

UNIVERSITY FOR DEVELOPMENT STUDIES, TAMALE

ASSESSING CONSUMER AWARENESS AND USAGE OF NUTRITION  
LABELS ON PRE-PACKAGED FOODS IN SAGNARIGU MUNICIPALITY

AYIMBILA WAZAA

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LABELS ON PRE-PACKAGED FOODS IN SAGNARIGU MUNICIPALITY**

**BY**

**AYIMBILA WAZAA**

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**JULY 2018**



## DECLARATION

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this University or elsewhere:

Candidate's signature: ..... Date: .....

Name: **Ayimbila Wazaa**

## SUPERVISORS' DECLARATION

I hereby declare that the preparation and presentation of the thesis was supervised in accordance with the guidelines on supervision of thesis laid down by the University for Development Studies.

Supervisor's signature: ..... Date: .....

Name: **Prof. Amidu Nafiu**



## ABSTRACT

Together with the excessive consumption of pre-packaged foods, insufficient awareness and use of nutrition labels have been linked to the rising epidemic of diet-related chronic diseases. In Ghana, people are increasingly consuming pre-packaged foods, which are generally associated with high salt, sugar and fat contents, and other elements that can be harmful to health. This makes the use of the nutrition label very important. Therefore, this study sought to assess consumer level of awareness and use of nutrition labels on pre-packaged food products, in a study involving 400 respondents in Sagnarigu municipality of the Northern Region. Chi squared ( $\chi^2$ ) tests were performed to observe any differences between those who had high awareness/low awareness of nutrition labels, those who used nutrition labels/did not use nutrition labels, and some socio-demographic & health related factors. Logistic regression with associated odds ratios and their 95% confidence intervals was used to determine factors which predicted awareness and use of nutrition labels. The findings of the study showed that 87.8% of respondents were aware of nutrition labels but only 80.3% used the nutrition information. Educational status was the only factor associated with awareness. No positive associations were found between the socio-demographic, health factors, special diet status and nutrition label use. Basic education was the sole predictor of nutrition label awareness. But after adjusting for employment, basic education and secondary education were the only correlates of high level of nutrition label awareness. Basic education was also the only predictor of nutrition label use. After adjusting for employment however, no significant predictors of nutrition label use were found. In conclusion, the study found that awareness of nutrition labels on pre-packaged foods was high but use of nutrition labels was relatively low.



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## DEDICATION

This piece of work is dedicated to my late father Anseh Yinbil and all those who have contributed in one way or the other to the success of my education.



## TABLE OF CONTENTS

DECLARATION .....	i
ABSTRACT.....	ii
DEDICATION.....	iv
CHAPTER ONE .....	1
1.0 INTRODUCTION .....	1
1.1 Background of the study .....	1
1.2 Statement of the Problem.....	4
1.3 Research Questions .....	5
1.4 Objectives .....	5
1.4.1 Main Objective.....	5
1.4.2 Specific Objectives .....	5
1.5 Significance of the Study .....	6
CHAPTER TWO .....	7
2.0 LITERATURE REVIEW .....	7
2.1.1 Content of a Food Label .....	7
2.2 Consumer Awareness and Use of food labelling information .....	19
2.3 Label Characteristics That May Cause Consumer Dissatisfactions .....	21
2.4 Benefits of the Use of a Food Label .....	23
2.5 Background to Nutrition Labelling.....	25
2.8 Factors Associated with Nutrition Label Use .....	35
2.8.1 Influence of Socio-Demographic Factors on Label Use.....	35
2.8.2 Influence of Health-Related Factors on Nutrition Label Use .....	39
2.8.3 Influence of Other Factors on Nutrition Label Use .....	43
2.9 The Negative Influence of Diet on Health.....	47
2.10.1 Obesity and Cardiovascular disease.....	48
2.10.2 Type 2 Diabetes Mellitus and obesity.....	48
2.10.3 Metabolic and Other Disorders Linked to Obesity .....	48
2.10.4 Obesity and Cancers .....	49
2.10.5 Obesity and Other Health Consequences.....	49
2.10.6 Obesity and premature mortality .....	49
2.11 Dietary Therapy and the Treatment of Obesity .....	49
2.11.1 Dietary Energy Restriction .....	50



2.11.2 Altering Diet Composition - High or Low Carbohydrate, Low Fat Diets and High Protein Diets .....	50
CHAPTER THREE .....	53
3.0 METHODOLOGY .....	53
3.1.0 Profile of Sagnarigu Municipality .....	53
3.1.1 Establishment.....	53
3.1.2 Location and size .....	53
3.1.3 Major Towns/Communities .....	53
3.1.4 Demography.....	54
3.1.5 Health.....	55
3.1.6 Religion and Cultural Heritage .....	56
3.1.7 Economy of the Municipality .....	57
3.1.8 Social Issues.....	57
3.2 Study Population.....	58
3.3 Inclusion Criterion .....	58
3.4 Study Design.....	58
3.5 Study type .....	59
3.6 Sampling Technique and Sample Size.....	59
3.6.1 Sample size .....	60
3.6.2 Sampling Technique .....	61
3.7 Quality Assurance.....	62
3.8 Research Instrument, Study Variables and Data Analysis.....	62
3.8.1 Research Instrument.....	62
3.8.2 Study Variables.....	64
3.8.3 Data Analyses .....	65
3.9 Ethical Consideration.....	66
CHAPTER FOUR.....	67
4.0 RESULTS .....	67
4.1 Background Characteristics of Respondents .....	67
4.2 Level of Awareness and Understanding of Nutrition Labels.....	69
4.3 Prevalence of Diet-Related Health Conditions .....	70
4.4 Common Sources of Nutritional Information .....	71
4.5 Components of Nutrition Labels That Respondents Were Most Likely To Use .....	72





4.6 Components of Food Labels That Respondents Were Most Likely to Use.....	73
4.7 Factors Associated with Nutrition Label Awareness and Use of Nutrition Label among Respondents .....	74
4.8 Factors That Predict Nutrition Label Awareness and Use among Respondents	78
CHAPTER FIVE .....	82
5.0 DISCUSSION .....	82
5.1 Consumer Awareness of Nutrition Labels .....	82
5.2 Food Label Information Most Likely to be used by Consumers .....	83
5.3 Components of Nutrition Label Information Most Likely to be used by Consumers When Purchasing Pre-packaged Foods.....	85
5.4 Factors Associated with Awareness and Use of Nutrition Information on Pre-packaged Foods.....	88
5.5 Limitations .....	95
CHAPTER SIX .....	96
6.0 CONCLUSION AND RECOMMENDATIONS .....	96
6.1 Conclusion .....	96
6.2 Recommendations.....	97
APPENDIX.....	124



**LIST OF TABLES**

Table 3.1: Age-Sex Structure of Sagnarigu Municipality .....55

Table 3.2: Religious Affiliations in the Municipality .....57

Table 4.1: Background characteristics of respondents .....68

Table 4.2: Level of awareness and understanding of food/nutrition labels .....69

Table 4.3: Differences in socio-demographic characteristics and health characteristics of consumers who had a low awareness and those who had a high awareness of nutrition labels .....75

Table 4.4: Differences in socio-demographic characteristics and health characteristics of consumers who use nutrition labels and those who do not.....77

Table 4.5: Logistic regression of factors that predict nutrition label awareness among consumers .....79

Table 4.6: Logistic regression of factors that predict nutrition label use among consumers .....81



**LIST OF FIGURES**

Figure 4.1: Prevalence of current diet related health conditions reported by study participants .....70

Figure 4.2: Sources of nutritional information for study participants .....71

Figure 4.3: Components of nutritional label on pre-packaged foods that participants were most likely to use .....72

Figure 4.4: Components of Food Labels Respondents Were Most Likely To Use .....73



## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background of the study

The growing availability of pre-packaged foods on the market attests to a rapid process of nutrition transition taking place within the Ghanaian society. Nutrition transition has been facilitated by globalisation which has significantly altered the nature of food production, processing, transport and marketing systems and as such, changed the types and desirability of foods available for consumption (Hawkes, 2006).

The globalisation of the food system has made nutrition labelling of pre-packaged foods very important because of the nutritional and health implications of consuming foods which have undergone the kind of processing modern food products have been subjected to.

Nutrition labelling, which is an effort to make available information concerning the nutritional content of food products in order to enable consumers choose nutritionally appropriate foods at the point of purchase (Grunert & Wills, 2007), involves the disclosure of information such as nutrition fact panels, daily reference values, health claims, recommendations and disclaimers (Hieke & Taylor, 2012).

The primary purpose of food labelling today is to serve as a medium through which manufacturers of processed food honour their commitments with consumers in regards to the provision of nutritional information (Leech, 2006). In other words, the consumer's right to health protection and his right to access to information on nutrition, ingredients and additives, and the disclosure of possible allergens are now the central focus of food labelling concerns (Cheftel, 2005).



For the greatest part of man's history, virtually all foods were prepared from fresh ingredients which were locally produced, locally purchased, and locally consumed. For this reason, food labelling was not so widely practised. Modern food labelling was ushered in with the advent of industrial food production, the discovery of technological preservation methods and the discovery of packaging techniques and materials (Cheftel, 2005).

In addition to all what it was intended for, nutrition labelling has made it more possible for consumers to be able to differentiate among the numerous products from the different geographic locations competing on the market. Nutrition labels are considered by many as the main source of information for the evaluation of product quality (Cheftel, 2005). For this reason, it is important for pre-packaged foods to carry nutrition labels.

Thanks to nutrition labelling, the consumer's food selection process has been enhanced and it is now more possible for consumers to make healthier food choices (Barreiro-Hurlé, Gracia & de-Magistris, 2010). People suffering from diet-related health conditions and those on special diets are also able to manage their conditions better when they use nutrition labels.

Nutrition labels are therefore used by actors in the food industry to demonstrate concern for consumers. They also use it to promote improved products. At the governmental level in some jurisdictions, nutrition labelling is a major policy tool for the promotion of healthy eating (Campos, Doxey & Hammond, 2011). Therefore, as a population-based approach (Bovell-Benjamin & Bromfield, 2010), government can use nutrition labelling to attain public health objectives (Hawkes, 2004) such as transforming consumer dietary behaviours or habits.



Despite its enormous benefits, nutrition labelling remains a voluntary exercise in Ghana, which follows the Codex alimentarius guidelines for nutrition labelling. This does not speak well for a country which has made regenerative health and nutrition a national agenda for the promotion of the health of its citizens.

Low or poor usage of nutritional information may be a reflection of low awareness of nutrition labels. Low usage of nutrition labels can have serious health consequences to consumers of pre-packaged foods and the health system.

Insufficient awareness regarding nutrition label use, together with the excessive consumption of pre-packaged foods (Washi, 2012), has been linked to the continuous rise in diet-related chronic diseases such as hypertension, diabetes mellitus, heart disease, and some forms of cancer, etc. Nutrition labelling can therefore be an effective tool in the fight against the rising prevalence of chronic diseases in the country if consumers use nutrition labels effectively.

But before they can do so, they first need to search for the label information, which they may do if they understand nutrition information (Grunert & Wills, 2007). There is therefore the need for awareness creation on nutrition labels as the first step towards promoting the use of nutrition labels. There is also the need for education on nutrition label information so that consumers can have a good understanding of the nutritional information on food labels.

A proper understanding of the factors associated with awareness and use of nutrition labels among consumers is necessary for effective public health education on the consumption of processed foods and how nutrition labels can be used to promote health and prevent diseases. It is in light of this that this study is very necessarily.



## 1.2 Statement of the Problem

The nutrition label on pre-packaged food products is a very important aspect of food label which provides vital information about the food consumers are to take seriously. Yet, nutrition label information is hardly applied by many consumers, making one to wonder whether consumers are even aware of its existence in the first place.

