means the awareness or information of the selected subjects regarding food and nutrition labeling and was collected using suitable questions.
- ❖ Attitude: An attitude towards an object or a person is a state of readiness to think or to feel about and to act towards that object or person in a certain way. Attitude is a reflection of an opinion or judgment of agreement. For the assessment of attitude the response of selected subject regarding an aspect of nutrition is evaluate as positive or negative responses.
- ❖ Practice: Practice means an exercise or action that corresponds to a theory. The theory may be based on learning or customs or culture. Practices also pointed out the application of knowledge in their day to day activities by having suitable practices.

i. Nutritional label reading

An opening question was asked from respondents using five-point Likert scale (1=never to 5=regularly) that “how frequently do you read nutrition labels on food packages” to select respondents for the study.

ii. Attitude towards nutrition information

Consumer’s attitude towards nutrition information displayed on food packages is posited to effect use of nutrition information. Attitude towards nutrition information is measured. Consumer responses were taken on five-point Likert scale ranging from “1” (strongly disagree) to “5” (strongly agree).

iii. Knowledge of nutrition information

An open ended question has been used to measure consumer knowledge regarding nutrition labeling. Consumers were instructed to list all the information they have seen on the product’s nutritional label.

iv. Understanding of nutrition information

Understanding of nutrition information has been measured with a scale adopted from DHKS questionnaire (1996). This scale comprising of six statements. Consumer responses have been recorded on three-point Likert scale where “1”= DON’T KNOW, “2”= STRONGLY DISAGREE and “3”= PARTIALLY DISAGREE. Two additional options have been used with three point scales for more correct responses i.e. “STRONGLY AGREE” and “DON’T KNOW”.

v. Use of nutrition information

Consumer’s use of nutrition information has been measured by asking as to how often consumers look at listed nutrition information. Overall use of nutrition information has been assessed including information on nutrition panel and information about claims. Thirteen statements describe this construct. Consumers responses have been taken on four-point Likert scale ranging from 1 to 4 (1=never and 4= regularly).

vi. Use of claims:

Three types of claim (word claims, nutrition claims and disease risk reduction claims) have been identified from packaged foods marketed in India. Highly used claims were identified and used to frame the scale for measuring „use of claims“. Consumers“ responses have been sought on “YES” or “NO” regarding use of these claims on food packages while buying foods.

vii. Trust towards food labels:

Trust of consumers in food labels has been measured with the help of two statements scale adopted from Garretson and Burton (2000). Seven-point Likert scale has been used for recording level of agreement and disagreement where “1” stands for strongly disagree and “7” stands for strongly agree. In the last part of the questionnaire, information regarding personal characteristics has been sought from the respondents. Information relating to gender, age, and city, and marital status, number of children, education, occupation and monthly family income has been collected.

PHASE IV Nutrition Education for further nutrition intervention Enhance the Knowledge Related To Food and Nutrition Labeling and Effective Consumption of Food Products.

The potential for nutrition labels to impact on population health relies on consumer ability to know and use this information. Consumer understanding of this information varies across socio demographic groups and with different label design formats. Labeling legislation requires

consumer education on the way to use nutrition labels, and up to date mandatory changes to the Nutrition Facts Panel (NFP) are underway to boost comprehensibility. Database searches were performed to spot interventions which delivered education on nutrition labels with outcomes measuring aspects of comprehension or use. (Moore, *et al.*, 2018)

Using nutrition information to shape healthy dietary choices requires consumer understanding and interpretation of nutrient contents and dietary recommendations. Therefore, a private understands or “knowledge” of what nutrition label information means should theoretically precede consumers’ actual use of this information in evaluating food purchases. However, understanding of nutrition label information has been found to vary across different age groups, genders, and academic attainment levels. Additionally, it's known that adequate health literacy, defined because the ability to get, understand, and use basic information needed to form decisions about health, similarly as numeracy, are key characteristics related to use and understanding of this information. As such, there's likely to be a drawback for a few consumer types, including those with limited levels of numeracy and health literacy, who are expected to use this information to create healthy choices.

Nutrition education incorporates a broad vision which encompasses educational strategies and environmental supports to encourage adoption of healthier, sustainable food choices and eating patterns. It goes beyond information-giving to foster critical thinking, attitudinal change and practical skills, in addition as integrated actions to facilitate and enable health-conducive food behaviors and environments. Nutrition education takes place in multiple settings, targeting different population groups and utilizing a range of channels, tools and materials.

A. Development and validation of nutrition education modules

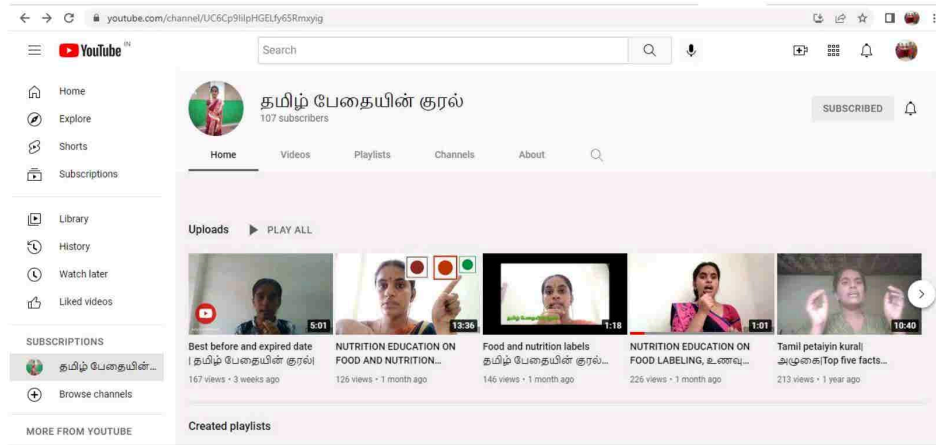
After evaluating the nutrition knowledge of the selected subject, the Nutrition education modules was developed. The Nutrition education modules was developed to enhance their knowledge regarding attitude towards common concerns for food and nutrition labeling, food and nutrition labeling claims, food safety, and principle of nutrition labeling, giving food group based food and nutrition labeling reading practices.

Development of education material for nutrition education: Education materials to impart nutrition knowledge were developed, by taking into consideration the subject’s prior knowledge of beneficiaries and functionaries. For development of NKM the content were discussed with the

supervisor and prepared a video and posted in the social media like YouTube, Whatsapp, Instagram and Telegram.

<https://www.youtube.com/watch?v=WDb6kZAVmhc&list=PLmErXIVDRvpTkG06U1Y6ZTtGtIq05RVCH> this is the nutrition education playlist link.

Figure 3.2 Nutrition awareness video



B. Creating awareness on food and nutrition label

Creating awareness through nutrition education is a key component of promotion of the good purchasing habit. In addition, it's also improved the health status and also reduces the purchasing of unhealthy foods. Studies that highlights proper nutrition education about food and nutrition labeling changing the purchasing habits of the consumer. With these backdrop simple suitable and e- media related education modules were developed in the term of video. Using the social media platform the nutrition education videos and poster were posted. And the links were shared in the Whatsapp groups and videos were watched by the selected subject. And the nutrition education programmed was well designed and subject extended their full co- operation. Whatapp in the name of label is cable for food products and You tube in the name of tamil pethaiyen kural.

YouTube videos contains following information:

Introduction about food and nutrition label,

Importance for reading food and nutrition label,

FSSAI guidelines about food and nutrition labels,

Difference between best before data and expired data,

Awareness about nutrition label facts and content,

Awareness about food group based product food labeling and how to check that and buy.

Awareness about practice reading food labels and how it is use full to our day to day life.

These are content covered in the video and shared among the selected subjects through the social media, and the subjects were watched and their views in the concerned site.

C. Implementation and evaluation of nutrition education on knowledge, attitude and practices of the selected subjects towards food and nutrition labeling

Nutrition education an accessible tool for developing healthful nutrition related practices (Kelder, 2012). Effect of nutrition education was assessed by comparing the initial and final labeling knowledge scores secured by the selected subjects during the nutrition education intervention for the period of fifty days.

PHASE V Analysis and Interpretation of Data

A. Data Analysis

Analysis of data involved number of closely related operation that is performed with the purpose of summarizing the collected data and organizing them in such a manner that they will yield answer to the research questions (Mohan, 2007).

The information obtained from the subjects was consolidated systematically and transformed scientifically in excel sheet. Tabulation of data was done as per the requirements of the study. Subjects were categorized in different categories as per their socio demographic profile of the subjects. And the data were coded for the statistical analysis. Socio- economic profile of the selected subject, association of knowledge with the level of occupation, study area of rural and urban / nutrition and non-nutrition students / employed and un employed young adult women (20-35 years) were analysed. The data was presented in the tabulation form and pie chart or bar graphs were used to represent the collected data in the suitable headings.

RESEARCH DESIGN

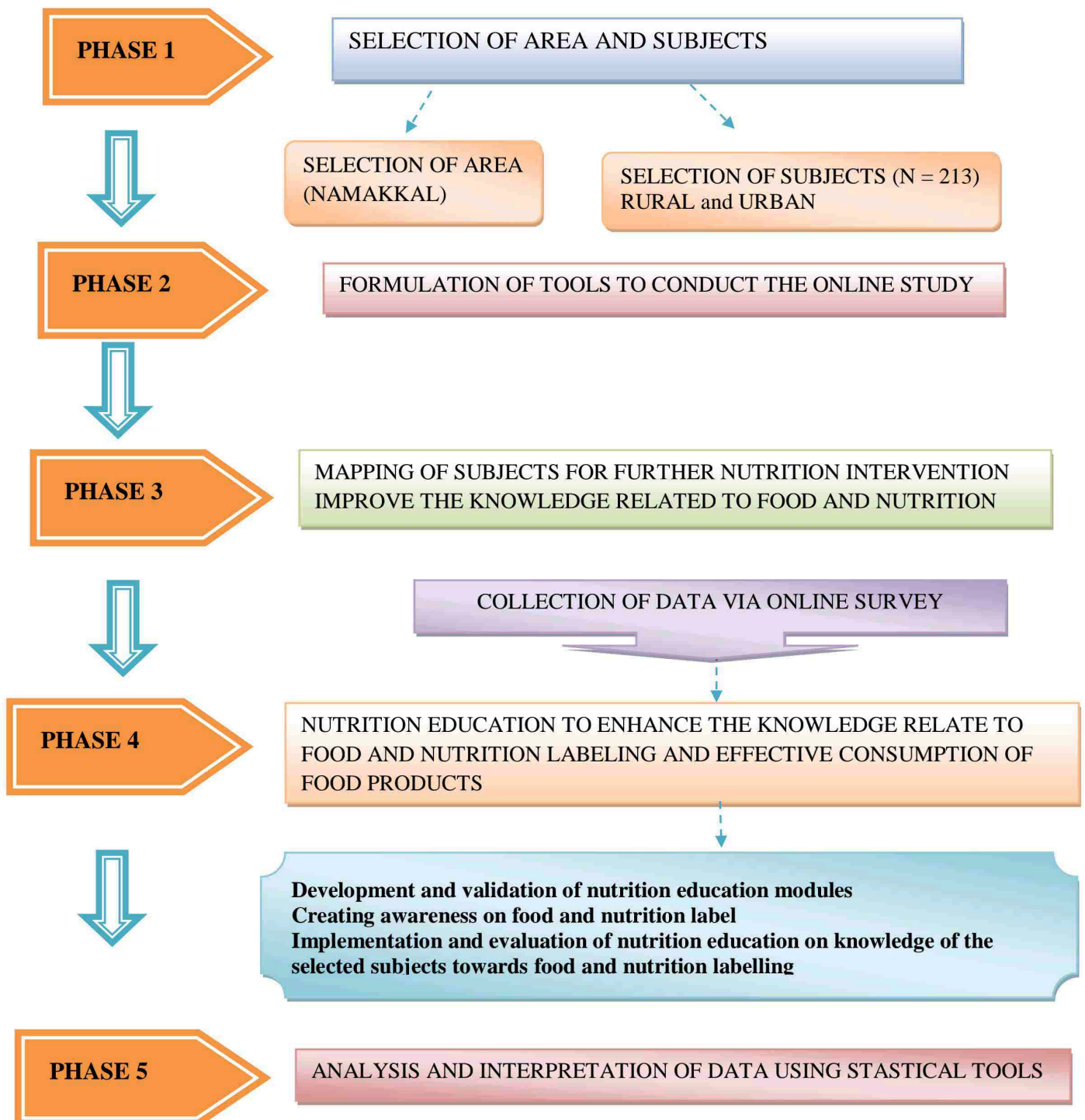


Figure 3.3 Research design

IV. RESULTS AND DISCUSSION

The results of the study on “EFFICACY OF ONLINE SURVEY ON KNOWLEDGE, ATTITUDE AND PRACTICES AMONG YOUNG ADUTLS TOWARDS FOOD AND NUTRITION LABELLING” are presented and discussed under the following headings:

- A. Socio economic profile of the selected subjects
- B. Purchasing habits of selected subjects
- C. Knowledge related to food and nutrition labels
 - 1. Importance of Food and Nutrition Label
 - 2. Information related to Food and Nutrition Label
 - 3. Information related to Food and Nutrition Label
 - 4. Opinion about Food Label
- D. Attitude towards food and nutrition labels
 - 1. Reason for Reading Food and Nutrition Label
 - 2. Health Issues of the selected subjects
 - 3. Trust Towards Food Labels
 - 4. Information in the food and nutrition label is trusted
 - 5. Quantity and quality of corrected information on nutrition label
- E. Practice of the selected subjects on food and nutrition labels
 - 1. Habits of Checking Food Labels and Choice of Food Items
 - 2. While purchasing check food label
 - 3. Purchase of expired products
 - 4. Check the packaging are damaged
 - 5. Food and nutrition label information influence the purchasing capacity
 - 6. Uses of Food and Nutrition Information Given In The Food Labels
 - 7. Time checking the food & nutrition label
 - 8. The information on food & nutrition label helps to purchase the product
 - 9. Observation of the weight of the food products
 - 10. Use of Claims
 - 11. Product Storage
 - 12. Keeping the food label until the product is fully used
 - 13. Properly used before expiry date

A. Socio economic profile of the selected subjects

Table II
Socio economic profile of the selected subjects

Socio economic factor	Rural		Urban	
	N = 114	%	N = 99	%
Education qualification				
UG/ PG	95	83	82	83
High school	13	11	15	15
Higher secondary	6	6	2	2
Occupation				
Employed	33	29	26	26
Unemployed	20	18	27	27
Nutrition students	31	27	17	17
Non- nutrition students	30	26	29	30
Monthly income*(Rs)				
Rs. 2500-4500 (low)	52	46	7	7
Rs. 4501 — 7500 (middle)	37	32	29	29
Rs. 7501 and above (high)	23	22	63	64
Food expenditure pattern (%)				
0 – 20	2	2	0	0
20 – 40	70	61	21	21
40 – 60	36	31	59	60
Above 60	5	5	19	19

*HUDCO Income Classification (2004)

i. Education qualification

The data related to education qualification revealed that 83 percent of the rural people have completed their UG/ PG education in college/ university, and 11 percent of the people completed secondary level and six percent of the selected subjects had high school level education whereas majority of the selected subjects from urban area had their UG/PG education with the percent of

83 and higher secondary school education was secured on 15 percent of the selected subjects and meager percent had basic school level education. At the same time, there was no distinguished difference in the urban and rural selected subject education level.

ii. Occupation

Among the selected 213 subjects in rural area of Namakkal nearly 29 percent were employed, 18 percent were unemployed, 27 percent were nutrition and 26 percent were non- nutrition students. In urban 26 percent were employed, 27 were unemployed, 17 percent were nutrition student, 30 percent are non nutrition student.

iii. Monthly income

According to Housing and Urban Development Corporation (2004) in rural are 46 percent were in low income group, 32 percent were in middle income and 22 percent were high income groups whereas in urban seven percent were in low income, 29 percent were middle income and 64 percent were in high income group. Compare to the subjects selected from rural area, urban area were earning more and belong to better income group.

iv. Food expenditure pattern

Total food expenditures, the amount spent at stores and in restaurants were lower among low-income households compared with other households. (Sharon Kirkpatrick, 2007). In rural area nearly two percent were spent 0- 20% of their monthly income for purchasing food, 61 percent were spent 20- 40% of their monthly income for food, 31 percent were spent 40- 60% of their monthly income for food and less than five percent spent more than 60% of their monthly income. In urban area none of the selected subjects spent 0- 20% of their income for food, 21 percent were spent 20- 40% of their monthly income for food, less than 60 percent were spent 40- 60% of their monthly income for purchasing food, food products and 19 percent were spent more than 60 percent of their monthly income. Urban people were spending more of their income for purchasing foods and food products when compared to rural selected subjects on food compared to rural.

B. Purchasing habits of the selected subjects

This has induced big national and multi-national corporations to invest into organized retailing. In the emerging Indian retail environment, this study provides insights on consumers' preferences of food and grocery products in terms of product and market characteristics with the help of primary survey data. Findings of the study clearly indicate that vegetables and fruits are

most frequently purchased from nearby markets as compared to grocery products. High consumer ratings on the product attribute of freshness/cleanliness along with price and quality suggests that food retailing needs to be customized as per their requirements (Ali *et al.*, 2011).

Table III
Purchasing habits of selected subjects

Attributes	Rural				Urban			
	1 N= 114	2 N=114	1 (%)	2 (%)	1 N= 99	2 N= 99	1 (%)	2 (%)
Purchasing capacity								
Daily	4	0	4	0	15	2	13	2
Bi weekly	7	3	6	3	48	6	45	6
Weekly	83	21	73	18	36	16	33	16
Bimonthly	6	35	5	31	10	12	8	12
Monthly	0	47	0	41	0	63	0	64
Others	14	8	12	7	4	0	1	0
Purchasing place								
Whole Scale	4		3		6		7	
Market	17		14		42		42	
Shop	9		8		39		39	
Farmers	84		75		12		12	

*1= Perishable foods 2= Perishable foods

i. Purchasing capacity

In rural area perishable foods purchased daily, weekly twice, weekly and monthly twice were four percent, six percent, 74 percent and five percent respectively. Non perishable foods purchased weekly twice, weekly, monthly twice and monthly were three percent, 18 percent, 31 percent and 41 percent respectively. In urban area perishable food purchased daily, weekly twice, weekly and monthly twice were 15 percent, 49 percent, 26 percent and 10 percent respectively. Non perishable foods purchased daily, weekly twice, weekly, monthly twice, monthly were less than two percent, six percent, 16 percent, 12 percent and 64 percent respectively. Compared to urban, rural subjects were purchased perishable food were in weekly bases. Others like house

hold framings were 12 percent perishable and seven percent non perishable food like Ragi, Sorgam, groundnuts collected from their own forms in rural area and four percent of urban subjects were collected perishable foods for their own organic green garden.

ii. Purchasing place

In rural area nearly four percent were purchased the variety food items from wholesale depots, 15 percent were purchased in local markets, eight percent were purchased in shops and departmental stores and 74 percent were purchased from local farmers whereas in urban area nearly seven percent were purchased from wholesale depots, 42 percent were purchased in markets, 39 percent were purchased in shops and departmental stores and 12 percent were purchased from local farmers. Compared to the subjects from the urban area rural subjects mostly purchased from their farms or direct purchase from the farmers at local market directly whereas in local urban area, the selected subjects purchased from the markets, shops, online mode.

C. Knowledge related to food and nutrition labeling of the selected subjects

Knowledge means the awareness or information of the selected subjects regarding food and nutrition labeling and was collected using suitable questions.

1. Importance of Food and Nutrition Label

Food labeling is a population-based approach to nutrition education that enables consumers to make more healthful choices by providing information at the point of purchase. Nutrition information, given as a nutrition label (called Nutrition Facts panel in some countries), is an important component of food labeling that provides knowledge of basic nutritional principles, generates consumer interest, and instills confidence that the food selection environment is conducive to making healthful choices (Cowburn and Stockley , 2005).

Table IV

Food labelling is an important attributes for food products

Attributes	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
Agree	61	29	61	29
Disagree	10	5	-	-
Neutral	45	22	1	-
Strongly agree	84	39	147	69
Strongly disagree	13	5	4	2
Total	213	100.0	213	100.0

Before conducting nutrition education programme, 29 percent agreed and five percent disagreed, 22 percent neutral, 39 percent strongly agreed and five percent strongly disagreed that food labeling was important for any food products. Nearly 30 percent of the selected subjects only aware of the importance of food labeling.

2. Information related to Food and Nutrition Label

Some consumers understand some of the information on nutrition labelling, in general they reported finding nutrition labelling confusing, especially the use of some technical and numerical information. Consumers reported that they did understand the terms ‘fat’, ‘calories/kilocalories’, ‘sugar’, ‘vitamins’ and ‘salt’ (Gill, 2004).

Table V

Quality of information on food and nutrition label

Attributes	Before nutrition education N = 213				After nutrition education N = 213			
	1	2	3	4	1	2	3	4
Easy to under stand	19 (32%)	7 (15%)	36 (75%)	21 (36%)	43 (73%)	35 (74%)	39 (81%)	29 (49%)
Somewhat easy to under stand	16 (27%)	12 (27%)	9 (19%)	30 (51%)	16 (27%)	12 (26%)	9 (19%)	30 (51%)
Somewhat difficult	15 (25%)	14 (29%)	3 (6%)	7 (11%)	0	0	0	0
Difficult to understand	9 (16%)	14 (29%)	0	1 (2%)	0	0	0	0
Total	59	47	48	59	59	47	48	59
t value	9.170							
P value	0.00*							

1= Employed 2= Unemployed 3= Nutrition student 4= Non nutrition student

*Significant difference at 5 percent level.

Before nutrition education quality of information provided in the food and nutrition label 32 percent employee were easily understand, 16 percent employee were difficult to understand the information provided in the food and nutrition label, 15 percent unemployed were easily understand, 29 percent were difficult to understand the information provided in the food and nutrition label, 75 percent nutrition students were easily understand, three percent nutrition students were difficult to understand the information provided in the food and nutrition label, 36 percent non-nutrition students were easily understand, 7 percent were difficult to understand the information provided in the food and nutrition label. After nutrition education quality of information provided in the food and nutrition label 73 percent employee were easily understand, 74 percent unemployed were easily understand, 81 percent nutrition students were easily understand, 49 percent non-nutrition students were easily understand. P value is ≤ 0.05 so the

null hypothesis was rejected and alternative was accepted. So there is significance between before and after nutrition education.

Table VI
Checking nutritional information in the label

Attributes	Before nutrition education N = 213				After nutrition education N = 213			
	1	2	3	4	1	2	3	4
Never	15 (25%)	13 (28%)	11(23%)	20(34%)	0	0	0	0
Rarely	13 (22%)	5 (11%)	8 (17%)	15(25%)	1 (2%)	1 (2%)	1 (2%)	1 (2%)
Sometimes	20 (34%)	15 (32%)	17(35%)	34(57%)	31 (52%)	32 (68%)	19(40%)	34(57%)
Regularly	11 (19%)	8 (17%)	20(42%)	13(22%)	27 (46%)	14 (30%)	28(58%)	23(39%)
Total	59	47	48	59	59	47	48	59
X ² value	129.125							
P value	0.00 *							

1= Employed 2= Unemployed 3= Nutrition student 4= Non nutrition student

*Significant difference at 5 percent level.

Before nutrition education intervention 25 percent employees of the selected subjects did not check the nutrition information in the food products labels, 19 percent employees were regularly check the nutrition information in the label, 28 percent unemployed did not check the nutrition information in the label, 17 percent regularly check the nutrition information in the label, 23 percent nutrition students did not check the nutrition information in the label 42 percent nutrition students regularly check the nutrition information in the label, 34 percent non-nutrition students did not check the nutrition information in the label, 22 percent non- nutrition students regularly check the nutrition information in the label. sAfter nutrition 46 percent employees were regularly check the nutrition information in the label, 30 percent regularly check the nutrition information in the label, 58 percent nutrition students regularly check the nutrition information in the label, 39 percent non- nutrition students regularly check the nutrition information in the label. P value is ≤ 0.05 so the H_0 is rejected and H_a is accepted. So there is significance between before and after nutrition education.

3. Information related to Food and Nutrition Label

Considering the significant role of consumers' awareness about food labels in making healthy food choices, this study was designed and executed to assess the knowledge, attitude and practice of the selected subjects about food labeling (Mahdavi, *et.al*, 2012). Table V depicts the awareness of the selected subjects towards food and nutrition labels of food products.