Any concerns about the use of the nutrition label on pre-packaged foods is justified by the fact that pre-packaged food products have become widely accepted as part of our dietary intakes. Concerns over the excessive consumption of pre-packaged foods are even more justified by the fact that these products contain high amounts of salt, sugar and fat, and other element, which are notoriously associated with poor health.

The use of the nutrition label can therefore serve as a means of promoting good dietary habits among consumers of pre-packaged foods, and therefore can go a long way in promoting health and general wellbeing. Unfortunately, in some Ghanaian communities, quite a substantial proportion of the consuming public are not aware of the presence of this precious label and this can be seen in the poor eating habits most people engage in, which appear to be normal for many Ghanaians.

Many reasons have been given to explain why people use or do not use the nutrition label, some bordering on demographic characteristics, others on health, and many more. This study will assess the level of awareness of the nutrition label on pre-packaged food products, and the extent to which people use nutrition label information. The factors associated with awareness and use of the nutrition label, which this study will also seek to unearth, will contribute greatly in addressing the problem of low awareness and use of nutrition labels in society.



### **1.3 Research Questions**

The questions this research sought to answer are as follows:

1. What is the level of awareness of consumers about the presence of nutrition labels of pre-packaged foods?
2. Which components of food and nutrition labels on pre-packaged foods are consumers most likely to use?
3. What are the factors associated with awareness and use of nutrition labels on pre-packaged foods?

### **1.4 Objectives**

#### **1.4.1 Main Objective**

The general goal of this study was to assess consumer awareness and use of nutrition labels on pre-packaged foods

#### **1.4.2 Specific Objectives**

1. To examine whether or not consumers of pre-packaged foods are aware of the presence of nutrition labels of pre-packaged foods
2. To assess which components of food and nutrition labels consumers are most likely to use
3. To examine factors associated with awareness and use of nutrition labels





### **1.5 Significance of the Study**

Consumer interest in healthy eating has been on the ascendency for some time now (Grunert & Wills, 2007). Increased interest in issues bordering on nutrition in recent time has been propelled by a number of factors which include lifestyle, ageing population, dietary and safety considerations (Shine, O'Reilly & O'Sullivan, 1997). As the public have become increasingly worried about their diet and its implications to health, the food industry has reacted by providing food labels with more detailed nutrition information (Petrovici, Fearn, Nayga Jr & Drolias, 2012).

Despite the growing demand for nutritional information and its subsequent supply in recent years very little studies have been conducted in our part of the world to examine the extent to which the consuming public know and actually use such vital information to inform their dietary choices.

Most of the knowledge we have on nutritional information use is comes from studies conducted in the West (EHN, 2003). In Ghana, only a handful of studies have been conducted on the subject matter.

The subject of this study is particularly important because of the role of poor nutrition in the chronic non-communicable disease outbreak and the enormous challenges the epidemic poses to the nation's health system. The findings contained in this study, apart from throwing light on the situation in our part of the world, may also help bring improvements, or even a new direction, in public health education relating to nutrition.



## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 Food Labelling

Food labelling has been defined as any written, printed, or graphic matter that is presented on the label accompanying the food, or is displayed near food for the purpose of promoting its sale (Codex, 1985). Food labels are very important because they are often the only available source of information about a food.

##### 2.1.1 Content of a Food Label

Food labels are often the only available source of information about a food product and therefore, as a matter of purpose, seek to satisfy consumer information demands about food products, which are largely driven by their specific dietary needs or some underlying health conditions (MORI, 2010).

To satisfy consumer information needs, processed food manufacturers and even some restaurant operators, provide different kinds of information about their foods, all in an effort, to respond to the needs of their customers. Some of the information about a food you would find in a food label includes the following;

##### 2.1.1.1 Food Safety

This label provides relevant information to assure consumers about the safety of a food product. Food safety problems may arise from different areas of the production chain (Hall & Osses, 2013). Consumer concerns about food safety may be addressed through labels by way of production date, country of origin, shelf life and expiry date, chemical contamination, microbial contamination, cooking and storage instructions, allergen statements, and genetically modified ingredients (Centre for Disease Control and Prevention, 2015).



One other important information on food safety you would find on food labels is “Best-before” date. “Best-before”, usually accompanied with a specific date, is meant to inform consumers that the food will possess all its known qualities when consumed before the stated date. In other words, the product may have some of its attributes such as colour, taste, texture, etc. slightly changed if eaten after the provided date. The “Best-before” date, most often than not, is confusing to some users of food label information as it is often mistaken with the expiry date of products, which indicates the date beyond which the food is no longer safe for consumption.

It has been opined that quality assurance and “Best-before” dates are often viewed by consumers as indicators of freshness, longer shelf-life and the general safety of a food product (Philip, et al., 2010). Following the growing awareness of the link between diet and health, it is obvious that food safety issues will continue to be of paramount importance to consumers for a very long time to come.

In Europe for instance, a study by Sabbe, Verbeke & Van (2009) shows that consumers prioritise information about food safety and well-being, and the production and distribution process of foods, than any other information you would find on a food label.

#### **2.1.1.2 Country of Origin**

Country of origin labelling is one aspect of the requirements of mandatory food labelling, and it basically has to do with information about the traceability of a food. The generally believe among consumers is that foods originating from their geographic region or country are safer and better than those coming from elsewhere (Philip, et al., 2010). This believe may be partly the reason 72% of British and Danish consumers preferred domestically produced conventional fruits and vegetables to the



organically imported ones on the market, as was found in a certain study (Wier, O'Doherty, Andersen & Millock, 2008).

So dear is "Country-of-origin" label that consumers in some places in the United States said they were ready to pay a premium for products carrying the label (Banterle & Stranieri, 2008). What this tells us is that pre-packaged food manufacturers stand to gain a lot from the inclusion of that label in the labelling of their products.

### **2.1.1.3 Quality**

In an environment where products are in competition, assurance of quality can be very instrumental in determining the consumer's purchasing decisions. Consumers look out for indications on products that give them assurance of quality, such as certified quality marks and mandatory standard information such as expiry date, etc. which they can interpret with ease (Verbeke, Pieniak, Vermeir, Bruns & Oslen, 2007).

Package is an important element of the appearance of products and serves as a major source of information about the product for many consumers. Package is so important, as a marketing strategy, that the amount devoted to it by manufacturers is so huge that it exceeds what they spend on mainstream advertising (Pires and Ricardo, 2008).

The huge amounts manufacturers readily devote to packaging is an indication of the fact that manufacturers of pre-packaged food products have come to realise that consumers may associate package with quality. The outer appearance of pre-packaged foods can be very helpful in creating a long-lasting positive impression about a product, especially when viewed as a measure of quality. It can also draw many first-time customers to choose a particular product over similar ones with less attractive packages.



Organic food products have also been held by some consumers as a standard measure for quality. As compared to conventional foods, organic products have been perceived by some consumers to be purer, healthier and of a better taste (Hoback, 2008). And because of their perceived value, organic foods are often more expensive than the conventional ones.

Despite its high value among consumers, Spanish and Belgian respondents in a certain study believed that quality control should be a government, rather than a personal responsibility (Verbeke, et al., 2007).

#### **2.1.1.4 Health Claims**

Health claims made on food products are often presented under this label. Health claims are messages that link the food or some of its elements to health. Health claims on foods have had some controversies before. Until 1984, health claims were largely incomplete, misleading and led to wrong nutritional knowledge, which as a consequence, impacted negatively on people (Silverglade, 1991).

This has partly contributed to the strict regulations on food labelling we see in the industry today. As a result, health claims can now be more trusted for their purported abilities to promote the health of consumers. An example of a health claim that may be made on a food label is 'low sodium food may reduce the risk of high blood pressure'.

Food products are more likely to be appreciated by consumers as being healthy and attractive if their labels carry a health claim (Roe, Levy & Derby, 1999). Health conscious consumers are always looking up in food labels for information that provide assurances of good health. A survey by MORI (2010) showed that consumers



looked out for health related information on food products that gave them assurances of specific qualities such as “no electronic numbers”, “no caffeine” and “low fat”.

Health claims are therefore of enormous importance to both producers of pre-packaged foods and consumers. For producers, health claims make their products more appealing to health conscious consumers. On the part of the consumer, the health claim label makes it possible for them to avoid foods that contain properties which may harm or bring improvements to their health.

#### **2.1.1.5 Price**

Price is one of the major food label information influencing consumer purchasing decisions, particularly consumers belonging to the lower income bracket. Seventy percent of consumer purchasing decision is based solely on price, taste and expiry date (Charles, 2002). Price has been noted as one of the most commonly food label information often sought for by consumers and it ranks alongside country of origin, expiry and “use-by” dates (Philip and colleagues, 2010).

For low income consumers, price is a major determinant of the types of food they purchase (Mahgoub, Lesoli & Gobotswang, 2007). Price is so much of a priority to low income consumers that they may pay less attention to other food label information after looking at the price tag on a food product (MORI, 2010).

#### **2.1.1.6 Daily Value**

Information on daily value can be found in the Nutrition Facts panel on food labels. In the Nutrition Facts panel, vitamins and minerals levels of a food are presented as a percentage of the Daily Values needed by the consumer. For example if the label lists 10% of calcium, what it means is that one serving of the food will yield 10% of the



calcium the consumer needs each day. Daily Values are based on a 2,000-calorie diet for a healthy adult.

Daily Values serve as the basis for nutrient content and health claims on pre-packaged foods. The 1968 National Academy of Sciences Recommended Daily Allowances for most vitamins and minerals form the basis for Daily Values on recent food labels (Murphy, Spungen, Barraj, Bailey & Dwyer, 2013).

#### **2.1.1.7 Serving Sizes**

Serving size is the amount of food normally eaten at a go and this forms the basis of the serving sizes on nutrition labels. Serving sizes are measured against reference amounts. For example, nutrition labels normally use terms like cup or table spoon at a quantity that is nearest to the reference amount for the particular food under consideration.

The serving size for foods which are normally divided before eating, example pizza, is a fraction of the amount of the food (eg.  $\frac{1}{4}$  pizza). For foods such as eggs which are defined as units, the serving size is shown as the number of whole units nearest the reference amount (Herring, Britten, Davis & Tuepker, 2002).

#### **2.1.1.8 List of Ingredients**

This is the section of a food label where every single ingredient in the food is listed. It is a standard practice to list ingredients in a descending order of weight. In addition to the listing of ingredients, it is required for producers of pre-packaged foods to provide information on the top eight allergies (milk, eggs, fish, peanuts, soy, tree nuts, wheat and shellfish) under this section where any of these allergies is a component of the food (Anderson, Young & Perryman, 2010).



### 2.1.1.9 Nutrition Facts

It is on the nutrition fact label you would find information on some nutrients a food product contains. A number of studies have been conducted on the particular nutrients to include in a nutrition label.

Although nutrition is usually about nutrients that impact positively on health, studies show that consumers are more concerned about controlling their intake of the nutrients that have negative effects, and therefore prefer to know the quantities of those that impact negatively on them (Heimbach, 1981; Putnam & Weimer, 1981; Burton, Creyer, Kees & Huggins, 2006; Russo, Staelin, Nolan, Russell & Metcalf, 1986).

In a study, Russo and colleagues (1986) tested the impact of providing positive nutrient content on consumer purchases of frozen TV dinners. A poster was placed in the aisle listing the vitamins and minerals of all the frozen TV dinners sold. While the presence of the posters increased nutrition knowledge, it did not change consumer frozen TV dinner purchases.

In the said study, a survey of grocery shoppers showed that respondents were more interested in negative nutrients. To test what they found in their study, Russo and colleagues (1986) conducted a second study by hanging posters in the cereal aisle, listing the amount of added sugar for each cereal product.

They found a shift in sales to cereals with lower amounts of added sugar. They concluded that consumers were not interested in knowing the quantity of positive nutrients present in a food product probably because one could simply meet the daily recommended amount for vitamins by taking a multivitamin.





Another study by Heimbach (1981) also showed higher interest of consumers in negative nutrients. The study by Heimbach (1981) basically sought to know how his participants will rate 38 food components he listed, in terms of how useful they thought it will be for them to know the quantities of those components in a food. In all, he listed 29 positive and 9 negative nutrients. All 9 negative nutrients (calories, fat, sugar, cholesterol, sodium, carbohydrates, starch, polyunsaturated fat, saturated fat) were ranked among the top 12 of “most useful”.

Similarly, Yoon (2009) found that the participants of his study were most interested in knowing nutrient information about total calories, total fat, trans fat, calories from fat, saturated fat, and protein. Almost all of these nutrients are unhealthy.

It has also been found that 9 out of 10 reasons for people changing their eating habits were to reduce consumption of negative nutrients (Putnam & Weimer, 1981). It has been found in a number of studies that consumers want to avoid or limit their consumption of calories, fats, sugars, and sodium to prevent health problems, manage health problems, or as a result of dietary recommendations based on age (Burros, 2004; Jones, 2007; Burton, et al., 2009).

In two different focus group discussions involving mothers and Senior Citizens to determine the impact of menu nutritional labelling on their food choices, it was the case that the mothers were more particular about the amount of calories for weight control.

The Senior Citizens on the other hand were much concerned about sodium content because of high blood pressure concerns, and the United States Daily Allowance recommendation for this age group to consume less than 1,500 milligrams of sodium



daily compared to 2,400 milligrams for adults (Jones, 2007; United States Daily Allowance, 2010).

Despite the fact that consumers are more concerned with more than just calories, federal laws on menu labelling require only caloric content of foods to be displayed. But the provision of additional negative nutrients for a menu item would be what it will take to create a more complete nutritional picture for the consumer.

To study consumers perceived likelihood to gain weight and develop heart disease and their attitude towards and purchase intention for some selected items, Burton and colleagues (2006) mailed out three different menus (no nutrition information, calories only, and calories, fat, saturated/trans-fat & sodium) listing four entrees (unhealthy: hamburger with fries and chef salad; healthy: grilled chicken with baked potato and turkey sandwich) to some individuals.

They found that the menu containing calories plus nutrients led to higher perceived likelihood of heart disease and weight gain than just the “calories only” menu and “no nutrition information” menu for the unhealthy items because including fat and sodium content was more informative.

Consumers are rationale and only want information that is relevant to their personal situations. They want the quantity of nutrients which, when overconsumed, has been proven to cause diet-related diseases (Heimbach, 1981; Cranage, Conklin & Lambert, 2005).

In a study by Cranage and colleagues (2005), nutrition information cards that were the same as the Nutrition Label and Education Act label panel were placed next to each hot entree at a university café. After patrons made their food selections, their answer



to a survey question showed that they only referred to total fat grams, calories, and calories from fat despite there being as many as twelve nutrients on the list provided.

In some countries, restaurants are required to provide additional nutrition information upon customer request. This requirement may not be necessary since a study by Roberto, Bragg, Schwartz, Seamans, Musicus, Novak & Brownell (2012) concluded that only 0.1% of consumers sought for nutrition information that was not on the menu.

In addition, Bassett M.T., Dumanovsky T., Huang C., Silver L.D., Young C., Nonas C.,...& Frieden T.R. (2008) found that only 30 percent of Subway patrons noticed nutrition information on the deli case. In the case of Pulos and Leng (2010) study, 70% of restaurant patrons noticed nutrition information on the menu.

Therefore, it is advisable to provide additional negative nutrients besides just calories. Also, menu labels should be placed at vantage points in restaurants because the closer the nutrition information is to where customers look when ordering food, the more likely it will be seen and used.

#### **2.1.1.10 Organic Labelling**

Food products claiming to be organic are required to meet some specifications (Anderson, et al., 2010). The guidelines on organic foods indicate that food products can be considered 100% organic only when they contain organic ingredients.

It is also required under the guidelines that food products contain at least 95% organic ingredients before they can be labelled as “organic”, with water and salt being the exception (Australian Certified Organic, 2013).



Products which contain at least 70% organic ingredients are regarded as "made with organic ingredients", and it is compulsory for such products to have the three organic elements on the principal display panel listed (Australian Certified Organic, 2013).

#### **2.1.1.11 Sustainability, Equity and Animal Welfare**

There has been growing public concerns bordering on ethics and environmental impacts of the food production process, which in a way has had great influence on consumer purchasing decisions.

Environmental and ethical impacts of the food production system include but not limited to carbon emissions (Steinfeld & Wassenaar, 2007), deforestation (Fitzherbert, Struebig, Morel, Danielsen, Brühl, Donald & Phalan, 2008), the welfare of animals in industrial farms (Mench & Tienhoven, 1986), unsustainable fishing practices (Brécard, Hlaimi, Lucas, Perraudeau & Salladarré, 2009), civic values, social norms, and moral and political ideas (Brécard et al., 2009).

The market for foods that are produced in a sustainable manner and ways which address animal welfare or the welfare of the farmer is growing and this can be seen in the increasing consumer demands for organic, environmentally friendly, Fairtrade and animal cruelty-free products.

In 2002, 27% of consumers in Organisation for Economic Co-operation and Development (OECD) countries were identified as 'green consumers' who had a strong willingness to pay for environmentally friendly products (Brécard et al., 2009). A further 10% were 'green activists' who had a lower willingness to pay, and a further 40% were identified as 'latent greens' who had the potential to become green activists or consumers (Brécard, et al., 2009). As far as equity of food production is



concern, global sales of Fairtrade products went up as high as US\$7.4bn in 2014 and continue to grow rapidly.

In relation to animal welfare, a study showed some consumers valued information on animal welfare even more than organic or carbon footprint labels and were ready to pay a high premium ranging from 43-93% for chicken products from chicken reared on free range (Van, Ellen, Nayga, Rodolfo & Verbeke, 2014). In view of this, pre-packaged food producers stand to gain significantly if they learn to address ethical and environmental concerns of consumers by practicing productions methods which does not violate those concerns.

Ethical labelling needs to be improved so that consumers can make maximum use of the information. Education is also one possible way by which consumers can improve their understanding of ethical labelling. Studies suggest consumers who are educated about the meaning of food labels are better able to interpret and use them, and perceive ethically labelled foods as more acceptable and of higher quality (Samant & Seo, 2016).

Ethical labelling could also be improved by streamlining the labels themselves. It is widely acclaimed that a labelling policy which is coherent would be of much help to consumers in making informed choices about food (Gadema & Oglethorpe, 2011).

#### **2.1.1.12 Information on Cultural beliefs**

Religion-specific food restrictions have led to increased usage of halal and kosher labels in multi-cultural communities like New Zealand. There have been different opinions about the use and effects of labels inspired by religious beliefs. Some in academia argue that the commonalities in respect of food laws amongst the Abrahamic faiths can be used as basis to bring improvements in animal welfare,



sustainable food production, especially at the industrial level, and even the nutrition of consumers by integrating these laws with traffic light systems to enhance better food choices that promote good health (Tieman & Hassan, 2015).

However, the problem with religious labelling is that while religious food laws make products more attractive to members of a particular religious group, there is the possibility of the religious label affecting perception of a branded product amongst consumers who do not fall within the target group via a ‘spillover effect’ whereby mental schemata of a brand and of a religion are perceived simultaneously and combined (Rauschnabel, Herz, Schlegelmilch & Ivens, 2015; Schlegelmilch, Khan & Hair, 2016).

#### **2.1.1.13 Other Food Label Information**

Some other food label information available include; the name and address of the manufacturer; country of origin of the product and the ingredients (Hoffman K.D., Czinkota M.R., Dickson P.R., Dunne P., Griffin A., Hutt M.D.,...& Ur-Bany J.E., 2005; Whitney & Rolfes, 2007), directions for use and serving suggestions (Hoffman, et al., 2005), the net contents of the product in weight or volume (Whitney and Rolfes, 2007), a barcode (Hoffman, et al., 2005) and the presence of allergens as a safety precaution.

#### **2.2 Consumer Awareness and Use of food labelling information**

There have been quite a number of studies carried out in different countries on the influence of knowledge and use of pre-packaged food labelling on purchasing decisions. The search for or use of food label information have been observed to be influenced by different motivations, which has to do with consumer perceptions about



the risk they associate with the use of a particular pre-packaged food (Sunelle, Hanli & Ment, 2010).

The study by Sunelle, Hanli & Ment, 2010 which involved consumers of pre-packaged foods sampled from supermarkets in South Africa, found that though a large proportion of the participants of the study read food labels, they were deprived of the full benefits of food label information due to lack of understanding of how to derive maximum benefit from what they read.

A qualitative consumer survey on issues of food labelling, conducted by the Australia and New Zealand Food Authority, with the objective of exploring consumer awareness, knowledge and understanding of food labels and behaviours towards food labelling, revealed that consumers chose food products based on the use of food label information on those products (Donna, Rhoda & Anna, 2001). Life stage and health consciousness greatly influenced label reading among the consumers who participated in the study.

In another study in Lesotho by Mahgoub and colleagues (2007), majority of the consumers sampled said food labels particularly nutrition information was used to determine specific foods they chose. The study found that 40.5% of the participants were motivated by the information on the nutrition label to purchase the food products they chose.

A study by Borra (2006) in Baltimore and Chicago, which had the goal of assessing attitudes and understanding of nutrition information among consumers of packaged, showed that consumers who were conscious about their health read food labels, and most especially nutrition information, because they saw the information on labels as a way by which they could improve their health. Some participants of the study said



food labels helped them in making better food choices. Others said the information on food labels were too complex and expressed the need for them to be simplified.

In the United Arab Emirates, Washi (2012) carried out a study to assess awareness of food labelling, with consumers being the study participants. The focus of the study was on knowledge, attitude and practice of consumers towards food labelling. The study showed that consumers needed more awareness on food label information especially that of nutrition, so that they could make healthier choices of food.

The participants of this study said their most preferred label information was production and expiry dates. This shows that the dangers of consuming foods which have expired were of great concern to the participants of the study. Many participants also looked at the nutrition information on food products, especially information on calories and low cholesterol.

The country of manufacture of the products also did not escape the radar of the participants. This shows that the source of the product could make it more preferred by consumers than other products of the same kind on the market.

Finally, a study by Philip and colleagues (2010a) in the UK indicated that nearly 50% of the population in that country read and used food labels. The study found that consumers read food labels primarily because they were concerned about the safety, hygiene and quality of the food products they patronised.

### **2.3 Label Characteristics That May Cause Consumer Dissatisfactions**

The first impression of a product is very critical in establishing long-lasting bonds with the product. As such, it is expected that the physical characteristics of a food label would be appealing to the eyes. However, some food product labels are so small in size that they are not able to contain enough information about the food.





When font size of a product's label is small individuals with sight problems might experience challenges reading the label information. As a result, health conscious individuals and the elderly (Silayoi & Speece, 2004; Dimara & Skuras, 2005) have consistently raised concerns about font size and colour differentiation (Doyle, Carus & Pridham, 2005).

The existence of food regulations has not taken away confusion and scepticism about the credibility and scientific accuracy of health claims on food labels (Silayoi & Speece, 2004; Worsley and Lea, 2008). The lack of trust in the credibility and accuracy of health claims on food labels leads to negative attitudes towards nutrition labels.

Some consumers find food labels hard to follow and just too time-demanding to read (Silayoi & Speece, 2004; Peters, Texeira & Badrie, 2005). Others are not clear about how food label information is presented, for example, the fact that ingredients are listed in a descending order of quantity (Doyle, et al., 2005; McEachern & Warnaby, 2008).

Another issue that can cause consumer dissatisfaction in a food label is the inability to find information they expect to see on the label or when the weight and content of imported foods are indicated in units they are not conversant with (Peters, Texeira and Badrie, 2005; de Magistris & Gracia, 2008); or if the labels contain unfamiliar terminologies or symbols (Mannell, Brevard, Nayga Jr, Combris, Lee & Gloeckner, 2006; Miles, Valovirta & Frewer, 2006).