Table VII

Awareness towards food and nutrition label of the food products

Awareness	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
Yes	156	73	213	100.0
No	57	27	0	0.0
Total	213	100.0	213	100.0

Before nutrition education intervention, 73 percent of the selected subjects were aware of food and nutrition label, 27 percent were not aware of food and nutrition label of the food products. After nutrition education intervention, it was heartwarming to note that all the selected subjects were interested to note the content nutrition information given in the food and nutrition labels of the food products available the commercial outlets and the figure 4.1 also highlights the rating of knowledge on food and nutrition labelling before and after nutrition education intervention.

Table VIII

Noticing the content of food label before purchasing

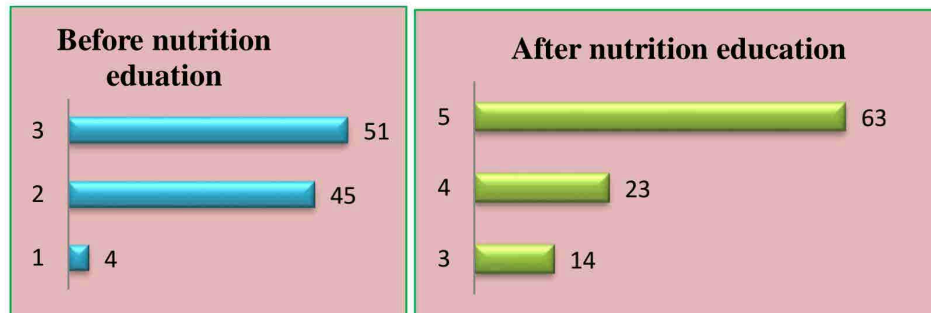
Attributes	N	Percent
All of them	10	5
No one	6	2
Somebody	197	93
Total	213	100.0

Less than five percent selected subjects particularly opened and noted the nutrition information in the food label before purchasing the products, two percent selected subjects did not note the food label while purchasing, nearly 93 percent felt that observation of the food labels before

purchasing the food products was highly useful and helpful for giving quality consumption of food products.

Figure 4.1

Rating of knowledge on food and nutrition label before and after nutrition education



Before nutrition education selected subjects were rated as 1, 2, and 3 with the score of four percent, 45 percent and 51 percent respectively. After nutrition education selected subjects were also rated as 3, 4 and 5 with the score of 14 percent, 23 percent and 63 percent. The results indicated that after nutrition education, knowledge of the selected subject was enhanced and noted the food and nutrition labels for effective food choices and quality food purchasing capacity.

4. Opinion about Food Label

Food labels are considered an important component of healthy diets and obesity-fighting strategies. Although different food labeling methods are used in various countries, its main purpose is to inform consumers and enable them to make healthier food choices (Cecchini, Warin, 2016). Table VII mentioned the views of the selected subjects related to cost of the food products.

Table IX

Labeled Food Products Are Costly

Attributes	Before nutrition education					After nutrition education				
	Rural		Urban		Total	Rural		Urban		Total
	N	%	N	%		N	%	N	%	
YES	55	48	52	53	107	1	0.8	1	1	2
NO	59	52	47	47	106	113	99.2	98	99	211
TOTAL	114	100	99	100	213	114	100	99	100	213
Correlation value	0.535									

Total selected subjects were 213. Among them, 114 were rural and 99 were urban. Among them, 48 percent of rural and 53 percent of the urban thought that labeled foods are costly and expensive. After nutrition education it reduced as 0.8 and 1.1. Correlation value is 0.535. It is greater than the 0.5 there is significance between the area and the opinion about food label cost.

Table X
Selected subjects views for safety of food

Attributes	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
It will not contain any insects inside the package	16	8	8	4
It will not contain any off flavor	14	7	4	2
Should not cross the best before date	14	7	2	0.9
The package does not have any damage	40	19	12	7
All of the above	129	60	194	91
Total	213	100.0	213	100.0

Before nutrition education intervention, the selected subjects expressed that the safety of foods according to the selected subject did not contain any insects inside the package, any off flavor, should not cross the best before date, the package did not have any damage and the percentage were eight percent, seven percent, seven percent, 19 percent and 60 percent. After nutrition education, safety of food according to the selected subject did not contain any insects inside the package and also contain any off flavor, should not cross the best before date, the package does not have any damage; all of the above were less than five percent, seven percent and 91 percent respectively.

D. Attitude towards food and nutrition labelling

1. Reason for Reading Food and Nutrition Label

Participants' reported using food labels were mainly to search for the products' nutritional characteristics through their information on nutrients, ingredients and composition. Expiration date was also cited. Looking for such information was important to compare products and decide which one to buy (Priscila et al, 2019).

Table XI
Reasons for noting food products label

Attributes	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
Curiosity	90	42	59	28
Diet conscious	40	19	39	18
Family habit	30	14	30	14
Suggested by nutrition counseling	43	20	83	39
Others	10	5	2	1
Total	213	100.0	213	100.0

Reasons for noting the food labels were curiosity, diet conscious and family habits, suggested by nutrition counseling and others like their involvement, want to know about the products, direction for uses followed 42 percent, 19 percent, 14 percent, 20 percent and five percent. After nutrition education 28 percent for curiosity, 18 percent for diet conscious, 14 percent for family habit and 39 percent for suggested by the nutrition counseling and others was rarely one percent. After the nutrition education the selected subjects were highly motivated to share the nutrition knowledge with their friends, parents and well wishers by the nutrition counseling are increased.

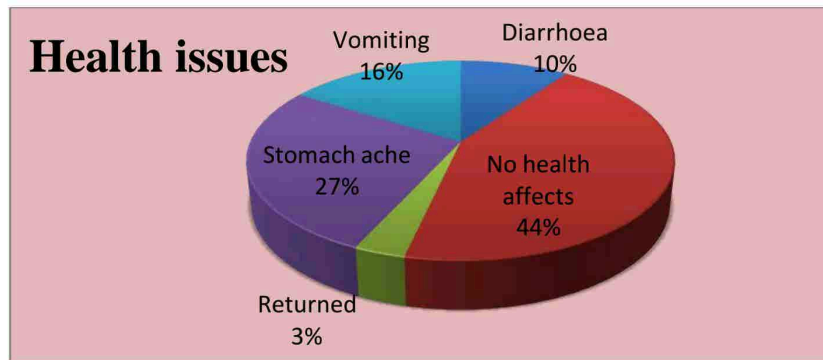
2. Health Issues of the selected subjects

"If you do eat a food past the expiration date [and the food] is spoiled, you could develop symptoms of food poisoning," said registered dietitian nutritionist Summer Yule, MS. The symptoms of forborne illness can include fever, chills, stomach cramps, diarrhea, nausea, and vomiting.

The selected subjects experienced health issues because of purchasing and utilizing expired products in the market list. Health issues like diarrhoea (10 percent), vomiting (16 percent), and

stomach ache (27 percent), whereas meagre percent of only three percent returning their expired product to the shop among 213 selected subjects. And 44 percent did not have any health issues.

Figure 4.2
Health issues because of purchasing and utilizing expired products



3. Trust Towards Food Labels

Food labeling can be considered as a communication tool between food industry and consumers. Although some reports highlighted the influence of food label information and purchase behavior, the lack of interest of consumers in food label have recently been discussed and are mainly associated with a lack of time (Moreira et al., 2021). Table X highlighted that the labeled food products were nutrition good and safe for human consumption.

Table XII
Labeled foods are safe for consumption

Labeled foods are safe	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
YES	174	82	212	99.5
NO	39	18	1	.5
TOTAL	213	100.0	213	100.0
r value	0.329 (occupation) 0.307 (area)			

*Significant difference at 5 percent level.

Before nutrition education 82 percent informed that labeled food were safe for consumption and 18 percent thought that labeled foods were not safe for consumption. After nutrition education, 99.5 percent expressed that the labeled foods products safe for consumption. r value is 0.329

compared to occupation and 0.307 compared to area. Both were greater than 0.05. So, there was no significance between the thought about food labels safety in area, occupation. Table X mentioned that the information food and nutrition label was trusted and had positive opinion about the food and nutrition label.

4. Information in the food and nutrition label is trusted

Importance of nutrition knowledge in food choices has been recognized from several studies. It was found that knowledge enhanced the effectiveness of food labels and determined food choices of the consumers (Kim, Nayga and Capps, 2001; van Trijp, 2009; Grunert, Wills and Fernández-Celemín, 2010).

Table XIII
Information in the food and nutrition label is trusted

Attribute	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
Strongly agree	31	15	101	47
Partially agree	51	24	61	29
Neutral	66	31	50	23
Partially disagree	15	7	0	0
Strongly disagree	10	5	0	0
Not aware	40	19	0	0
Total	213	100.0	212	100.0

Before nutrition education 15 percent strongly agreed, 24 percent partially agreed, 31 percent neutral, seven percent partially disagreed, five percent strongly disagreed, and 19 percent not aware of the information given in the food and nutrition label was trusted. After nutrition education 47 strongly agreed that the information given in the food and nutrition label was trusted, 29 percent partially agreed that the information given in the food and nutrition label was trusted, 23 percent neutral that the information given in the food and nutrition label, and no one repoused not aware of it.

5. Quantity and quality of corrected information on nutrition label

Labeling must provide sufficient information to enable the public to identify foods and their characteristics, includes ingredients and nutrition value. Effective labeling must present the information so that consumer can understand and use it in deciding what foods to buy. The agencies guiding principles in recommending specific changes have been health importance, the consumer right to know, and economic protection (Porter and Wellman, 2020).

Table XIV

Quantity and quality of corrected information on nutrition label

Attribute	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
Strongly agree	20	10	115	54
Partially agree	49	23	98	46
Neutral	60	28	--	--
Partially disagree	22	10	--	--
Strongly disagree	19	7	---	--
Not aware of it	43	20	--	--
Total	213	100.0	213	100.0
Correlation value	0.046 (area)			

*Significant difference at 5 percent level.

Before nutrition education nearly 10 percent strongly agreed, 23 percent partially agreed, 28 percent neutral, 10 percent partially disagreed, seven percent strongly disagreed, and 20 percent did not aware of the ingredient in the packet and the food label. After nutrition education 54 percent strongly agreed that the ingredient given in the food label is exactly what they packed in the packet 46 percent partially agreed that the ingredient given by the food label was exactly what they packed, and no one reported not aware of it. Correlation value is 0.046 is less than 0.05. It revealed that there is no significance difference between the area and the food label ingredient thought among the subjects.

E. Practices towards food and nutrition labelling

Practice means an exercise or action that corresponds to a theory. The theory may be based on learning or customs or culture. Practices also pointed out the application of knowledge in their day to day activities by having suitable practices.

1. Habits of Checking Food Labels and Choice of Food Items

Understanding what's in the foods you buy is key to stocking a nutritious kitchen. Yet food labels are not always easy to decipher. Throw in terms like "fresh," "no additives," and "natural," and the confusion meter rises. Though they look good on packages, these terms aren't regulated, so they don't necessarily mean a food is better for you (Kathleen et al, 2020)

Figure 4.3

Mode of purchasing food products



It was evident to note that majority of the selected subjects (91 percent) physically went to the shops/ stores to purchase food commodities and rest of them arrived online purchase of food commodities.

2. While purchasing check food label

The food nutrition label provides the nutrition information that helps consumers on food choices and used to give us information so that customer can choose between foods. This study was aimed to determine the association between knowledge, attitude and practices on food label use and to determine the factors that influence the use of food labels during making food purchasing decision (Nurliyana *et al.*, 2011).

Table XV
While purchasing check food label

Attribute	Before nutrition education N = 213				After nutrition education N = 213			
	1	2	3	4	1	2	3	4
Never	8	8	1	2	0	0	0	0
Rarely	6	13	4	9	2	2	0	0
Occasionally	24	17	15	25	20	15	12	23
Regularly	21	9	28	23	37	30	36	36
Total	59	47	48	59	59	47	48	59
t value	8.306							
P value	0.00 *							

1= Employed 2= Unemployed 3= Nutrition student 4= Non nutrition student

*Significant difference at 5 percent level.