For some consumers, for example, discerning consumers and those who have special nutrition or food and health-related interests, the lack of certain information they deem critical to their needs can cause their dissatisfaction with a food label. They



expect labels to contain more than what is considered normal for the ordinary person and might be displeased if certain information, for example, if a product's associated geographic region, its production methods or its traceability, is not indicated in the label (Dimara & Skuras, 2005; McEachern & Warnaby, 2008; Teisl, Radas & Roe, 2008).

Too much information on the other hand could bring about information overload (Silayoi & Speece, 2004; Kimura, Wada, Tsuzuki, Goto, Cai & Dan, 2008).

Attempting to satisfy consumers who demand more information can generate some amount of controversy among manufacturers of pre-packaged foods over what information should be included on the label in order to satisfy everybody (Feunekes, Gortemaker, Willems, Lion & Van Den Kommer, 2008).

To conclude, the point has to be made that consumer food choices are greatly prejudiced if they are not able to understand the label information (Jacobs, et al., 2011). This is because consumers normally ignore the information or they might even refuse to accept a particular product in favour of one whose label information appears to be easy for their understanding (Silayoi & Speece, 2004). Consumer dissatisfaction with a food label on a product can bring about less demand for that product.

#### **2.4 Benefits of the Use of a Food Label**

Researchers have found that the use of food labels can actually promote healthier food choices, resulting in improved nutrition and lower risk of chronic disease (Drichoutis, Lazaridis & Nayga Jr, 2006; Taylor & Wilkening, 2008; Todd & Variyam, 2008; Silverglade & Heller, 2010). Though food labelling in itself is not sufficient to change eating habits, it can be an important motivating tool in the fight against obesity and chronic diseases which are related to nutrition (Ollberding, Wolf & Contento, 2011).



Food labelling is an integral part of a comprehensive strategy in public health that can bring about improvements to the consumer food selection process and environment, by the provision of crucial nutrition information, possibly resulting in healthier decision making (Cowburn & Stockley, 2005; Todd & Variyam, 2008; Silverglade & Heller, 2010). Cowburn & Stockley (2005) have noted that food labels have the ability to empower and enlighten consumers about food products.

Nutrient content and ingredient information about food items provided on food labels can be useful to consumers in identifying healthy food, such as those high in fibre, vitamins, minerals, etc. and help them in avoiding the less healthy ones like those with high concentrations of fat, calories or sodium (Brecher, Bender, Wilkening, McCABE & Anderson, 2000; Todd & Variyam, 2008). Also, nutrition information can influence purchasing behaviour by shaping consumer perceptions of food products and the perceived value of the product (Drichoutis, et al., 2006).

Label use improves the intake of nutrients, such as increasing dietary fibre consumption and reducing calories from all fats, cholesterol and sodium (Kim, 2000; Drichoutis, et al., 2006), which demonstrates how beneficial and important a tool food label can be for consumers.

The potential of food labels to improve dietary choice makes it useful in reducing the risk of current leading causes of mortality in the United States of America, such as diabetes, heart attacks, stroke and some cancers, as well as bringing down the excessive costs of nutrition related chronic health problems (Silverglade & Heller, 2010).



To maximise the benefits of food labelling and its efficacy, food label information should be accompanied by educational campaigns (Drichoutis, et al., 2006; Taylor & Wilkening, 2008).

The motivation behind the use of food labels, and how and whether food label information really influences food choices remains unknown due to no research in that respect (Hieke & Taylor, 2012). The many research works examining food label use are very narrow in focus.

Therefore, a more detailed interviewing is needed to explore the cognitive process consumers go through when food labels in real life situations, rather than examining self-reported knowledge concerning nutrition (Hieke & Taylor, 2012).

Additionally, more information is needed about the types of strategies that can be used to raise knowledge about the way to use labels so as to increase their usage (Cowburn & Stockley, 2005). It has been noted by Todd and Variyam (2008) that label use decreased between 1995/1996 and 2005/2006. They have therefore recommended more research be conducted to understand the reasons for the decline.

## **2.5 Background to Nutrition Labelling**

The whole idea of nutrition labelling was conceived to guide consumers in order that they may be able to make food choices that would be of benefit to their health (Bonsmann, Storcksdieck, Celemín & Grunert, 2010). Nutrition labelling, as a concept, was conceived by the Food and Drug Administration (FDA) of the United States of America.

Nutrition labelling was partly aimed at addressing concerns about nutrient deficiencies, a problem that still affects huge number of people across many third



world countries today. For many years, nutrition labelling of food products was not compulsory except where a nutrition claim was made, or where a specific nutrient was added to a food product (Taylor & Wilkening, 2008).

International laws on food were put in place at the beginning of the nineteenth century and this action was necessitated by the need to ensure the safety and quality of foods. This was necessary to protect the health of consumers from the criminal practice of adulteration and falsification of foods, to ensure that foods were free from all forms of hazards, and to stop the unhygienic handling of foods, all of which were causing all sort of problems to consumers (Lasztity, Petro-Turza & Foldesi, 2004).

The need for food labelling was also necessitated by the desire for producers to satisfy consumer information curiosity about the characteristics of food products such as information about its nutritional properties (Lasztity, et al., 2004).

The provision of food labels on pre-packaged foods is mandatory and is supposed to be written in the official language of the country where the food is destined for. However, presenting nutrition labels on pre-packaged food products may not be mandatory depending on a country's food labelling legislation (Campos, et al., 2011).

The need for mandatory nutrition labelling in some countries has been necessitated by demands of citizens for foods which will meet their health needs, and also the need to respect the right of consumers to nutrition and other information about processed foods which have become very popular among their nationals.

Laws governing nutrition labelling are promulgated with careful considerations. Such laws are required to be accurate and detailed, and must ensure consumers have access to nutritional content information on packaged food products (Abbott, 1997).



In the United States of America, nutrition labelling is mandatory. The existing law on food in the US – the Nutrition Labelling and Education Act of 1990 (NLEA), makes it necessary for those in the food industry to disclose the nutritional content of pre-packaged foods, except in situations where the food is meant for immediate consumption (FDA, 1994).

The Nutrition Labelling and Education Act have been of much benefit to consumers since its enactment. It has served the purpose for which it was enacted such as helping consumers make healthier food choices through improved access to nutrition content information, protecting consumers from inaccurate or misleading health-related claims on food packages, and encouraging manufacturers to improve the nutritional quality of their food products by making nutrition content visible (Mayer, Maciel, Orlaski & Flynn-Polan, 1998), and will continue to do so for many years to come.

Australia, New Zealand and Canada are other countries where nutrition labelling of pre-packaged food is also mandatory (Cowburn & Stockley, 2005). Until the year 2005, nutrition labelling was not mandatory in Canada and when the law on mandatory nutrition labelling was passed, nutrition labelling became mandatory for almost all pre-packaged foods in that country in 2007 (Health Canada, 2010).

Even though more and more countries are gravitating towards mandatory nutrition labelling of pre-packaged foods, many countries across the world still maintain the voluntary system of nutrition labelling for some reasons. Some of the reasons advanced in favour of the voluntary system of nutrition labelling for which reason some countries still hold onto it, as suggested by Patten, Hodges & Lange (1994) include;



1. Fears about the possible financial cost to businesses, especially the smaller ones
2. The argument that nutrition labelling hardly influences consumer purchasing decisions and
3. Consumers find it difficult in understanding nutrition information as found in some studies

Ghana's policy for nutrition labelling of pre-packaged food products is based on Codex Alimentarius guidelines because of its standing as a member of the Codex Alimentarius Commission (FAO, 2009a; FAO, 2009b). Nutrition labelling is voluntary for all foods based on Codex Alimentarius guidelines except where a producer makes a nutrition or health claim about a food. It is therefore not strange to find pre-packaged food products, whether locally produced or imported, in Ghana, without nutrition labels. The lack of nutrition labels on food products deprive consumers the opportunity to choose foods which are appropriate for their nutritional and health needs.

## **2.6 Codex Guidelines for Nutrition Labelling of All Foods**

Codex alimentarius as a commission has existed for more than 50 years and is made up of experts from across the world. The commission is dedicated to establishing and refining international food standards meant to protect the health of consumers and to ensure fairness in food trade practices. Codex guidelines serve as a recommendations for nutrition labelling of all foods (FAO, 2016).

Codex guidelines on nutrition labelling is to ensure that nutrition labelling is effective in the following ways (FAO, 1993):

- Making available information about foods in order that consumer may be able to make the right choice of food



- Providing a means by which information on the nutrient content of food labels could be conveyed
- Encouraging the application of proper nutrition principles in the production of foods beneficial to public health
- Providing opportunities for the inclusion of supplementary nutrition information on the label.
- It also seeks to ensure that the process of nutrition labelling does not involve the presentation of false about the product
- And finally, it seeks to ensure that nutrition claims are not without nutrition labelling.

In a nutshell, the codex guidelines on nutrition labelling require that (World Trade Organisation, 2014):

- Nutrition labelling should be voluntary except where a nutrition claim is made.
- When a nutrition claim is made, declaration of four nutrients namely, protein, energy, available carbohydrate, and fat should be mandatory, in addition to any other nutrient for which a claim is made.
- Dietary fibre should be disclosed where a claim has been made for that nutrient
- Where a claim is made for carbohydrates, the amount of sugars is to be listed, in addition to the four basic nutrients above.
- The amount of saturated and polyunsaturated fatty acids is to be listed where a claim is made on fatty acids.
- Any other nutrient recognised by national legislation to be vital for the maintenance of good nutritional status may as well be listed.
- Nutrients are to be listed per 100g or 100ml or per portion, where the portion size is stated.





- Nutrient claims should be in line with national nutrition policy and should be in support of that policy.
- Nutrient claims are allowed for protein, energy, carbohydrate, fat and their components, and sodium, fibre, vitamins and minerals. Claims can be made of foods as being low in, free of, high in, or a source of specified nutrients only if in accordance with nutrient reference values defined in the Guidelines.
- Claims related to healthy diets or dietary guidelines are required to be in harmony with dietary guidelines.
- Foods shouldn't be described as "healthy" or depicted in any way as to imply a food in itself will impart health.
- Any food containing a nutrition claim should carry a nutrition label which is in accordance with the Nutrition Labelling Guidelines.

### **2.7 Consumer Understanding of Nutrition Information**

Nutrition labels have been in existence for many years and questions about whether consumers of pre-packaged foods understand the messages they convey have prompted numerous studies aimed at assessing consumer understanding of nutritional information.

This has led to the conduction of many studies on the subject matter. Studies conducted by Britten and colleagues (2006) and Tuttle (2001) shows that though people have a general understanding of the basic concepts of nutrition as contained in the food pyramid, they do not have a good understanding of the specific knowledge relating to the correct food placement on the pyramid and the right portion size for the various foods.



It has also been said that consumers have a hard time when it comes to interpreting guidelines on diet, particularly on fat (Keenan, AbuSabha & Robinson, 2002). Some other areas on nutrition labels consumers do not find easy, for which reason they hardly extract and apply nutrition information on the nutrition label, has to do with matters relating to difficulties in understanding nutrition information, the different nutrition labelling formats, nutrition and health claims, and Front-of-Packs (Fatimah, Ismail & Tee, 2010; Jones & Richardson, 2007; Liu, Hoefkens & Verbeke, 2015b).

Despite the fact that nutrition labelling and Front-of-Packs are viewed very highly by consumers as a reliable source of nutrition information (Guthrie & Saltos, 1995; Cowburn & Stockley, 2005; Campos, et al., 2011) it has been found that consumers hardly use nutrition labels when making food choices (Cowburn & Stockley, 2005; Mhurchu & Gorton, 2007; Liu et al., 2015b).

Some barriers identified to hinder the effective use of nutrition labels include poor knowledge, the general lack of understanding of nutrition information and low level of confidence with terms, values and symbols associated with nutrition information (Jacobs, de Beer & Larney, 2011; Besler, Buyuktuncer & Uyar, 2012; Liu et al., 2015b) as well as the style of presentation (Baltas, 2001; Besler et al., 2012), such as the font size (Tessier, Edwards & Morris, 2000; Jacobs, et al., 2011).

Owing to this, there has been calls for simplified standards in labelling, which are clearer and easier for the understanding of consumers (Besler, et al., 2012). Ares, Giménez, Bruzzone, Antúnez, Sapolinski, Vidal & Maiche (2012) have made the observation that consumer understanding of labels is easier when Front-of-Packs, highly regarded among consumers of pre-packaged foods, are displayed in graphical



format (Geiger, Wyse, Parent & Hansen, 1991), such as in the traffic light style, for example (Roberto, Agnew & Brownell, 2009).

Consumer understanding of nutrient content in foodstuffs has also been said to improve when Front-of-Pack labels are presented with complete information (Edge, Toner, Kapsak & Geiger, 2014). However, the presence of many different Front-of-Pack formats in the system poses a serious problem to the understanding of consumers and discourages them from using nutrition labels (Draper, Adamson, Clegg, Malam, Rigg & Duncan, 2013).

Apart from knowledge of nutrition information, factors such as consumer socio-demographic conditions (Burton & Andrews, 1996), age, sex, educational level, marital status, (Besler, et al., 2012), and perceived product characteristics, like taste (Jacobs, et al., 2011) are factors that greatly or somehow affect the use of nutritional labels.

Other known factors affecting use of nutrition labels include price, wording, time constraints, etc. (Jacobs, et al., 2011). In some cases, factors such as general food involvement (Hansen, Thomsen & Beckmann, 2013) and the desire for a healthier diet (Campos, et al., 2011) or one low in fat/cholesterol as a result of medical advice (Guthrie, Fox, Cleveland & Welsh, 1995) seem to influence the attention consumers pay to nutrition labels, especially on health/nutrition information.

It has also been suggested that consumers find it difficult differentiating between nutrition and health claims about foods despite the difference between nutrition information and health claims (Verhagen, Vos, Francl, Heinonen & van Loveren, 2010). Consumer impressions about nutrition labels become greater when they are able to verify health and nutrition claims.



Consumers feel satisfied with health claims if the nutrition labelling and information affirm what they already know (Mazis & Raymond, 1997). What this means is that if a nutrition claim fails to affirm what the consumer understands or perceives about nutrition or health, the consumer is likely to regard such information as lacking validity, and the consumer may develop a negative opinion about the product.

Recent analysis of nutrition labelling, and nutrition and health claims appears to downplay the influence of the efficacy of nutrition and health claims in supporting consumer food choices (Andrews, Burton & Netemeyer, 2000; Garretson & Burton, 2000). Information about nutrition appears to thrive on public opinions or perceptions, and this is not good because it reduces the confidence people have in nutrition and health information.

Some studies suggest nutrition and health claims may not influence food choices because they do not appear to influence consumer evaluation of food products (Naylor, Droms & Haws, 2009; Wills, genannt Bonsmann, Kolka & Grunert, 2012), and they can negatively affect the consumer's perceptions about the naturalness of a food (Lähtenmäki, Lampila, Grunert, Boztug, Ueland, Åström & Martinsdóttir, 2010).

That said, the point has to be made that, consumer perception about nutrition and health claims, which is influenced by personal and objective factors, is somehow encouraging (Wansink & Chandon, 2006; Ares, Giménez & Deliza, 2010; Carrillo, Varela & Fiszman, 2012). Consumer perceptions are essentially driven by the importance they attach to issues of health and their attitudes towards health claims about a food product (Andrews, Netemeyer & Burton, 1998; Dean M., Lampila P.,



Shepherd R., Arvola A., Saba A., Vassallo M.,...& Lähteenmäki L. (2012);  
Lähteenmäki, 2013).

Their involvement with a food product also frames their perceptions (Hansen, et al., 2013). However, socio-demographic conditions are said to have a minimal effect on consumer perceptions (Lähteenmäki, 2013).

Intercountry differences in food habits are also factors that can have a great deal of impact on nutrition and health claims and are said to be more objective drivers of perception (Bech-Larsen & Grunert, 2003; Dean M., Shepherd R., Arvola A., Vassallo M., Winkelmann M., Claupein E.,...& Saba A., 2007; Van Trijp & Van der Lans, 2007).

Perceptions about nutrition and health claims also have a link with the product carrying the message, and most importantly, its overall healthy appearance (Wills, et al., 2012; Lähteenmäki, 2013), the particular type of claims (Van Trijp & Van der Lans, 2007) or the functional ingredients the product is made of (Rimal, 2005; Dean, et al., 2012; Wills, et al., 2012).

In countries where the law requires scientific substantiation of health claims, consumers have it a hard time differentiating among the different levels of scientific substantiation, and it is difficult to tell if they have the right perceptions about the different levels of scientific substantiation (Kapsak, Schmidt, Childs, Meunier & White, 2008; Kim, Kang, Kwon & Kim, 2010).

On matters about restaurant food labelling, Jun, Kwon, Park, Kim, Kwon & Jung (2009) have disclosed that declaring menu nutrition does not influence restaurant choice. However, sections of the market who are conscious about the consumption of healthy foods are more likely to use restaurants food labels (Josiam & Foster, 2009).



In general, consumers find it hard in correctly understanding calorie levels and the nutrition basis of restaurants (Burton, Howlett & Tangari, 2009). For this reason, the introduction of calorie ranges has been helpful to the extent that it has been able to minimise errors in energy estimation among different types of menus (Liu, et al., 2015b).

In conclusion, emphasis have been made on the need for improvement in consumer knowledge on nutrition (Burke, Milberg & Moe, 1997; Kozup, Burton & Creyer, 2006; Jacobs, et al., 2011), though this may not automatically translate into a positive effect on consumer decisions regarding purchasing healthier food (Williams, 2005). Consumer purchasing decisions about foods which carry health claims or make claims about nutritional benefits are not influenced by consumer knowledge or interest in healthy eating but rather by behavioural factors (Onozaka, Melbye, Skuland & Hansen, 2014).

## **2.8 Factors Associated with Nutrition Label Use**

Nutrition label use is dependent on many factors; they include socio-demographic factors such as age, sex, education, income, employment status, household size, household composition, and ethnicity. Some non socio-demographic factors such as nutritional knowledge, the food category, grocery shopping habits and health have all been identified as factors which influence nutritional label use.

### **2.8.1 Influence of Socio-Demographic Factors on Label Use**

#### **2.8.1.1 Age**

A large number of studies have shown that older individuals are less likely than the middle-aged or younger adults to use nutrition labels (Drichoutis, Lazaridis, Nayga, Kapsokafalou & Chrysochoidis, 2008). Issues of nutrition generate more interest



among older consumers largely because of increasing awareness of the link between age, diet and health.

The results of a greater number of studies on perceptions of Americans about nutrition information show that older persons have greater trust in the accuracy of nutrition information somehow than younger individuals (Worsley, 2003). For example, a study conducted by Huang and colleagues (2004), which looked at the frequency of nutrition label use among adolescents, showed that only 22% of adolescents who took part in the study always read nutrition labels.

Research findings on the positive effect of old age on nutrition label use have however been contradicted by studies conducted by Satia and colleagues (2005), Jensen and colleagues (1996) and Misra (2007) who have observed no link between age and nutrition label use in their studies.

#### **2.8.1.2 Sex**

There have been gender differences in the way nutrition labels are used. Women have been found to use nutrition labels more frequently than men do in quite a number of studies (Jensen, Adams, Hollis & Brooker, 1996; Satia, Galanko & Neuhouser, 2005; Rasberry, Chaney, Housman, Misra & Miller, 2007). This observation perhaps is because women are more concerned about their body weight which is a function of their calorie intakes, and also by the fact that they plan meals and are generally responsible for the nutritional needs of all members of the family, including the sick and children.

The male and female sexes evaluate the impact of nutrition labels on their food choices differently, which could have reinforced the different levels we observe in the way they use nutrition labels. A study by Kreuter and colleagues (1997) found that



women who participated in the study, were more likely than the men, to agree that nutrition labels had impacted their food choices.

Another study found that women had more trust for nutrition labels than men (Worsley, 2003). Despite the many studies reporting significant differences in nutrition labels use between the male and female sexes, some have found sex to have no major effect on nutrition label use (Klopp & MacDonald, 1981; Nayga Jr, 2000).

### **2.8.1.3 Education**

Studies on the effects of education on nutrition label use have found education to have a positive effect on nutrition label use, with higher educational level correlating with better use of nutrition labels (Klopp and MacDonald, 1981; McArthur, Chamberlain & Howard, 2001; Satia et al., 2005).

This observation could be explained by the fact that higher education translates into better knowledge or understanding of nutrition information and hence, usage.

Drichoutis, Lazaridis & Nayga Jr. (2005), however, have made a contrary observation regarding education having a link with nutrition label use.

Some studies on nutrition label use, with a focus on individuals in society who are not socioeconomically sound, have observed different rates of nutrition label use among people of that class, which were lower than those of the general population (Michel, Korlund, Finan & Johnson, 1994; Haldeman, 2000; Pérez, Escamilla, et al., 2001).

### **2.8.1.4 Income/Price**

Possible links between income/price and nutrition labels use have also been examined by quite a number of studies with varying observations. One study conducted by Blitstein and Evans (2006) observed that individuals within the lower income bracket used nutrition labels less, even though Drichoutis, et al. (2005) made contrary





observations. Jensen and colleagues (1996) on the other hand reported significant effect of income on nutrition label use.

Nayga (2000) found in his study that individuals who earned lower income had a lower level of nutritional knowledge, which corresponds with poor label use (Guthrie & Saltos, 1995). Because income is normally related to education, it is naturally expected to be associated with nutrition label use.

With regards to the influence of price of pre-packaged foods on consumer use of nutrition labels, studies have shown that consumers who are more concern about price are less concern about nutritional information (Grunert, Wills & Fernández-Celemín, 2010; Campos, et al., 2011). The possible reason nutrition information can be secondary to price could be because of a high perception of healthier foods being the most costly foods on the market among low income earners.

#### **2.8.1.5 Employment/Household size/ Household with children/Married Couples**

Results of various studies on the effects of employment on nutrition label use show mixed findings (Nayga, 2000; Drichoutis, et al., 2005). Household size and household with children affect interest in and search for nutritional information on food products.

Larger households and households with children have been linked to nutrition label use (McArthur, et al., 2001). Such households also agree that nutrition labels should be mandatory in its implementations (Jensen, et al., 1996; Mannell et al., 2006), in much the same way married couples do (Blitstein & Evans, 2006).

#### **2.8.1.6 Ethnicity/race**

Studies on ethnicity or race on label use have also observed ethnic or racial differences in the levels of nutrition label use. Compared to other ethnic groups,



Caucasians have been found to be more likely to use nutrition labels (Hyman, Simons-Morton, Ho, Dunn & Rubovits, 1993; Dooley, Novotny & Britten, 1998).

But a study by Satia and colleagues (2005) have also observed high levels of usage of nutrition labels among African-American adults living in North Carolina. Latino adults have been observed in some studies to have lower use of nutrition labels (Haldeman, 2000; Pérez-Escamilla, Himmelgreen, Bonello, González, Haldeman, Méndez & Segura-Millán, 2001).

One comparative study of ethnic groups in the United States found that in terms of proportions, only half of Latinos had ever used labels as compared to their “White” and African-American counterparts who participated in the study (Hyman, et al., 1993).

Ethnic differences have also been observed in the type of information people search for on nutrition labels (Bender & Derby, 1992). Latinos are said to be more likely to look out for information on sodium and dietary fibre (Kim, Nayga & Capps, 1999).