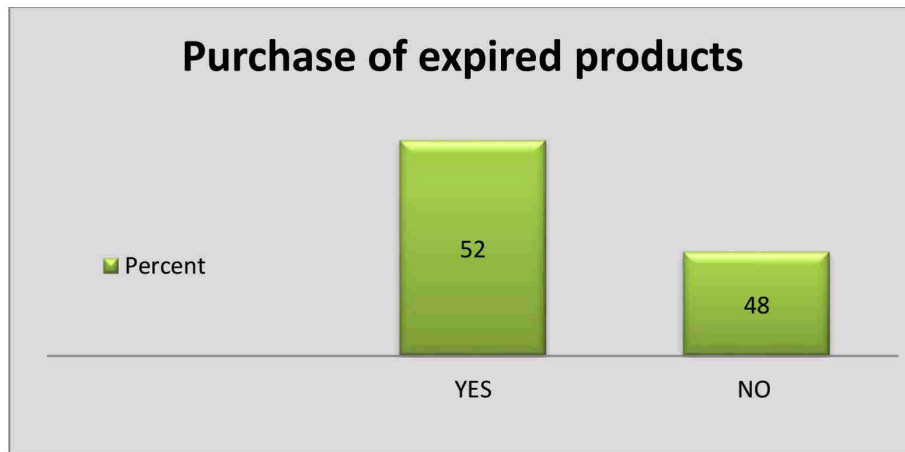
In the initial stage of the study, only meager percent of the selected subjects did not note the food labels and rest of them rarely or occasionally or noted the content of food labels. Nearly 21 percent of employed, nine percent of unemployed, 28 percent nutrition and 23 percent of non nutrition students regularly noted the content of food labels in term of nutrition content, date of manufactures and expired date. P value is ≤ 0.05 so the H_0 is rejected and H_a is accepted. So there is significance between before and after nutrition education.

3. Purchase of expired products

Food labelling implies a consumer's right to adequate and safe food, right to information and right to health. Thousands of years ago, the International Food Trade has existed which helped in trade of food internationally.

Figure 4.4

Purchase of expired products



While noting the content of food labels, nearly 52 percent of the selected subjects did not bother about the quality and quantity of expired products whereas 48 percent were very conscious about the available in the markets nutrient content and date of manufactures and expiry date of the products.

4. Check the packaging are damaged

Mitra et al. (1999) investigated whether influence of nutrition panel and health claims on perception of products varied with education level. The results revealed that both these sources influenced perception of consumers regarding products healthfulness when checked independently.

Table XVI
Check the packaging are damaged

Attribute	Before nutrition education					After nutrition education				
	Rural		Urban		Total	Rural		Urban		Total
	N	%	N	%		N	%	N	%	
Never	12	10	7	7	19	0	0	0	0	0
Rarely	20	18	21	21	41	18	16	18	18	36
Sometime	30	26	32	32	62	22	19	21	21	43
Regularly	52	46	39	40	91	74	65	60	61	134
Total	114	100	99	100	213	114	100	99	100	213
X ² value	50.419									
P value	0.00*									

* Significant difference at 5 percent level.

Before nutrition education in rural nearly 10 percent selected subjects did not check the packing damages, 18 percent rarely checked the packaging damages, 26 percent occasionally checked the packaging damages, 46 percent were regularly checked the packaging damages. In urban seven percent selected subjects did not check the packing damages, 21 percent rarely checked the packaging damages, 32 percent occasionally checked the packaging damages, 40 percent were regularly checked the packaging damages. After nutrition education in rural, 16 percent rarely checked the packaging damages, 19 percent occasionally checked the packaging damages, 65 percent were regularly checked the packaging damages. In urban, 18 percent rarely checked the packaging damages, 21 percent occasionally checked the packaging damages, 61 percent were regularly checked the packaging damages. P value is ≤ 0.05 so the H_0 is rejected and H_a is accepted. So there is significance between before and after nutrition education.

5. Food and nutrition label information influence the purchasing capacity

The manner in which nutrition labelling influences purchasing choices of an individual also depends upon trust in the communicated information. It has been recognized that consumers hesitate to trust information presented on food labels (Chan, Patch and Williams, 2015).

Table XVII**Food and nutrition label information influence the purchasing capacity**

Attribute	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
Yes	134	63	207	97
No	79	37	6	3
Total	213	100.0	213	100.0
t value	3.303			
P value	0.001*			

* Significant difference at 5 percent level.

Before nutrition education intervention, Food and nutrition label information influenced the purchasing capacity of 63 percent of the selected subjects and rest of them did not have any impact on the purchasing choose because of the food and nutrition labels. After nutrition education, 97 percent of the selected subjects were educated for purchasing chooses because of the food and nutrition label. P value is ≤ 0.005 . So, null hypothesis is rejected and alternative hypothesis is accepted. There is 0.001 level significance difference between before and after nutrition education.

Table XVIII**Purchasing of unlabeled food products**

Attribute	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
Never	30	14	79	37
Rarely	79	37	119	56
Sometimes	79	37	10	5
Regularly	25	12	5	2
Total	213	100.0	213	100.0
P value	0.00*			

* Significant difference at 5 percent level.

Before nutrition education 14 percent never purchased the unlabeled food products, 37 percent rarely purchased unlabeled food products, 37 percent sometimes purchased unlabeled food products. Nearly 12 percent purchased unlabeled food products. After nutrition education 37 percent never purchased unlabeled food products, 56 percent rarely purchasing unlabeled food products, five percent sometimes were purchased and two percent regularly purchased unlabeled products. Among the selected subjects, regularly purchasing the unlabeled food products was reduced after the nutrition education. P value is ≤ 0.005 . Null hypothesis is rejected and alternative hypothesis is accepted. Statistical analysis revealed that there is significant difference between before and after nutrition education intervention.

6. Uses of Food and Nutrition Information Given In The Food Labels

A 2005 survey by Nielsen and co cookers revealed that half of consumers understood nutrition labels only "in part," although two out of ten said that they consistently read them. The secret to reading a food label knows what to look for. If you understand the label lingo, it's not so difficult to make the healthiest purchase.

Table XIX
Checking the quality of product

Attribute	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
By seeing the product	50	24	1	.5
Through the label	88	42	212	99.5
Asking to older	72	34	0	0
Others	3	1	0	0
Total	213	100.0	213	100.0

Among the selected subjects before nutrition education, 24 percent were checked quality of products by seeing the food product label, 42 percent were checked by seeing the labels and 34 percent were checked through asking to elders in the shops/stores. In meager percent to know about the quality of the product and asked the experience of these persons. After nutrition education, it was interesting to note that the 99.5 percent of the subjects were checked the product quality by seeing the label. After nutrition education, the majority of the selected subjects (84

percent) particularly note the nutrient content and also about dates of products manufacturing and expiry date. Table XVIII shows the checking the food and nutrition label.

7. Time checking the food & nutrition label

Nutrition information provided on labels should be truthful and not mislead consumers. At the same time, labeling regulations should provide incentives to manufacturers to develop products that promote public health and assist consumers in following dietary recommendations. It is likely that in many countries, there would be some segments of the population that would benefit from information about the composition of foods (Wijngaart, 2022).

Table XX
Time checking the food & nutrition label

Attribute	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
While purchasing	113	53	190	89
After purchasing	34	16	18	9
Before using this product	62	29	5	2
After using the product	4	2	0	0.0
Total	213	100.0	213	100.0

Before nutrition education, 53 percent checked the food and nutrition label at the time of purchasing, 16 percent checked the food and nutrition label after purchasing, 29 percent checking the food and nutrition label before using the products and only two percent checked after using the products. After the nutrition education among 213 selected subjects, 190 (89percent) were checked at the time purchasing the products. Majority of the selected subjects followed the instruction for checking the quality and quantity of food products on the food and nutrition labels.

8. The information on food & nutrition label helps to purchase the product

Researchers have also studied about the information most often looked at by the consumers from nutrition labels. Shine, O'Reilly and O'Sullivan (2007), Higginson et al. (2002), Mannell et al. (2006) and Grunert et al. (2010) showed that the nutrients—calories and fat were most frequently

looked for by the consumers for purchasing foods. The finding of Aygen (2012) was slightly different as it was reported that information for energy and protein was mostly used for buying decisions.

Table XXI

The information on food & nutrition label helps to purchase the product

Attribute	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
Strongly agree	70	33	88	41
Partially agree	39	18	120	56
Neutral	77	36	5	3
Partially disagree	19	9	0	0.0
Strongly disagree	8	4	0	0.0
Total	213	100.0	213	100

The information given in the food and nutrition label helped to purchase the products, were strongly agreed, partially agreed, neutral, partially disagreed and strongly disagreed was followed by 33 percent, 18 percent, 36 percent, nine percent, four percent respectively before the nutrition education. After the nutrition education most of the subjects (56) was partially agreed and 41 percent were strongly agreed, three percent were neutral to agree food labels and its usefulness.

9. Observation of the weight of the food products

A study by Chopera et al, 2014 reports a higher consideration for net weight/volume among rural consumers whereas urban consumers held high importance for ingredients and date of expiry.

Table XXII

Observation of the weight of the food products

Attribute	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
Note down the weight in label	117	54	186	87
Checking the weight in the weighing balance	72	34	23	11
Asking shop keepers	15	7	4	2
Simply buy the products	9	4	0	0
Total	213	100.0	213	100.0
t value	5.827			
P value	0.00*			

* Significant difference at 5 percent level.

Before nutrition education 54 percent were carefully noted the weight of the product by seeing the label, 34 percent knew the weight of the products by checking the weight with the weighing balance, seven percent asked the shop keepers and noted the body and four percent of selected subjects were simply purchased the product. After giving the nutrition education, 87 percent knew the weight of the product by seeing the label and 11 percent of the subjects were verified the actual weight of the product using in the weighing balance and nearly two percent were believed statement the shop keepers. P value is ≤ 0.005 . So, null hypothesis is rejected and alternative hypothesis is accepted. Statistical interpretation revealed that there was significant between before and after nutrition education.

10. Use of Claims

Food makers can make claims about certain nutrients, such as calcium, fiber, and fat that are found naturally in foods. The health claims must be balanced and based on current, reliable scientific studies and must be approved by the U.S. Food and Drug Administration (FDA, 2020).

Table XXIII
Knowledge about FSSAI

Attribute	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
YES	41	19	213	100.0
NO	172	81	0	0
TOTAL	213	100.0		
t value	1.627			
p value	0.034*			

* Significant difference at 5 percent level.

Before nutrition education, 19 percent only known about FSSAI and 81 percent did not aware of the FSSAI. After nutrition education, all the selected subjects were aware of the FSSAI. P value is ≤ 0.005 . So, null hypothesis is rejected and alternative hypothesis is accepted. This showed that there is significant difference between before and after nutrition education.

11. Product Storage

Ensure correct utilization of the food, the Food Regulations requires the manufacturer or the packer to mention the “Instructions for use” and storage of the products after opened on the label on the Pre-packaged food. The instructions may include the directions regarding reconstitution or dilution of the product before use, where applicable.

Table XXIV
Storage of the products after opening the package

Attribute	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
By experience	43	20.2	--	--
By asking experienced person	69	32.4	9	4
By searching in web resource	8	3.8	7	3
Guidelines given by the label	93	43.7	197	93
Total	213	100.0	213	100.0

Before nutrition education 20 percent by their experience stored the products after opening the packets or pack, 32 percent stored the products on the basis of guideless of experienced person, four percent searched in web resources and stored the product after opening and 44 percent store the products by the guidelines given in the label. After nutrition education four percent stored the product by asking to the experienced person, three percent searched in web resource and stored the products, 93 percent stored their products by the guidelines given in the label.

12. Keeping the food label until the product is fully used

Labeling of food is an important aspect in food processing chain. It is the first point of contact between a consumer and the producer. It helps us in identifying one product from another and also about purchasing decision of the product.

Table XXV

Keeping the food label until the product is fully used

Attribute	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
Never	42	20	6	3
Rarely	54	25	32	15
Sometimes	81	38	46	21
Regularly	36	17	129	61
Total	213	100.0	213	100.0
Chi- square value	0.363(area) 0.013 (occupation)			

Before nutrition education 20 percent never kept the food label until the products was fully used, 25 percent rarely kept the food label until the products was used, 38 percent sometimes the food label until the products fully used and 17 percent regularly the food label until the products used completely. After nutrition education most of the selected subjects 61 percent regularly the food label until the products used, 22 percent sometimes stored the products food label and preserved, fifteen percent rarely kept safe the food label until the products, very less percent (2.8) never kept the food label safe until the product was completely used for preparation.

13. Properly used before expiry date

The important aspect during buying food product was expiry date, taste, price and nutrient content were significantly associated with the use of food label.

Table XXVI

Properly used before expiry date

Attribute	Before nutrition education		After nutrition education	
	N	Percent	N	Percent
Never	5	2	-	-
Rarely	19	9	4	2
Sometimes	97	46	94	44
Regularly	46	21	115	54
Don't care about it	47	22	-	--
Total	213	100.0	213	100.0

Before nutrition education, two percent never checked the best before date of expiry for cooking, nine percent rarely checked best before date for cooking, 46 percent sometimes checked the best before date for cooking, 21 percent regularly checked the best before date for cooking, 22 percent did not care about the best before date for cooking. After nutrition education two percent rarely checked the best before date before cooking, 44 percent sometimes checked the best before date for cooking, fifty four percent regularly checked the best before date for cooking.

Nutritional labeling provides consumers with the information that can be used to make informed and healthier food choices. It is particularly useful for people who are on special diets to select suitable foods for their health conditions. Considering the significant role of consumers' awareness about food labels in making healthy food choices, it was therefore important to enlighten suburban area of Namakkal consumers about the importance of reading the food labels. Therefore this study has aimed to assess consumer knowledge, attitudes and practices on food labels in the suburban area of Namakkal. No similar study was previously conducted in the suburban area of Namakkal. This study will provide new data related to the use of food labels by consumers in the Namakkal suburban which are necessary to put them in public health recommendations and health educational programs to improve consumers' behaviors towards better use of the information on the food label for better nutritional status of suburban area of Namakkal consumers.

V. SUMMARY AND CONCLUSION

Packaged foods segment is found as one of the fastest growing segment in India. Processed food industry is ranked fifth for production, consumptions and exports of processed foods (IBEF, 2017). Although packaged foods offer convenience and easy accessibility, yet these foods usually contain high content of sugar, salt and fat due to which many health issues have emerged in the society. In this current scenario, both developed and developing countries are facing the problem of over nutrition and under nutrition termed as dual burden of malnutrition at the same time. It was found by the Food and Agriculture Organization that at least 10.9 percent of the world population go to bed hungry or suffer undernourishment in terms of energy intake. Rising health issues depict that people are not getting the right food as they do not have sufficient information regarding quality and quantity of nutrients the foods contain. This problem can be resolved by conveying relevant information about the products to the consumers. One of the best ways to communicate information at point of purchase is nutrition labelling.

Nutrition labelling is more prevalent in developed countries due to increase in diet related problems. Labelling of packaged foods is strictly regulated by authorities such as World Health Organization (WHO), the World Trade Organization (WTO), Codex Alimentarius Commission etc. Thus, majority of the packaged foods in these countries contain nutrition labelling (Brecher et al., 2000; Legault et al., 2004; Brandt, Moss and Ferguson, 2009). In India, packaged foods are regulated by the Food Safety and Standards Authority of India (FSSAI) since 2006. Initially, labelling of packaged food was restricted to only general information such as name of the food, price and quantity of product, ingredients and manufacturer's identity (Singla, 2010; Srivastava and Ghufran, 2013). But in 2009, FSSAI made it mandatory to label some nutrients on packaged foods. New guidelines have further been added and detailed provisions regarding disclosure of nutrients are provided in the draft report of "Regulations on labelling (2012). With these background information, the present study was carried out in suburban area of Namakkal to know about the concept, usage and significance and health information of given in food and nutrition labels.

This study was based on how the consumer uses the food and nutrition labels. To know the Namakkal sub urban working, non- working, rural, urban, nutrition students and non- nutrition

student's food and nutrition labelling related awareness, practice, knowledge, attitudes. The selected subjects for the study were willing to know about the food and nutrition labelling and their knowledge were to implement in their daily life practices. The selected subjects were in the age group of 20- 35 years of adult women available in the selected study area. In this present study, primary data collection method was used to conduct the present study to collect information using questionnaire on food and nutrition label. Online survey was the most cost-effective and can reach the maximum number of people in comparison to the other medium. The performance of this survey was much more widespread than the other data collection methods. The present survey was conducted in online. The prepared Google form posted in the social media like WhatsApp, Instagram, Telegram were used to collect the data related to conducted food and nutrition labelling. Nutrition education incorporates a broad vision which encompasses educational strategies and environmental supports to encourage adoption of healthier, sustainable food choices and eating patterns.

After evaluating the nutrition knowledge of the selected subjects, the Nutrition education modules were developed. Creating awareness through nutrition education is a key component of promotion of the good purchasing habit. In addition, it's also improved the health status and also reduces the purchasing of unhealthy foods.

Effect of nutrition education was assessed by comparing the initial and final labeling knowledge scores secured by the selected subjects before and after the nutrition education intervention for the period of fifty days.

- ✚ In the selected subject 54 percent of rural and 46 percent of urban were participated in this study.
- ✚ The data related to education qualification revealed that 83 percent of the rural people have completed their UG/ PG education in college/ university, and 11 percent of the people completed secondary level and six percent of the selected subjects had high school level education whereas majority of the selected subjects from urban area had their UG/PG education with the percent of 83 and higher secondary school education was secured on 15 percent of the selected subjects and meager percent had basic school level education. At the same time, there was no distinguished difference in the urban and rural selected subject education level

- ✚ Among the selected 213 subjects in rural area of Namakkal nearly 29 percent were employed, 18 percent were unemployed, 27 percent were nutrition and 26 percent were non- nutrition students. In urban 26 percent were employed, 27 were unemployed, 17 percent were nutrition student, 30 percent are non nutrition student.
- ✚ According to Housing and Urban Development Corporation (2004) in rural are 46 percent were in low income group, 32 percent were in middle income and 22 percent were high income groups whereas in urban seven percent were in low income, 29 percent were middle income and 64 percent were in high income group. Compare to the subjects selected from rural area, urban area were earning more and belong to better income group.
- ✚ In rural area 31 percent were spent 40- 60% of their monthly income for food and less than five percent spent more than 60% of their monthly income. In urban area less than 60 percent were spent 40- 60% of their monthly income for purchasing food, food products and 19 percent were spent more than 60 percent of their monthly income. Urban people were spending more of their income for purchasing foods and food products when compared to rural selected subjects on food compared to rural.
- ✚ In rural area perishable foods purchased daily, weekly twice, weekly and monthly twice were four percent, six percent, 74 percent and five percent respectively. Non perishable foods purchased weekly twice, weekly, monthly twice and monthly were three percent, 18 percent, 31 percent and 41 percent respectively. In urban area perishable food purchased daily, weekly twice, weekly and monthly twice were 15 percent, 49 percent, 26 percent and 10 percent respectively. Non perishable foods purchased daily, weekly twice, weekly, monthly twice, monthly were less than two percent, six percent, 16 percent, 12 percent and 64 percent respectively. Compared to urban, rural subjects were purchased perishable food were in weekly bases. Others like house hold framings were 12 percent perishable and seven percent non perishable food like Ragi, Sorgam, groundnuts collected from their own forms in rural area and four percent of urban subjects were collected perishable foods for their own organic green garden.
- ✚ In rural area 15 percent were purchased in local markets, eight percent were purchased in shops and departmental stores and 74 percent were purchased from local farmers whereas in urban area, 42 percent were purchased in markets, 39 percent were purchased in shops

and departmental stores and 12 percent were purchased from local farmers. Compared to the subjects from the urban area rural subjects mostly purchased from their farms or direct purchase from the farmers at local market directly whereas in local urban area, the selected subjects purchased from the markets, shops, online mode.

- ✚ Before conducting nutrition education programme, 29 percent agreed and five percent disagreed, 22 percent neutral, 39 percent strongly agreed and five percent strongly disagreed that food labeling was important for any food products. Nearly 30 percent of the selected subjects only aware of the importance of food labeling.
- ✚ Before nutrition education quality of information provided in the food and nutrition label 32 percent employee were easily understand, 15 percent unemployed were easily understand, 29 percent were difficult to understand the information provided in the food and nutrition label, 75 percent nutrition students were easily understand, three percent nutrition students were difficult to understand the information provided in the food and nutrition label, 36 percent non-nutrition students were easily understand, 7 percent were difficult to understand the information provided in the food and nutrition label. After nutrition education quality of information provided in the food and nutrition label 73 percent employee were easily understand, 74 percent unemployed were easily understand, 81 percent nutrition students were easily understand, 49 percent non-nutrition students were easily understand.
- ✚ Before nutrition education 25 percent employees did not check the nutrition information in the label, 19 percent employees were regularly check the nutrition information in the label, 28 percent unemployed did not check the nutrition information in the label, 17 percent regularly check the nutrition information in the label, 23 percent nutrition students did not check the nutrition information in the label 42 percent nutrition students regularly check the nutrition information in the label, 34 percent non-nutrition students did not check the nutrition information in the label, 22 percent non- nutrition students regularly check the nutrition information in the label. sAfter nutrition 46 percent employees were regularly check the nutrition information in the label, 30 percent regularly check the nutrition information in the label, 58 percent nutrition students regularly check the nutrition information in the label, 39 percent non- nutrition students regularly check the nutrition information in the label. P value is ≤ 0.05 so the H_0 is

rejected and H_a is accepted. So there is significance between before and after nutrition education.

- ✚ Less than five percent selected subjects opened that they noted the food label before purchasing the products, two percent selected subjects did not note the food label while purchasing, nearly 93 percent felt that few subjects were observed the food labels before purchasing the products.
- ✚ Before nutrition education selected subjects were rated as 1, 2, and 3 with four, 45, and 51 respectively. After nutrition education selected subjects were also rated as 3, 4 and 5 with 14 percent, 23 percent and 63 percent. The results indicated that after nutrition education, knowledge of the selected subject was enhanced and noted the food and nutrition labels for effective food choices.
- ✚ Total selected subjects were 213 among them 114 were rural and 99 were urban. Among them, 48 percent of rural and 53 percent of the urban were thought that labeled foods are costly. After nutrition education it will be reduced as 0.8 and 1.1. Correlation value is 0.535. It is greater than the 0.5 there is significance between the area and the thought about food label cost.
- ✚ Before nutrition education safety of food according to the selected subject did not contain any insects inside the package, any off flavor, should not cross the best before date, the package did not have any damage; all of the above were eight percent, seven percent, seven percent, 19 percent, 60 percent. After nutrition education safety of food according to the selected subject did not contain any insects inside the package and also contain any off flavor, should not cross the best before date, the package does not have any damage; all of the above were four percent, two percent, 0.9 percent, seven percent, 91 percent respectively.
- ✚ Reasons for noting the food labels were curiosity, diet conscious, family habits, suggested by nutrition counseling and others like their involvement, want to know about the products, direction for uses followed 42 percent, 19 percent, 14 percent, 20 percent and five percent. After nutrition education 28 percent for curiosity, 18 percent for diet conscious, 14 percent for family habit and 39 percent for suggested by the nutrition counseling and others was rarely one percent. After the nutrition education the selected

subjects were highly motivated to share the nutrition knowledge with their friends, parents and well wishers by the nutrition counseling are increased.

- ✚ The selected subject experienced health issues because of purchasing and utilizing expired products in the market list. Health issues like diarrhoea 10 percent, vomiting 16 percent, stomach ache 27 percent, only three percent returning their product to the shop among 213 selected subjects. And 44 percent did not have any health issues.
- ✚ Before nutrition education 82 percent thought that labeled food are safe for consumption and 18 percent thought that labeled foods are not safe for consumption. After nutrition education 99.5 percent aware that labeled foods are safe for consumption. r value is 0.329 compared to occupation and 0.307 compared to area. Both were less than 0.5. So, there was low level of significance between the thought about food labels safety and area, occupation.
- ✚ Before nutrition education 15 percent strongly agreed, 24 percent partially agreed, 31 percent neutral, seven percent partially disagreed, five percent strongly disagreed, and 19 percent not aware of the information given in the food and nutrition label was trusted. After nutrition education 47 strongly agreed that the information given in the food and nutrition label was trusted, 29 percent partially agreed that the information given in the food and nutrition label is trusted, 23 percent neutral that the information given in the food and nutrition label, and no one reported not aware of it.
- ✚ Before nutrition education nearly 10 percent strongly agreed, 23 percent partially agreed, 28 percent neutral, 10 percent partially disagreed, seven percent strongly disagreed, and 20 percent did not aware of the ingredient in the packet and the food label. After nutrition education 54 percent strongly agreed that the ingredient given in the food label is exactly what they packed in the packet 46 percent partially agreed that the ingredient given by the food label was exactly what they packed, and no one reported not aware of it. Correlation value is 0.046 is less than 0.5 so; there is no significance between the area and the food label ingredient thought among the subjects.
- ✚ It was evident to note that majority of the selected subjects (91 percent) physically went to the shops/ stores to purchase food commodities and rest of them arrived online purchase of food commodities.