## **2.8.2 Influence of Health-Related Factors on Nutrition Label Use**

### **2.8.2.1 Perception about diet-health**

Perceptions about diet and health, to a large extent, influence the use of nutrition information (Kim, Nayga Jr & Capps Jr; 2000; Lin & Lee, 2003; Drichoutis, et al., 2005). Individuals who find diet as an essential factor in their lives have a greater tendency to use nutrition information (Kim, et al., 2010).

The point has been made that the importance individuals attach to the link between diet and health negatively affects their intake of saturated fat, while at the same time positively influencing their intake of fibre (Kim, et al. 2000).



As compared to participants who cared less about the healthfulness of their diet, Lin and Lee (2003) found that participants of their study who attached importance on healthy diet were the likeliest to check their fat intake and to search for information on fat when selecting pre-packaged foods.

Drichoutis and colleagues (2005) also found a good level of nutrition label use among consumers who had good attitude to diet and health. They observed that consumers had a greater perceived health risk if they felt their health would suffer in future and this obviously influenced their attitudes towards nutrition information.

Finally, the use of nutrition labels is said to be associated with healthy dietary practices or how people perceive dietary guidelines. People who think they are more prone to heart disease because of their excessive consumption of fat are more likely to use nutrition labels to choose low fat food products (Lin & Lee, 2003).

#### **2.8.2.2 Special diet status and diet-related chronic diseases**

Several studies have observed associations between special diet status and diet-related chronic diseases and nutrition label use. Individuals with special dietary needs or diet-related chronic diseases have been found to be more likely to use nutrition labels to inform their purchasing decisions in the market when shopping for pre-packaged foods (Drichoutis, et al., 2005; Loureiro, Gracia & Nayga Jr., 2006; Bayar, 2009; Lewis, et al., 2009; Post, Mainous, Diaz, Matheson & Everett, 2010).

In a study, Lewis and colleagues (2009) found a higher awareness and use of nutrition labels among participants who had chronic diseases like heart disease, diabetes, overweight, etc. Another study conducted by Bayar (2009) made similar observations. Loureiro and colleagues (2006) observed, in a study conducted on evaluation of



nutrition labels, that nutrition information was more valued by consumers who suffered diet related problems than those who did not suffer from such problems.

A study by Post and others (2010) showed that patients who were suffering from type 2 diabetes, hypertension, and/or hyperlipidemia and were advised to make changes to their eating habits showed keen interest in the use of nutrition information. These patients took more fibre and less energy, carbohydrates, saturated fat and sugar than those who were not on special diet, because they read nutrition labels.

As compared to those who were not of special diet status, individuals on special diet were found by Kim and others (2000) to have a greater tendency to use information on total fat, saturated fat, sodium, cholesterol ,fibre. Vegetarians and individuals on reduced-fat diet have also been observed to use of nutritional information (Lin & Lee, 2003).

Lin and Lee (2003) also reported that calories intake from total fat was 2.22 percent lower among vegetarian participants of their study and 4.36 percent lower for those who were on reduced-fat diet when compared to those who were on special diet. Because special diet status requires regularly reading labels to know the nutrient content of foods, the link between special diet status and nutrition label use is naturally expected.

Finally, Prathiraja and Ariyawardana (2003) have argued that consumers with diet related health problems may have a greater value for nutrition labels because of their need for a healthier diet to manage their conditions.

### **2.8.2.3 Healthy lifestyle behaviours**

Healthy practices like healthy eating and exercising, and unhealthy practices like smoking have been found in a number of studies to be associated with how nutrition



labels are used (Nayga Jr, Lipinski & Savur, 1998; McArthur et al., 2001; Lin & Lee, 2003; Satia et al., 2005; Bayar, 2009).

Satia and colleagues (2005) for example, have observed greater nutritional label use among individuals who practice healthier eating habits than those who do not. They suggest the differences in use of nutrition labels among the two groups may be as a result of personal preferences.

But McArthur and others (2001) believe the association between the two may be due to the requirements of a health-related diet. Kim and others (2000) noticed in a study that, participants who did not smoke and those who engaged in regular exercise made use of nutrient content information, particularly on fat, more than those who smoked and those who did not engage in regular exercise. They attributed their observation to the possibility of their health consciousness.

Another study by Lin & Lee (2003) found that individuals who exercised more frequently also consumed less total fat. They also noticed that the smokers among their respondents consumed more total fat.

In a cross-country study between the United States and Turkey, Bayar (2009) noted that the longer the Turkish participants exercised, the greater importance they attached to calories information, which he believes was because the Turkish had problems with cholesterol across all age groups. However, the opposite was the case for the American participants probably because of the conception that a higher physical activity burns more calories.

Kempen and companions (2012) also observed that participants of their study who read nutrition labels were often more health conscious and engaged in healthy



lifestyles like eating fresh fruit and vegetables on a regular basis and reducing their alcohol intake than those who did so less often.

## **2.8.3 Influence of Other Factors on Nutrition Label Use**

### **2.8.3.1 The Food Category**

Interest in nutrition labels also differs across food categories. Food categories, such as yogurt, pizza and soup attract higher nutritional interest than fruits and vegetables, foods used as snacks, such as crackers and nuts, and those used for desserts, example cream and cookies (Graham & Jeffery, 2011).

### **2.8.3.3 Grocery Shopping Habits**

Time spent on shopping is said to be a strong predictor of nutritional labels use. According to Nayga Jr and others (1998), individuals whose habits involve spending more time at shopping for groceries have a greater tendency to use labels than those who spend less time shopping (Klopp & MacDonald, 1981; Mannell, et al., 2006; Rasberry, et al., 2007).

### **2.8.3.4 Overweight and obesity**

Some research works have demonstrated the presence of a link between weight status or body mass index (BMI) and nutrition information use (Kim, et al., 2000; Bayar, 2009). Body mass index has been shown to have a positive impact on nutritional label use, particularly relating to information on fat (Kim et al., 2000; Bayar, 2009).

In a study conducted by Bayar (2009), obesity was found to have a positive influence on how consumers used information on calories. In the said study, participants who monitored their weight and were on a program for weight loss, and had to control their dietary intakes, were more likely, than their colleagues who did not have the problem of overweight, to affirm the importance of nutrition label information, especially in relation to calories.



This finding was however contradicted by Nayga Jr (1999) whose study showed that individuals with higher body mass index did not see the importance of nutrition labels, probably because of participants' perception that weight status was determined by biology and therefore there is little anyone can do about it.

### **2.8.3.5 Nutritional Knowledge**

#### **2.12.3.5.1 Nutritional Knowledge and Label Use**

Nutritional knowledge influences peoples' attitudes towards food labels and their readiness to apply the nutrition information in food labels. Unfortunately, the food label information may not all the time communicate the intended message (Drichoutis, Nayga, Rodolfo & Lazaridis, 2009; Hieke & Taylor, 2012), or the consumer may even interpret the information wrongly due to poor nutritional knowledge. Research shows that the tendency for one to use nutrition labels is influenced greatly by the person's knowledge of nutrition (Miller & Cassady, 2015).

A theoretical model developed by Miller and Cassady (2015) based on cognitive processing to understand the association between nutritional knowledge and label use suggests that people will give attention to the content of a food label when they come across one. They will then apply whatever knowledge they have on nutrition stored in their brains to try to understand the information on the label. This knowledge enables them to make decisions relating to food.

For this reason, it is expected that individuals who possess higher nutritional knowledge will use food labels in more effective ways; seeing that they are capable of identifying relevant information, interpreting that information, and making healthy dietary choices.



To verify their theoretical model, Miller and Cassady (2015) conducted a review of 34 studies and discovered that the outcome of their review was very much in line with the model. Individuals who displayed greater nutritional knowledge were more likely to comprehend and use nutritional labels.

There were also indications that higher nutritional knowledge was associated with more healthy dietary choices which could have been as a result of the mechanism of information processing of nutrition labels. There is however the need for caution to be exercised on this observation as it cannot be said with certainty that the results of the study were solely because of nutritional knowledge influencing healthier dietary intake irrespective of whether one used food labels or not.

There is also enough evidence to suggest that the use of labels could bring about moderate food consumption among people experiencing negative affect. A study by Chien, Huang and Hung-Chou (2010) on the effect of nutritional label use on behaviour regarding variety seeking found that individuals try dealing with the problem of boredom by purchasing different number of snack items and beverages.

This behaviour is known to cause overconsumption (Kahn & Wansink, 2004). But the problem associated with variety seeking is found to be reduced when labels are presented on food products (Chien *et al.*, 2010). As such, usage of food label could possibly moderate negative consumption behaviours.

Grunert and others (2010) have identified nutritional knowledge as a good predictor when it comes to gauging people's understanding of nutritional information, and this influences their ability to use the nutritional information.

While this knowledge is mostly acquired through sources like the media, health personnel, education campaigns, hearsay, and the consumer's own efforts, it is also





obtained from experience of label use. Therefore, nutritional knowledge is associated with nutritional information availability, which differs from country to country and across food categories.

Consumer's personal interest in nutrition has also been mentioned as another factor upon which nutritional knowledge is dependent upon. Poor education or lower incomes are negative factors (Campos, et al., 2011) associated with nutritional knowledge and label understanding. As a result, nutritional knowledge moderates label use, and at the same time depends on the personal characteristics of the consumer and external label stimulus.

#### **2.8.3.5.2 Nutritional Knowledge and Food Consumption**

Nutritional knowledge is one potential mechanism that could enable individuals with diet-related health conditions make healthier food choices. After conducting a literature review of twenty-nine studies that assessed the relationship between nutritional knowledge and dietary intake, Spronk and colleagues (2014) came to the observation that higher nutritional knowledge correlated with the consumption of more fruits and vegetables, fibre and carbohydrates.

They observed the opposite to be true for those who had lower nutritional knowledge.

The literature also showed that those with high nutritional knowledge also took the dietary guidelines more seriously than those who had lower nutritional knowledge.

They also observed that individuals who possessed higher nutritional knowledge had daily intakes of energy, fat and sweetened beverages which were lower than their counterparts with lower nutritional knowledge consumed.

Some other studies which were not part of the 29 studies reviewed by Spronk and colleagues (2014) also showed that the relationship between nutritional knowledge



and dietary intake was positive. For example, in a study involving professional rugby players, Alaunyte, Perry, & Aubrey (2015) found that higher nutritional knowledge had a positive correlation with consumption of greater amounts of fruits and vegetables.

In a study involving 1040 adults on nutritional knowledge assessment, Wardle, Parmenter & Waller (2000) found a positive relationship between nutritional knowledge and healthy eating habits.

In another research, there were significant improvements in students' eating habits after undertaking and completing a course in nutrition compared to their counterparts who did not take the course (Watson, Kwon, Nichols & Rew, 2009).

## **2.9 The Negative Influence of Diet on Health**

Diet has contributed significantly to the rising number of cases of the chronic non-communicable diseases across the world. For instance, the risk of cardiovascular disease and several cancers is increased by insufficient consumption of fruits and vegetables; while excessive intake of salt results in increased risk for hypertension, stomach cancer and cardiovascular diseases (WHO, 2003; Steyn N.P., Mann J., Bennett P.H., Temple N., Zimmet P., Tuomilehto J.,...& Louheranta A., 2004).

In addition, heart disease is associated with the chronic consumption of high saturated fats; the consumption of red or processed meat in particular, is linked to certain cancers; and diabetes has been linked with dietary factors (WHO, 2003; Steyn, et al., 2004).

Excessive energy intake causes obesity, which is associated with several chronic health problems. Obesity and chronic non-communicable diseases are major health challenges, contributing so much to global mortality rates. Developing countries



suffer the most with respect to non-communicable diseases induced mortalities as about 80 per cent of global deaths caused by non-communicable diseases occur in these countries (WHO, 2008).