- ✚ In the initial stage of the study, only meager percent of the selected subjects did not note the food labels and rest of them rarely or occasionally or noted the content of food labels. Nearly 21 percent of employed, nine percent of unemployed, 28 percent nutrition and 23 percent of non nutrition students regularly noted the content of food labels in term of nutrition content, date of manufactures and expired date. P value is ≤ 0.05 so the H_0 is rejected and H_a is accepted. So there is significance between before and after nutrition education.
- ✚ While noting the content of food labels, nearly 52 percent of the selected subjects did not bother about the expired products quality and quantity whereas 48 percent were very conscious of the products nutrient content and date of manufactures and expiry date.
- ✚ Before nutrition education in rural nearly 10 percent selected subjects did not check the packing damages, 18 percent rarely checked the packaging damages, 26 percent occasionally checked the packaging damages, 46 percent were regularly checked the packaging damages. In urban seven percent selected subjects did not check the packing damages, 21 percent rarely checked the packaging damages, 32 percent occasionally checked the packaging damages, 40 percent were regularly checked the packaging damages. After nutrition education in rural, 16 percent rarely checked the packaging damages, 19 percent occasionally checked the packaging damages, 65 percent were regularly checked the packaging damages. In urban, 18 percent rarely checked the packaging damages, 21 percent occasionally checked the packaging damages, 61 percent were regularly checked the packaging damages. P value is ≤ 0.05 so the H_0 is rejected and H_a is accepted. So there is significance between before and after nutrition education.
- ✚ Before nutrition education Food and nutrition label information influenced the purchasing capacity of 63 percent, selected subjects and rest of them did not have any impact on the purchasing choose because of the food and nutrition labels. After nutrition education, 97 percent of the selected subjects changed their purchasing chooses because of the food and nutrition label. P value is ≤ 0.005 . So, null hypothesis is rejected and alternative hypothesis is accepted. There is 0.001 level significance between before and after nutrition education.
- ✚ Before nutrition education 14 percent never purchased the unlabeled products, 37 percent rarely purchased unlabeled products, 37 percent sometimes purchased unlabeled

products. Nearly 12 percent purchased unlabeled products. After nutrition education 37 percent never purchased unlabeled products, 56 percent rarely purchasing unlabeled products, five percent sometimes were purchased and 2 percent regularly purchased unlabeled products. Among the selected subjects regularly purchasing the unlabeled products was reduced after the nutrition education. P value is ≤ 0.005 . Null hypothesis is rejected and alternative hypothesis is accepted. So, there is significant between before and after nutrition education.

- ✚ Among the selected subject before nutrition education 24 percent were checked quality of products by seeing the food product label, 42 percent were checked by seeing the labels, 34 percent were checked through asking to elders in the shops/stores. In meager percent to know about the quality of the product and asked the experienced persons. After nutrition education 99.5 percent of the subjects were checked the product quality by seeing the label. After nutrition education, the majority of the selected subjects 84 percent particularly nutrient content and also about date of products manufacturing and expired date.
- ✚ Before nutrition education 53 percent checked the food and nutrition label at the time of purchasing, 16 percent checked the food and nutrition label after purchasing, 29 percent checking the food and nutrition label before using the products and only two percent checked after using the products. After the nutrition education, among 213 selected subjects 89 percent were checked at the time purchasing the products. The nutrition education majority of the selected subjects followed the instruction of checking the food and nutrition labels.
- ✚ The information given in the food and nutrition label helped to purchase the product were strongly agreed, partially agreed, neutral, partially disagreed and strongly disagreed was followed by 33 percent, 18 percent, 36 percent, nine percent, four percent before the nutrition education. After the nutrition education most of the subject (56) was partially agreed and 41 percent, strongly agreed, three percent neutral to agree food labels and its usefulness.
- ✚ Before nutrition education 54 percent were carefully noted the weight of the product by seeing the label, 34 percent knew the weight of the product by checking the weight with the weighing balance, seven percent asked the shop keepers and noted the body and four

percent of selected subject were simply purchased the product. After giving the nutrition education 87 percent knew the weight of the product by seeing the label and 11 percent of the subjects were verified the actual weight of the product using in the weighing balance and nearly two percent were believed statement the shop keepers. P value is ≤ 0.005 . So, null hypothesis is rejected and alternative hypothesis is accepted. There is significant between before and after nutrition education.

- ✚ Before nutrition education, 19 percent only known about FSSAI and 81 percent did not aware of the FSSAI. After nutrition education, all the selected subjects (213) were aware of the FSSAI. P value is ≤ 0.005 . So, null hypothesis is rejected and alternative hypothesis is accepted. There is significant between before and after nutrition education.
- ✚ Before nutrition education 20 percent by their experience stored the product after opening the packets or pack, 32 percent stored the product on the basis of guideless of experienced person, four percent searched in web resources and stored the product after opening and 44 percent store the product by the guidelines given in the label. After nutrition education four percent stored the product by asking to the experienced person, three percent searched in web resource and stored the products, 93 percent stored their products by the guidelines given in the label.
- ✚ Before nutrition education 20 percent never kept the food label until the product was fully used, 25 percent rarely kept the food label until the product was used, 38 percent sometimes the food label until the product fully used and 17 percent regularly the food label until the product used completely. After nutrition education most of the selected subject 61 percent regularly the food label until the product used, 22 percent sometimes stored the product food label and preserved, fifteen percent rarely kept safe the food label until the product, very less percent (2.8) never kept the food label safe until the product was completely used for preparation.
- ✚ Before nutrition education two percent never checked the best before date of expiry for cooking, nine percent rarely checked best before date for cooking, 46 percent sometimes checked the best before date for cooking, 21 percent regularly checked the best before date for cooking, 22 percent did not care about the best before date for cooking. After nutrition education two percent rarely checked the best before date before cooking, 44

percent sometimes checked the best before date for cooking, fifty four percent regularly checked the best before date for cooking.

Considering the significant role of consumers' awareness about food labels in making healthy food choices, it was therefore important to enlighten suburban area of Namakkal consumers about the importance of reading the food labels. Therefore this study has aimed to assess consumer knowledge, attitudes and practices on food labels in the suburban area of Namakkal. No similar study was previously conducted in the suburban area of Namakkal. This study will provide new data related to the use of food labels by consumers in the Namakkal suburban which are necessary to put them in public health recommendations and health educational programs to improve consumers' behaviors towards better use of the information on the food label for better nutritional status of suburban area of Namakkal consumers.

Conclusion

Form the above data conclude that even the selected subject were educated and employed they did not know about much of food and nutrition label and the knowledge and practices towards food and nutrition label was very less before the nutrition education. Form the collected data nutrition education module was prepared and educated the selected subject the effect of nutrition education intervention on knowledge, attitude and practices of selected subjects revealed that there was a statically signifies improve in knowledge, attitude and practices score progress was well. It was know from the post data collection.

Directions for future research

Future studies can further explore some of the aspects of this topic as discussed here.

1. It would be interesting to conduct a longitudinal study to analyze the trends of food labelling over a period of time. It will help to understand conformance of the guidelines announced by regulatory authorities. Moreover, improvements in labelling practices on the part of marketers can also be explored over a period of time.

2. The study limits itself to investigate the impact of psychological variables only on consumers' use of nutrition information. There are number of other consumer's variables such as special dietary needs of people, weight status of people, time pressure and shopping involvement during purchases etc. that can have direct and indirect impact on consumers' understanding and use of food labels. So, these factors can be incorporated in future studies to enrich the literature.

BIBLIOGRAPHY

- Ali, J., Kapoor, S., & Moorthy, J. (2010). Buying behaviour of consumers for food products in an emerging economy. *British food journal*.
- Ali, J. and Kapoor, S. (2009). 'Understanding consumers' perspectives on food labelling in India.' *International Journal of Consumer Studies*, 33(6), 724-734.
- Andrews, J. C., Burton, S., & Netemeyer, R. G. (2000). Are some comparative nutrition claims misleading? The role of nutrition knowledge, ad claim type and disclosure conditions. *Journal of Advertising*, 29(3), 29-42.
- Ares, G., Giménez, A., & Gámbaro, A. (2008). Influence of nutritional knowledge on perceived healthiness and willingness to try functional foods. *Appetite*, 51(3), 663-668.
- Aygen, F. G. (2012). Turkish consumers' understanding and use of nutrition labels on packaged food products. *International Journal of Business and Social Science*, 3(6), 171-183.
- Balasubramanian, S. K., & Cole, C. (2002). 'Consumers' search and use of nutrition information: The challenge and promise of the nutrition labeling and education act.' *Journal of marketing*, 66(3), 112-127.
- Barreiro-Hurlé, J., Gracia, A., & De-Magistris, T. (2010). 'Does nutrition information on food products lead to healthier food choices?.' *Food Policy*, 35(3), 221-229.
- Besler, H. T., Buyuktuncer, Z., & Uyar, M. F. (2012). 'Consumer understanding and use of food and nutrition labeling in Turkey.' *Journal of nutrition education and behavior*, 44(6), 584-591.
- Blanchfield, J. R. (Ed.). (2000). *Food labelling*. Woodhead Publishing.
- Bleich, S.N. and Wolfson, J.A. (2015). 'Differences in consumer use of food labels by weight loss strategies and demographic characteristics.' *BMC public health*, 15(1), 1275.
- Brandt, M., Moss, J., & Ferguson, M. (2009). The 2006–2007 Food Label and Package Survey (FLAPS): Nutrition labeling, trans fat labeling. *Journal of Food Composition and Analysis*, 22, S74-S77.
- Brandt, M., Moss, J., & Ferguson, M. (2009). The 2006–2007 Food Label and Package Survey (FLAPS): Nutrition labeling, trans fat labeling. *Journal of Food Composition and Analysis*, 22, S74-S77.
- Brecher, S. J., Bender, M. M., Wilkening, V. L., McCABE, N. M., & Anderson, E. M. (2000). Status of nutrition labeling, health claims, and nutrient content claims for processed foods: 1997 Food Label and Package Survey. *Journal of the American Dietetic Association*, 100(9), 1057-1062.
- Brucks, M., Mitchell, A. A., & Staelin, R. (1984). The effect of nutritional information disclosure in advertising: An information processing approach. *Journal of Public Policy & Marketing*, 3, 1-25.

- Burton, S., Biswas, A., & Netemeyer, R. (1994). Effects of alternative nutrition label formats and nutrition reference information on consumer perceptions, comprehension, and product evaluations. *Journal of Public Policy & Marketing*, 13(1), 36-47.
- Cairns, G., Angus, K. & Hastings, G. (2009). The extent, nature and effects of food promotion to children: A review of the evidence to Dec 2008. A report prepared for the World Health Organization. Available at http://www.who.int/dietphysicalactivity/Evidence_Update_2009.pdf
- Cairns, G., Angus, K. & Hastings, G. (2009). The extent, nature and effects of food promotion to children: A review of the evidence to Dec 2008. A report prepared for the World Health Organization. Available at http://www.who.int/dietphysicalactivity/Evidence_Update_2009.pdf
- Cairns, G., Angus, K. & Hastings, G. (2009). The extent, nature and effects of food promotion to children: A review of the evidence to Dec 2008. A report prepared for the World Health Organization. Available at http://www.who.int/dietphysicalactivity/Evidence_Update_2009.pdf
- Cannoosamy, K., Pugo-Gunsam, P., & Jeewon, R. (2014). Consumer knowledge and attitudes toward nutritional labels. *Journal of Nutrition Education and Behavior*, 46(5), 334-340.
- Chan, C., Patch, C., & Williams, P. (2005). Australian consumers are sceptical about but influenced by claims about fat on food labels. *European Journal of Clinical Nutrition*, 59(1), 148-151.
- Chopera, P., Chagwena, D. T., & Mushonga, N. G. T. (2014). ' Food label reading and understanding in parts of rural and urban Zimbabwe.' *African health sciences*, 14(3), 576-584.
- Colby, S. E., Johnson, L., Scheett, A., & Hoverson, B. (2010). Nutrition marketing on food labels. *Journal of Nutrition Education and Behavior*, 42(2), 92-98.
- Consumers International (2008). *The junk food trap- marketing unhealthy food to children in Asia Pacific*. United Kingdom, London.
- Cowburn, G. & Stockley, L. (2005) Consumer understanding and use of nutrition labelling: a systematic review, *Journal of Public Health Nutrition*, 8:21-28.
- Darkwa, S. (2014). Knowledge of nutrition facts on food labels and their impact on food choices on consumers in Koforidua, Ghana: A case study. *South African Journal of Clinical Nutrition*, 27(1), 13-17.
- Doll, R., & Peto, R. (1981). The causes of cancer: Quantitative estimates of avoidable risks of cancer in the United States today. *JNCI: Journal of the National Cancer Institute*, 66(6), 1192-1308.
- Drichoutis, A. C., Lazaridis, P., & Nayga, R. M. (2005). Nutrition knowledge and consumer use of nutritional food labels. *European Review of Agricultural Economics*, 32(1), 93-118.

- Drichoutis, A. C., Lazaridis, P., Nayga, R. M., Kapsokefalou, M., & Chrysochoidis, G. (2008). A theoretical and empirical investigation of nutritional label use. *The European Journal of Health Economics*, 9(3), 293-304.
- Earl, R., Porter, D. V., & Wellman, N. S. (1990). Nutrition labeling: issues and directions for the 1990s. *Journal of the American Dietetic Association*, 90(11), 1599-1601.
- Edalati, S., Omidvar, N., Haghghian Roudsari, A., Ghodsi, D., & Zargaraan, A. (2020). Development and implementation of nutrition labelling in Iran: A retrospective policy analysis. *The International Journal of Health Planning and Management*, 35(1), e28-e44.
- Food and Agriculture Organization of the United Nations and World Health Organization (1985). Guidelines on Nutrition Labelling, CAC/GL 2-1985.
- Food Safety and Standards Authority of India (2009). Food Safety and Standards Regulations, 2009. Available at <https://old.fssai.gov.in/Portals/0/FSSAI%20regulations.pdf>
- Food Safety and Standards Authority of India (2012). Indian Food Code. Available at [http://www.fssai.gov.in/portals/0/pdf/indian_food_code\(25-06-2012\).pdf](http://www.fssai.gov.in/portals/0/pdf/indian_food_code(25-06-2012).pdf)
- Food Safety and Standards Authority of India (Ministry of Health and Family Welfare) (2012). Draft “Regulation on Labelling (claims)”. Available at <http://www.fssai.gov.in/Portals/0/Pdf/covering%20letter%20for%20draft%20regulation>
- Food Safety and Standards Authority of India. (2011). <https://www.fssai.gov.in/>. Accessed on 12.3.2020.
- Garretson, J. A., & Burton, S. (2000). Effects of nutrition facts panel values, nutrition claims, and health claims on consumer attitudes, perceptions of disease-related risks, and trust. *Journal of Public Policy & Marketing*, 19(2), 213-227.
- Gorton, D., Mhurchu, C. N., Chen, M.-h., & Dixon, R. (2009). ‘Nutrition labels: a survey of use, understanding and preferences among ethnically diverse shoppers in New Zealand.’ *Public health nutrition*, 12(9), 1359-1365.
- Gould, B. W., & Lin, H. C. (1994). Nutrition information and household dietary fat intake. *Journal of Agricultural and Resource Economics*, 19(2), 349-365.
- Gracia, A., Loureiro, M. L., & Nayga, R. M. (2009). Consumers’ valuation of nutritional information: A choice experiment study. *Food Quality and Preference*, 20(7), 463-471.
- Gracia, A., Loureiro, M., & Nayga Jr, R. M. (2007). ‘Do consumers perceive benefits from the implementation of a EU mandatory nutritional labelling program?’ *Food policy*, 32(2), 160-174.
- Grunert, K. G., & Wills, J. M. (2007). A review of European research on consumer response to nutrition information on food labels. *Journal of Public Health*, 15(5), 385-399.
- Grunert, K. G., Fernández-Celemín, L., Wills, J. M., Genannt Bonsmann, S. S., & Nureeva, L. (2010). Use and understanding of nutrition information on food labels in six European countries. *Journal of Public Health*, 18(3), 261-277.

- Grunert, K. G., Wills, J. M., & Fernández-Celemín, L. (2010). Nutrition knowledge, and use and understanding of nutrition information on food labels among consumers in the UK. *Appetite*, 55(2), 177-189
- Hawkes, C., & World Health Organization. (2004). Nutrition labels and health claims: The global regulatory environment.
- Hess, R., Visschers, V. H., & Siegrist, M. (2012). The role of health-related, motivational and sociodemographic aspects in predicting food label use: a comprehensive study. *Public health nutrition*, 15(3), 407-414.
- <https://www.fao.org/nutrition/education/en/>
- IBEF (2017). Food processing. Available at <https://www.ibef.org/download/FoodProcessing-January-2017.pdf>
- IBEF (2017). Food processing. Available at <https://www.ibef.org/download/FoodProcessing-January-2017.pdf>
- Jackson, S L. (2008) *Research Methods: A Modular Approach*. Belmont, California: Thomson Wadsworth
- Jacobs, S. A., de Beer, H., & Larney, M. (2011). 'Adult consumers' understanding and use of information on food labels: a study among consumers living in the Potchefstroom and Klerksdorp regions, South Africa.' *Public health nutrition*, 14(3), 510-522.
- Jones, A., Dunford, E., Crossley, R., Thout, S. R., Rayner, M., & Neal, B. (2017). An evaluation of the healthiness of the Indian packaged food and beverage supply. *Nutrients*, 9(10), 1103.
- Katona, G., & Mueller, E. (1955). 'A study of purchase decisions.' *Consumer behavior: The dynamics of consumer reaction.* 1, 30-87.
- Keller, S. B., Landry, M., Olson, J., Velliquette, A. M., Burton, S., & Andrews, J. C. (1997). The effects of nutrition package claims, nutrition facts panels, and motivation to process nutrition information on consumer product evaluations. *Journal of Public Policy & Marketing*, 16(2), 256-269.
- Kenkel, D. (1990). Consumer health information and the demand for medical care. *The Review of Economics and Statistics*, 72(4), 587-595.
- Kim, S. Y., Nayga, R. M., & Capps, O. (2001). Food label use, self-selectivity, and diet quality. *Journal of Consumer Affairs*, 35(2), 346-363.
- Kim, S. Y., Nayga, R. M., & Capps, O. (2001). Health knowledge and consumer use of nutritional labels: The issue revisited. *Agricultural and Resource Economics Review*, 30(1), 10-19.
- Kristal, AR., Levy, L., Patterson, RE., Li, SS. & White, E. (1998) Trends in food label use associated with new nutrition labeling regulations, *American Journal of public Health*; 88(8): 1212- 1215.


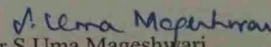
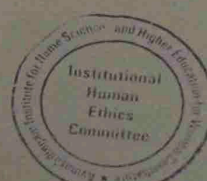
- Kumar, S., & Pandit, A. (2008). Food labels: Assessing awareness and usage level of Indian consumer and influences on food buying behavior. *IIML WPS*, 9(15).
- Legault, L., Brandt, M. B., McCabe, N., Adler, C., Brown, A. M., & Brecher, S. (2004). 2000–2001 food label and package survey: An update on prevalence of nutrition labeling and claims on processed, packaged foods. *Journal of the American Dietetic Association*, 104(6), 952-958.
- Legault, L., Brandt, M. B., McCabe, N., Adler, C., Brown, A. M., & Brecher, S. (2004). 2000–2001 food label and package survey: An update on prevalence of nutrition labeling and claims on processed, packaged foods. *Journal of the American Dietetic Association*, 104(6), 952-958.
- Levy, A. S., & Fein, S. B. (1998). Consumers' ability to perform tasks using nutrition labels. *Journal of Nutrition Education*, 30(4), 210-217.
- Levy, A. S., Fein, S. B., & Stephenson, M. (1993). Nutrition knowledge levels about dietary fats and cholesterol: 1983-1988. *Journal of Nutrition Education and Behavior*, 25(2), 60-66.
- Loureiro, M. L., & McCluskey, J. J. (2000). Consumer preferences and willingness to pay for food labeling: A discussion of empirical studies. *Journal of Food Distribution Research*, 34(3), 95-102.
- Mannell, A., Brevard, P., Nayga Jr, R., Combris, P., Lee, R., & Gloeckner, J. (2006). French consumers' use of nutrition labels. *Nutrition & Food Science*, 36(3), 159- 168.
- Manthena, J. S. K., Mythili, K., & Rao, V. S. (2012). Current scenario of health and nutrition claims on food labels in India: A study of pre-packaged food. *Asian Journal of Food and Agro-Industry*, 5(01), 45-51.
- Marietta, A. B., Welshimer, K. J., & Anderson, S. L. (1999). Knowledge, attitudes, and behaviors of college students regarding the 1990 Nutrition Labeling Education Act food labels. *Journal of the American Dietetic Association*, 99(4), 445-449.
- Miller, L. M. S., & Cassady, D. L. (2012). Making healthy food choices using nutrition facts panels. The roles of knowledge, motivation, dietary modifications goals, and age. *Appetite*, 59(1), 129-139.
- Miller, L. M. S., & Cassady, D. L. (2015). The effects of nutrition knowledge on food label use: A review of the literature. *Appetite*, 92, 207-216.
- Misra, R. (2007). Knowledge, attitudes, and label use among college students. *Journal of the American Dietetic Association*, 107(12), 2130-2134.
- Mitra, A., Hastak, M., Ford, G. T., & Ringold, D. J. (1999). Can the educationally disadvantaged interpret the FDA-mandated nutrition facts panel in the presence of an implied health claim? *Journal of Public Policy & Marketing*, 18(1), 106- 117.
- Monye, F. N., Ezumah, N. N., Ani, J., Umezuruike, H., Ukwueze, F. O., & Okiche, E. L. (2020). Examining Knowledge, Attitude and Practice Towards Food Labels Among Consumers in

- Enugu State, Nigeria—A Baseline Survey. *International Journal of Law and Society*, 3(4), 221.
- Moore, S. G., Donnelly, J. K., Jones, S., & Cade, J. E. (2018). Effect of Educational Interventions on Understanding and Use of Nutrition Labels: A Systematic Review. *Nutrients*, 10(10), 1432.
- Moorman, C. (1998). Market-level effects of information: Competitive responses and consumer dynamics. *Journal of Marketing Research*, 35(1), 82-98.
- National Institute of Nutrition (2011). Dietary guidelines for Indian- A manual. Available at <http://ninindia.org/DietaryGuidelinesforNINwebsite.pdf>
- Nayga, R. M. (2000). Nutrition knowledge, gender, and food label use. *Journal of Consumer Affairs*, 34(1), 97-112.
- Norazmir, M. N., Norazlan Shah, H., Naqieyah, N., & Anuar, M. K. (2012). Understanding and use of food package nutrition label among educated young adults. *Pakistan Journal of Nutrition*, 11(10), 836-842.
- Pettigrew, S. & Pescud, M. (2013). 'The salience of food labelling among low-income families with overweight children. ' *Journal of nutrition education and behavior*, 45(4), 332-339.
- Popkin, B. M., Adair, L. S., & Ng, S. W. (2012). Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews*, 70(1), 3-21.
- Popkin, B. M., Horton, S., Kim, S., Mahal, A., & Shuigao, J. (2001). Trends in diet, nutritional status, and diet-related non-communicable diseases in China and India: The economic costs of the nutrition transition. *Nutrition Reviews*, 59(12), 379-390.
- Prathiraja, P. H. K., & Ariyawardana, A. (2003). Impact of nutritional labeling on consumer buying behavior. *Sri Lankan Journal of agricultural economics*. 5(1), 35-46
- Roe, B., Levy, A. S., & Derby, B. M. (1999). The impact of health claims on consumer search and product evaluation outcomes: Results from FDA experimental data. *Journal of Public Policy & Marketing*, 18(1), 89-105.
- Saha, S., Vemula, S. R., Mendu, V. V. R., & Gavaravarapu, S. M. (2013). 'Knowledge and practices of using food label information among adolescents attending schools in Kolkata, India.' *Journal of nutrition education and behavior*, 45(6), 773-779.
- Santra, S. (2018). Why packaged food sector has immense opportunity in India. Available at <https://www.franchiseindia.com/content/why-packaged-foodsector-has-immense-opportunity-in-india.11196>
- Satia, J. A., Galanko, J. A., & Neuhouser, M. L. (2005). Food nutrition label use is associated with demographic, behavioral, and psychosocial factors and dietary intake among African Americans in North Carolina. *Journal of the American Dietetic Association*, 105(3), 392-402.