## **2.10 Obesity and chronic diseases**

Obesity is a diet-related health condition that needs special attention because of its role as a major risk factor for a substantial number of the non-communicable chronic diseases (WHO, 2000). Obesity is widely linked to increased mortality and increased risk of chronic diseases like diabetes, hypertension, cardiovascular disease, etc. (Royal College of Physicians, 1983; National Research Council of USA, 1989).

### **2.10.1 Obesity and Cardiovascular disease**

Obesity is a major risk factor for cardiovascular diseases such as strokes and coronary heart disease. Obesity accounts for a considerable per cent of the risk of hypertension and cardiovascular disease and stroke (James and others, 2004). Other cardiovascular conditions like arrhythmias, cardiac failure, pulmonary hypertension and peripheral vascular disease are said to be associated with obesity (Ma, et al., 2008).

### **2.10.2 Type 2 Diabetes Mellitus and obesity**

The risk of type 2 diabetes has been found to be higher among people who have the problem of obesity (Qiao & Nyamdorj, 2010). Even individuals with normal body weight who are suffering from just abdominal obesity have increased risk of Type II Diabetes (WHO, 2004).

### **2.10.3 Metabolic and Other Disorders Linked to Obesity**

Obesity is also found to be associated with insulin resistance and dyslipidaemia – a condition associated with increased triglycerides levels in the plasma and an unhealthy situation of plasma cholesterol, where the level of “bad” cholesterol is



increased and that of the “good” or healthy one is decreased (WHO, 2000). It is not uncommon to see women with moderate obesity suffering from the reproductive disorder called polycystic ovary syndrome (Magnotti & Futterweit, 2007).

#### **2.10.4 Obesity and Cancers**

There is overwhelming evidence to show for the role of obesity as a major risk factor for some cancers (World Cancer Research Fund, 2007). Examples of some of those cancers include cancers of the pancreas, esophagus, bowel, kidney and the gallbladder.

#### **2.10.5 Obesity and Other Health Consequences**

Obesity is also associated with increased risks of other health conditions like gallstones, osteoarthritis, gout and gallbladder disease. Obesity is also associated with respiratory problems and more than 10 per cent of obese people have sleep apnoea (WHO, 2000). Also associated with obesity is psychological problems such as social bias, eating disorders, prejudice and discrimination (WHO, 2000).

#### **2.10.6 Obesity and premature mortality**

Body Mass Index (BMI) has been shown in studies to be linked with premature mortality (WHO, 2000). Such a finding is in line with observations of the significance of overweight/obesity as a risk factor for non-communicable diseases like cardiovascular disease, type-2 diabetes and hypertension, which are known to increase the mortality rate.

### **2.11 Dietary Therapy and the Treatment of Obesity**

In view of the seriousness of the health implications of consuming unhealthy diets, some health conscious individuals have taken to the consumption of special diets



either for the purpose of keeping themselves in good physical form or for the prevention or management of one diet-related health condition or the other.

The use of dietary therapies for the treatment of obesity has come on the back of many studies which suggest that excessive body weight can be controlled or managed through the use of certain diet therapies. The following are some of such known therapies;

### **2.11.1 Dietary Energy Restriction**

Obesity occurs when energy intake is chronically in excess of energy expended by the body, leading to a positive energy balance and weight gain. Therefore, the restriction of dietary energy will allow for energy reserves in the body to be used up for the various physiological activities of the body.

Therefore, to bring about weight loss, a deficit resulting from restrictions in calories intake must be created to make room for energy reserves in the body to be used up (Rolls & Bell, 2000). This assertion has been corroborated by Heilbronn, Noakes & Clifton (2001) and Wang, Ding, Jones & Jones (2002) who found that energy restriction brought about weight loss.

Sadly, weight loss through energy restriction has not been sustainable in the long term (Rolls & Bell, 2000; Nammi, Koka, Chinnala & Boini, 2004) because of the tendency for people to go back to their past dietary habits.

### **2.11.2 Altering Diet Composition - High or Low Carbohydrate, Low Fat Diets and High Protein Diets**

Even though the evidence available is inconclusive, altering the composition or ratio of macronutrients in the diet can be instrumental in the quest for weight reduction. A low fat, high carbohydrate diet has been found to be associated with reductions in



bodyweight and fat mass, and at the same time sustaining fat free mass (Saris, Astrup, Grunwald, Melanson & Hill, 2000).

Several other studies have shown that low fat diets lead to a reduction in body weight and body fat (Saris, et al., 2000; Sloth B., Krog-Mikkelsen I., Flint A., Tetens I., Björck I., Vinoy S.,...& Raben A., 2004). But the gains in reduction can be maintained only by adherence to long term low fat diets (National Nutrition Surveillance Centre, 2009).

It has been observed by the National Weight Control Registry of the United States of America that people who have been most successful at weight loss maintenance followed a diet which had 24% of energy from fat (Wing & Hill, 2001), which gives more credence to how low fat intake can help bring about weight loss and hence, the management of obesity.

Another diet composition for weight reduction has been low carbohydrate diets which have proven to have a positive effect on weight loss in the short term. In a randomised control trial on diet and body weight by Foster G.D., Wyatt H.R., Hill J.O., McGuckin B.G., Brill C., Mohammed B.S.,...& Klein S. (2003), participants assigned to low carbohydrate, high protein, high fat diet lost substantial body weight compared to those who were assigned to high carbohydrate, low fat, low calorie diet after six months; the difference after a year was however not significant.

In yet another study which investigated changes in body composition following an ad libitum, low carbohydrate diet, low fat diet, it was reported that between the two groups ie. low carbohydrate and low fat groups, loss of bodyweight and fat mass was higher in the low carbohydrate group despite no difference in energy intake (Brehm, Spang, Lattin , Seeley, Daniels & D'Alessio (2005).



The reduction in fat-free mass and resting metabolic rate were similar in both groups. However, one shortcoming of this study has to do with the fact that the results could not be explained by increased resting energy expenditure or physical activity and could not account for by their reported energy intakes, and may have been due to under-reporting in the low fat group.

For high protein diet, the evidence of its effects on weight loss remains inconclusive. Low fat diets high in protein and low fat diets high in carbohydrates both lead to a reduction in bodyweight but the one high in protein has been found to bring about the greater reduction (Skov, Toubro, Rønn, Holm & Astrup, 1999).

Apart from its special role in reducing weight (Baba, Sawaya, Torbay, Habbal, Azar, & Hashim, 1999), high protein diet also preserves lean tissue during weight loss (Layman, Boileau, Erickson, Painter, Shiue, Sather & Christou, 2003).



## CHAPTER THREE

### 3.0 METHODOLOGY

#### 3.1.0 Profile of Sagnarigu Municipality

##### 3.1.1 Establishment

The Sagnarigu municipality is one of the newly created Assemblies in the Northern Region of Ghana. It was created out of the Tamale Metropolis by Legislative Instrument 2066 in the first half of 2012. The District was inaugurated as a functional entity in the year 2012. In the year 2018 however, it was elevated from the status of a district to a municipality.

##### 3.1.2 Location and size

The Sagnarigu municipality is located in the central part of the Northern Region of Ghana. It falls between Longitudes 0057''N and 00 57''W and Latitudes 9016'' N and 9034''N. The municipality has an estimated total land size of 114.29kmsq – representing 26% of the total landmass of the region. It shares boundaries to the North with Savelugu-Nanton Municipality, to the South and East with Tamale Metropolis, to the West with Tolon District, and to North-West with Kumbungu District.

The municipality is spatially attached to the Tamale Metropolis (the administrative and commercial hub of the northern part of Ghana) to the South and East. This strategic location presents the municipality with tremendous economic potentials, especially in the areas of commerce, industry, education, transportation and hospitality.

##### 3.1.3 Major Towns/Communities

There are 79 communities in the Sagnarigu municipality. The 20 largest communities in the district are Sagnarigu, Choggu-Mmanayili, Choggu Hill Top, Wurishe, Shishegu-Yepala, Gurugu-Yepalsi, Gbolo, Gurugu, Kpalsi, Choggu Yapalsi, Kasalgu-





West, Katariga-Yepala, Malshegu, Sognayili, Kasalgu East, Sugashie, Katariga, Garizegu, Yongduni, and Shishegu

### **3.1.4 Demography**

The regions of Northern Ghana have vast land cover with smaller population sizes.

According to the 2010 population and housing census, the Sagnarigu municipality has an estimated population of 148, 099 constituting 74,886 males representing 50.5% and 73,213 females representing 49.5%. There are 23,447 households in the district with an average household size of 6.3 people. The municipality has a rural population of 54,549 and urban population of 93,550. Details of the demography of the municipality are shown in Table 3.1.



**Table 3.1: Age-Sex Structure of Sagnarigu Municipality**

Age Group	Both Sexes	Sex		Type of Locality	
		Male	Female	Urban	Rural
All Ages	148,099	74,886	73,213	93,550	54,549
0 – 19	72,268	37,223	35,045	45,318	26,950
20 – 24	15,525	7,717	7,808	9,902	5,623
25 – 29	14,062	6,655	7,407	8,971	5,091
30 – 34	10,903	5,357	5,546	6,988	3,915
35 – 39	8,180	4,039	4,141	5,263	2,917
40 – 44	6,750	3,364	3,386	4,239	2,511
45 – 49	4,932	2,617	2,315	3,151	1,781
50 – 54	4,294	2,264	2,030	2,694	1,600
55 – 59	2,403	1,358	1,045	1,573	830
60 – 64	2,712	1,398	1,314	1,692	1,020
65 – 69	1,491	769	722	938	553
70 – 74	1,921	877	1,044	1,186	735
75 – 79	967	489	478	622	345
80 – 84	895	404	491	532	363
85 – 89	446	209	237	272	174
90 – 94	250	101	149	143	107
95 – 99	100	45	55	66	34
<b>Age-Sex Structure by Age Group</b>					
All Ages	148,099	74,886	73,213	93,550	54,549
0 – 14	55,535	28,435	27,100	34,432	21,103
15 – 64	86,494	43,557	42,937	55,359	31,135
65+	6,070	2,894	3,176	3,759	2,311
Age dependency ratio	71.2	71.9	70.5	69	75.2

Source: Ghana Statistical Service, 2010 Population and Housing Census

### 3.1.5 Health

#### 3.1.5.1 Health Infrastructure

The municipality boasts of 20 functional and 2 non-functional facilities. They consist of five hospitals, one specialist facility, three health centres, one polyclinic, four clinics, three maternity homes, three community-based planning and services compounds and a nutrition centre. The municipality is only a few kilometres away



from the Tamale Teaching hospital which serves as a major referral centre for the three regions of the north.

### **3.1.5.2 Health Staff Situation**

The municipality has a total of 100 people working as technical and non-technical health staff. There is not a single medical doctor in the municipality which means the manning of health facilities is in the hands of nurses.

### **3.1.5.3 Mortality and Causes of deaths in households**

Out of the municipality's total population of 148,009, 847 deaths were recorded in the households in 2010. This means the crude death rate of the district as 5.7, which is lower than the average for the region which is 5.9. The total number of reported deaths in the district 7.3 percent (representing 62 deaths) are attributed to accident/violence/homicide/ suicide and the remaining 92.7 percent attributed to 'all other causes'.

### **3.1.6 Religion and Cultural Heritage**

The municipality is inhabited by many ethnic groups, the dominant group however is the native Dagomba people. Other ethnic groups include Nanumbas, Gonjas, Mamprusi, Bimoba, Dagartis,Wala, Frafra, Akans, Ewes and other northern ethnic groups. The peaceful coexistence among these diverse groups is considered an important development potential in the municipality. Similarly, the Sagnarigu municipality is religiously diverse as shown in the table 3.2.



**Table 3.2: Religious Affiliations in the Municipality**

Religion	Number	Percent
Total	148,099	100.0
No religion	263	0.2
Catholic	10,685	7.2
Protestants (Anglican Lutheran etc.)	4,647	3.1
Pentecostal/Charismatic	5,248	3.5
Other Christian	2,644	1.8
Islam	123,613	83.5
Traditionalist	602	0.4
Other	397	0.3

Source: Ghana Statistical Service, 2010 Population and Housing Census

### **3.1.7 Economy of the Municipality**

More than 50% of the working population in the municipality are into agriculture and its related activities. Significant populations are also engaged in manufacturing, commercial, and service sectors.