- Schiffman, L., Kanuk, L., & Hansen, H. (2012). *Consumer behaviour: A European outlook* (International ed.): Upper Saddle River: Pearson.
- Sharf, M., Sela, R., Zentner, G., Shoob, H., Shai, I., & Stein-Zamir, C. (2012). 'Figuring out food labels. Young adults' understanding of nutritional information presented on food labels is inadequate.' *Appetite*, 58(2), 531-534.
- Shine, A., O'Reilly, S., & O'Sullivan, K. (1997). Consumer attitudes to nutrition labelling. *British Food Journal*, 99(8), 283-296 .
- Sinclair, S., Hammond, D., & Goodman, S. (2013). 'Sociodemographic differences in the comprehension of nutritional labels on food products.' *Journal of nutrition education and behaviour*. 45(6), 767-772.
- Singla, M. (2010). Usage and understanding of food and nutritional labels among Indian consumers. *British Food Journal*, 112(1), 83-92.
- Singla, M. (2010). Usage and understanding of food and nutritional labels among Indian consumers. *British Food Journal*, 112(1), 83-92.
- Srivastava, N., & Ghufuran, A. (2013). Analysis of nutritional information disclosure on labels of milk based malted health drinks in India. *Integral Review: A Journal of Management*, 6(1), 61-69.
- Szykman, L. R., Bloom, P. N., & Levy, A. S. (1997). A proposed model of the use of package claims and nutrition labels. *Journal of Public Policy & Marketing*, 16(2), 228-241.
- Tan, S. J., & Tan, K. L. (2007). Antecedents and consequences of skepticism toward health claims: An empirical investigation of Singaporean consumers. *Journal of Marketing Communications*, 13(1), 59-82.
- Urala, N., Arvola, A., & Lähteenmäki, L. (2003). Strength of health-related claims and their perceived advantage. *International Journal of Food Science & Technology*, 38(7), 815-826.
- US Food and Drug Administration (FDA). (1994). *Guide to Nutrition Labeling and Education Act (NLEA) Requirements*.
- Van den Wijngaart A. W. (2002). Nutrition labelling: purpose, scientific issues and challenges. *Asia Pacific journal of clinical nutrition*, 11(2), S68-S71.
- Van Trijp, H. C. (2009). Consumer understanding and nutritional communication: Key issues in the context of the new EU legislation. *European Journal of Nutrition*, 48(1), 41-48.
- Vijaykumar, S., Lwin, M. O., Chao, J., & Au, C. (2013). Determinants of food label use among supermarket shoppers: A Singaporean perspective. *Journal of Nutrition Education and Behavior*, 45(3), 204-212.
- Wahab, R. A. (2018). Food label use and awareness of nutritional information among consumers in Bahrain: an exploratory study. *KnE Life Sciences*, 26-36.

- Weisburger, J. H. (2002). Lifestyle, health and disease prevention: The underlying mechanisms. *European Journal of Cancer Prevention: The Official Journal of the European Cancer Prevention Organization (ECP)*, 11, S1-7.
- Williams, P. (2005). Consumer understanding and use of health claims for foods. *Nutrition Reviews*, 63(7), 256-264.
- Wills, J. M., Schmidt, D. B., Pillo-Blocka, F., & Cairns, G. (2009). Exploring global consumer attitudes toward nutrition information on food labels. *Nutrition reviews*, 67(suppl_1), S102-S106.
- World Health Organization (2011). *Global status report on non-communicable diseases*. Geneva: World Health Organization.

APPENDIX I

INSTITUTIONAL HUMAN ETHICS COMMITTEE	
 <p>Seek and Ye Shall Find</p>	Avinashilingam Institute for Home Science and Higher Education for Women (Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956) Re-accredited with 'A++' Grade by NAAC. Recognised by UGC Under Section 12 B Coimbatore-641 043, Tamil Nadu, India
26 th February 2022	
Chairman Dr. Sudha Ramalingam Director-Research & Innovation, Professor-Community Medicine, PSG Institute of Medical Sciences & Research, Coimbatore	To Ms. Deepika.R.N Department of Food Science and Nutrition Avinashilingam Institute for Home Science and Higher Education for Women Coimbatore – 641 043
Member Secretary Dr.S.Uma Mageshwari Professor and Head, Department of Food Service Management & Dietetics	Dear Deepika.R.N, Ref: Your proposal No. IHEC/21-22/FSN-07 entitled “Survey on Knowledge, Attitude and Practice towards Food and Nutrition Labelling in Suburban Town of Namakkal” submitted for approval of IHEC on 23.11.2021.
Members Mr.K.Arunmoli (Legal Expert) Dr.Subhashini K. Sripathi Dr.Ā.Saraswathy (Medical Officer) Ms.D.Kavitha Dr.A.R.Sudamani Ramasamy Dr.G.Victoria Naomi Dr. Judith Justin Dr.AnithaSubash	The Institutional Human Ethics Committee of our University hereby grants approval to your research proposal No. IHEC/21-22/ FSN-07 entitled “Survey on Knowledge, Attitude and Practice towards Food and Nutrition Labelling in Suburban Town of Namakkal” submitted by you. The Approval number for the same is AUW/IHEC/ FSN-21-22/XPD-07.
	We wish you all the best in your research endeavours.
	Regards,  Dr.S.Uma Mageshwari Member Secretary
	

APPENDIX II

**EFFICACY OF ONLINE SURVEY ON KNOWLEDGE, ATTITUDE AND PRACTICES
AMONG YOUNG ADULTS TOWARDS FOOD AND NUTRITION LABELLING**

A. GENERAL INFORMATION:

- 1. Name of the consumer
- 2. Date of the survey
- 3. Name of the area Rural Urban

B. SOCIAL DEMOGRAPHIC INFORMATION OF CONSUMER:

- 4. Gender Male Female
- 5. Age (in year)
- 6. Education qualification
 Secondary in complete Secondary completed College/university

7. Occupation

- Employed Business Home maker
- Students (under graduate) Nutrition Non nutrition students

8. How much percent of your income spent for food items and food products per month?

- 0 – 20 % 20 – 40 % 40 – 60% Above 60%

C. PURCHASING HABITS

9. How often you are purchasing perishable foods?

Daily	Bi weekly	Weekly	Bimonthly	Monthly	Others

10. How often you are purchasing non perishable foods?

Daily	Bi weekly	Weekly	Bimonthly	Monthly	Others

11. Where you purchasing your food products and materials?

- Whole Scale Market Shop Farmers

D. FOOD LABELING

8. Did you go purchase any food product for shop? Yes No

9. If yes how often you go?

- Rarely Sometimes Regularly

10. Do you agree that food labeling is important for any food products?

- Important Not important No idea

11. If is unimportant why you think like -----

12. While purchasing does you check food label?

- Never Rarely Sometime Regularly

13. If never why?

- Time consuming Able to understand Do not have interest
 It is unnecessary Not aware of it Others (specify)

14. If you check when you see the food & nutrition label?

While purchasing	After purchasing	Before using the product	After using the product

15. Did you understand the information provided in the food and nutrition label?

Easy to understand	Somewhat easy	Somewhat difficult	Difficult tounderstand

16. Do you feel the amount of information provide in the food and nutrition label?

- Too much of information Required information Less information

17. If it is less information what does you what include in that -----

18. Do you agree the information given in the food label & nutrition label is trusted?

Strongly agree	Partially agree	Neutral	Partially disagree	Strongly disagree	Not aware of it

19. The information on food & nutrition label helps you to purchase the product

Strongly agree	Partially agree	Neutral	Partially disagree	Strongly disagree

20. Which of the following information you check while purchasing?

- Price Net weight Offers
 Name of the brand Manufacture date Expiry date

- Nutrition information Storage condition Instruction for use
 List of the ingredient Made in Others (specify) -----

21. How many year you following to see the food and nutrition label?

- More than 5 years 5 years Less than 5 years Recently

22. Do you aware why the food label & nutrition label is in product? Yes No

23. Whether the food& nutrition label information change your food purchasing choose?

- Yes No

24. Do you think the labeled foods are costly? Yes No

25. Is that labeled foods are safe for consumption? Yes No

26. Reason for reading food label

Curiosity	Suggested by nutrition counseling	Family habit	Diet conscious	Others (specify)

27. Do you check nutritional information in the label?

- Never Rarely Sometime Regularly

28. Do you think people are watching food label and then only they purchasing?

- All of them Somebody No one

29. At any time you purchased expired product in market? Yes No

30. If yes is that cause any healthy issues to you?

- Stomach ache Diarrhoea Vomiting Others (specify) -----

31. If you are not checking the food label then how you know the price?

- By the shop keeper By the list of the price board By someone

32. How do you check the product quality?

- Through the label By seeing the product Asking to older

33. Do you check the packagings are damaged?

- Never Rarely Sometime Regularly

34. How often you are purchasing unlabeled product?

- Never Rarely Sometime Regularly

35. Do you always purchasing in a one shop? Yes No

36. Do you know what FSSAI is? Yes No

37. How you rate your food and nutrition label knowledge?

Very good Good Normal Bad Very bad

38. in your view when the food is safe?

It will not contain any insects inside the package It will not contain any off flavor

The package does not have any damage Should not cross the best before date

All of the above

39. Do you agree the ingredient give by the food label is exactly what they use?

Strongly agree	Partially agree	Neutral	Partially disagree	Strongly disagree	Not aware of it

40. In the nutrition information which of the following you check maximum?

Energy Carbohydrate Protein Fat

Vitamins Minerals All of this above None of this above

41. How to know the weight of the product?

By seeing the label By taking the weight in the weighing balance

By the shop keepers Simply you by the product

42. Before cooking do you check the best before date or use by date given in the table?

Never Rarely Sometime Regularly

Don't care about it

43. How do you buy the product in the way of seeing?

Brand name Quality Price Nutrition facts

Attractiveness None of this above Others (specify)

44. Do you buy any instant product?

Never Rarely Sometime Regularly

45. How do you use the instant product?

By the direction of the use given by the label

Direction by the person (friends, family members, ECT...)

By your own direction

Others (specify) _____

46. Have you eat any other country product? Yes No

47. If yes how do you know that is made in other country?

By seeing made in Hearing by person By Your own assumption

48. How do you store the product after opening the package?

By your experience By asking experienced person

By searing in web resource Guidelines given by the label

49. Do you keep the food label until the product will get end?

Never Rarely Sometime Regularly

50. Do you agree is the food and nutrition label having advantages for consumer?

Strongly agree	Partially agree	Neutral	Partially disagree	Strongly disagree	Not aware of it

51. Do you think what the advantages that have are?

To giving clear knowledge about the product

It will help to compare the one product to another product

It will help to purchase the quality and safe product

It will give the correct dietary choices

All of the above

Others (specify) _____

52. While seeing food and nutrition label have you experience any interesting think? (Any embarrassing moment)

53. Do you want suggest anything _____?

APPENDIX III
FEED BACK FORM

How do you rate this survey for collection of data?

Poor Good Very good Excellent

Are you satisfied the nutrition education? Yes No

Is that nutrition education video are useful to you? Yes No

If yes how?

If no why?

Is that nutrition education about food and nutrition label video make any changes in your purchasing choice? Yes No

Reason:

Mention strength of nutrition education video

Mention suggestions to upgrade the quality and quantity of nutrition education video

Enumerate the weakness of nutrition education video

How do you rate the nutrition education?

1 2 3 4 5

THANK YOU FOR PARTICIPATING IN THE RESEARCH STUDY NUTRITION
EDUCATION.