### **3.1.8 Social Issues**

#### **3.1.8.1 Household Size**

The municipality has a household population of 146,291 with a total number of 23,447 households. The average household size from the 2010 Population and Housing Census data in the municipality is 6.3 persons per household. The average household per house is 1.4 with urban dwellers having a higher proportion of households per house than rural dwellers. However, average household size for both rural areas and urban areas is the same (6.3).

#### **3.1.8.2 Marital Status**

Data of the marital status of people 12 years and older in the Sagnarigu municipality shows that almost half (48.5%) of the persons in this age category are married with about 46 percent of them having never married. The widowed, divorced and separated, however, are in the minority and represent 3.8 percent, 1.1 percent and 0.7 percent respectively of persons 12 years and older in the municipality.



### **3.1.8.3 Marital Status and level of education**

There are a total of 101,779 people aged 12 years and older in the municipality out of which 40.6 percent have no education, and 31.5 percent have basic education which happens to be the most commonly attained level of education among the population. Just about 4.0 percent of the population has attained a tertiary level of education in the municipality in comparison with 8.6 percent of them that have post-middle/secondary/diploma certificates.

### **3.1.8.4 Literacy and Education**

The total literate population of the municipality is 62,856 and the non-literate stands at 41,498. This implies that about 40 percent of the population in the municipality is not literate in any language. Of the number that are literate (representing 60 percent of the population), 38.6 percent is literate in English only, 1.4 percent in Ghanaian Language only and more than half of them (59.1%) are literate in English and Ghanaian language.

## **3.2 Study Population**

The study population were the people of Sagnarigu municipality

## **3.3 Inclusion Criterion**

The inclusion criterion was; ability to read in the English language since food and nutrition labels in Ghana are written in that language.

## **3.4 Study Design**

The study was cross-sectional and was conducted across some selected communities across the municipality.



### **3.5 Study type**

The study was largely quantitative. According to Williams (2007), the data that is meant to answer questions in a quantitative research are reported in numerical terms. The quantitative approach provides the possibility for relationships between or among factors to be tested (Bryman and Bell, 2003). The integrity of quantitative analysis can be established as it allows for the testing of theories and models in the form of research hypothesis (Bryman, 2004) and statistical significance as well, making them the preferred option for researchers in the pure and applied sciences. The design is most appropriate for researchers who want to make logical comparisons of data and also generalise the findings of their studies so that the application of their findings will be relevant not only to the sample but the entire population (Creswell, 2008).

Quantitative research follow a sequence starting with statement of the problem, stating the hypothesis, reviewing the existing literature and finally, analysing the quantitative data itself (Williams, 2007).

On a final note, Madrigal and McClain (2012) explain that what quantitative study has to offer is that it provides explanations and understanding of personal experience of respondents, which makes it more suitable in issues concerning local conditions and stakeholders' needs.

### **3.6 Sampling Technique and Sample Size**

In studies involving human populations, the ideal situation is for the researcher is to have each and everyone in the population to be involved as a participant, but that is sometimes not the case. This is because researchers are sometimes confronted with



circumstances that make it practically impossible to reach the entire population. This is where the use of samples becomes imperative.

Sampling is a technique widely used in research to select a subset of individuals from within a population to give estimates of a population attribute by making inferences from the sample. The use of samples has been proven to provide reliable estimates and has been used in surveys in Imperial Russia way back in the 1870s (Cochran, 1963).

Sampling continues to remain a popular option for researchers all over the world today. The use of samples in studies is motivated by two main reasons which include a faster speed of data collection and lower cost (Kish, 1965; Robert, 2004).

Sampling is done with caution, some important points to consider when selecting individuals to constitute a sample include ensuring randomisation in the selection process and keeping the sample as heterogeneous as the larger population from which the sample is being drawn (Singh and Masuku, 2014).

Even where convenience sampling technique is used, as is the case in this study, it is imperative to keep in mind the different segments of society and to ensure a fair representation, as much as possible, of those segments in the sample so that the findings can be generalised.

### **3.6.1 Sample size**

The sample size for this study was arrived at by the Cochran sample size formula which is widely used by researchers across the world. The procedure involved in arriving at the sample size is demonstrated:



$$\text{Sample size (n)} = \left( \frac{Z^2 p(1-p)}{E^2} \right), \text{ Where}$$

Z = standard deviation

E = margin of error

P = precision (or assumed prevalence of awareness of nutrition labels)

Therefore, taking  $p = 0.5$ ,  $E = 0.05$  and  $Z = 1.96$  at the 95% confidence level

$$\text{Sample size (n)} = \left( \frac{1.96^2 \times 0.5(1-0.5)}{0.05^2} \right),$$

$$n=384$$

This figure was rounded up to 400. Therefore, the sample size for the study was 400.

### 3.6.2 Sampling Technique

The study took place in four communities in the municipality. The communities were Shishegu, Sagnarigu, Wurishe and Choggu (Hill Top). These communities were conveniently chosen. In every community, a list of house numbers was compiled. Each house number was then written on a small piece of paper and the papers folded and put in a basket which was shaken as much as possible to ensure that there was adequate mixing of the papers.

Two hundred pieces of the papers were then picked from the basket without looking. The houses whose numbers were chosen will be the ones from which the 100 participants needed in that community would be chosen.

Even though only 100 participants were needed in each of the chosen communities, for every community, 200 house numbers were randomly selected from the basket. This was to ensure that enough data could still be collected if some of the selected houses would have to be skipped because they did not have persons who met the





inclusion criteria. Data was mostly collected in the evening and weekends when most people would be available at home. The data was collected in February, 2018 and the exercise took three weeks.

### **3.7 Quality Assurance**

A pilot study involving 25 respondents was undertaken to ascertain what challenges respondents were likely to encounter, particularly in relation to their ability to properly understand the questions in the way they were framed, and the necessary adjustments were made where there was the need before the questionnaires were finalized.

During the data collection for the study, respondents were always reminded to ask for further clarification if they thought certain things were not still clear enough for them before attempting to provide answers.

Questionnaires were also given unique identification numbers so that every questionnaire could easily be identified. Data were coded and cleaned to rectify all entry errors during the data entry process.

### **3.8 Research Instrument, Study Variables and Data Analysis**

#### **3.8.1 Research Instrument**

Research instrument is the item a researcher uses to solicit information or collect data for a research project (Kent, 2007). The data for this study was collected by the use of structured questionnaires which contained both closed and open-ended questions.

As argued by Lokesh (1997) open questions allow for in-depth responses and also give greater freedom for respondents to disclose their opinions and provide further



clarification on their responses. Questionnaires are useful and appropriate in collecting data from all segments of the population (Kumekpor, 1993).

What makes the use of questionnaires even more helpful is the fact that they ensure standardize data collection, high confidentiality of respondents, and therefore elicit information which is more truthful (Sarantakos, 1998).

The questionnaire used for gathering the data for this study had different sections designed to collect data on socio-demography, health, awareness on food and nutrition label, and food and nutrition label use. Below are some details of the various sections of the questionnaire.

#### **3.8.1.1 Socio-Demographic data**

This section of the questionnaire solicited questions on individual and household characteristics of respondents. The variables on which questions were asked under the section were sex, age, marriage, ethnicity, education, employment, income, household size and household composition.

#### **3.8.1.2 Health**

This section was meant to seek answers to questions related to respondents' current health status, and family history of chronic diseases related to bad dietary habits. The section also asked questions on perceptions about current weight status and whether respondents, for health reasons, were on special diets.

#### **3.8.1.3 Food and Nutrition Labels Awareness**

There were six items on the questionnaire relating to nutrition information sources, awareness that pre-packaged foods carry food and nutrition labels, and perceived level of understanding of nutritional label information on pre-packaged foods.



#### **3.8.1.4 Nutrition Labels Use**

Under this section, questions were asked to ascertain whether respondents ever used food labels and what information on food labels they were most likely to use if they did. Questions were also asked to know whether respondents used nutrition labels, their reasons if they did or did not use nutrition labels, the nutritional label information they most likely used, how nutrition labels was of help to them in their purchasing decisions and the circumstances under which they chose to use nutrition labels. Use of nutrition labels was subject to respondents own definition of use.

#### **3.8.2 Study Variables**

##### **Dependent variables**

The dependent variables were:

- High awareness
- Low awareness
- Use nutrition labels
- Do not use nutrition labels

##### **Independent variables**

The independent variables were:

- Sex
- Age
- Marital status
- Educational status
- Employment status
- Household composition



- Household size
- History of health condition
- Special diet status.

### 3.8.3 Data Analyses

Data entry and analysis were performed using the Statistical Package for Social Sciences (SPSS) version 23 and Microsoft excel 2010. Descriptive statistics were calculated for socio-demographic data, health related data, items on food and nutrition label awareness, components of a food label that were most likely to be used, nutrition label use and components of a nutrition label that were most likely to be used. Percentages were computed for categorical variables and means and standard deviations for continuous variables. Results were presented in tables and charts.

Awareness of food and nutrition labels was categorized into levels of low and high awareness based on the response to four awareness questions (Questions 18-21). Those who answered “yes” to all four questions were classified as having high awareness and those who said “no” to at least one question were classified as having low awareness. Those who never used nutrition labels and those who sometimes or often used nutrition labels were categorized into the ‘do not use’ and ‘use’ groups respectively.

Chi square ( $\chi^2$ ) tests were used to look at differences between those who have a high awareness of nutrition labels and those who had a low awareness, those who use nutrition labels and those who do not, with respect to socio-demographic and health related characteristics of respondents.



Logistic regression with associated odds ratios (ORs) and their 95% confidence intervals (CIs) was used to determine factors which predict awareness and use of nutrition label. The analysis were also adjusted for employment, owing to the assumption that individuals who are employed will have better incomes, and therefore may have higher consumptions of pre-packaged foods, because of their ability to afford them. For this reason, they may have greater fears about their consumption rate and this may bring about greater awareness and use of the nutrition label.

P -values < 0.05 were considered statistically significant.

### **3.9 Ethical Consideration**

The data collection process was done with utmost respect to respondents. Respondents were first told the purpose of the research after an introduction. They were then assured confidentiality if they consented to respond to the questionnaire. The confidentiality was further guaranteed by the fact that names of respondents were not required from them as it was not necessary for the research. Assurance of confidentiality will ensure more honest information from respondents.



## CHAPTER FOUR

### 4.0 RESULTS

#### 4.1 Background Characteristics of Respondents

Table 4.1 shows the socio-economic and demographic background of respondents who took part in the study. A large majority (more than 70%) of the respondents were young people who were 35 years or below. About 60% of respondents were never married; there were more people who had basic education than those who had secondary and post-secondary education. There were more unemployed people than those who were employed.

In terms of ethnicity, Dagombas constituted a large majority (69%), while respondents of non-Akan ethnicity from southern Ghana constituted the least (5.3%). In respect of household composition, those who came from families that lived as couples with children were the majority, constituting 66.5%, while those who lived as couple without children constituted the least percentage (3.5%).

From the same table, it can be seen that a large number of respondents (63.5%) had no income, which is a reflection of the high unemployment situation of the majority of those who took part in the study.

Generally, male and female respondents did not differ significantly across many of the variables. However, significantly differences were noted in terms of marital status and employment and also across the 24 – 28 age group, Akan and “no income” sub-groups.



**Table 4.1: Background characteristics of respondents**

<b>Variable</b>	<b>Total (n=400)</b>	<b>Male (n=194)</b>	<b>Female (n=206)</b>	<b>p- value</b>
<b>Age (years)</b>				
<24	106 (26.5%)	46 (23.7%)	60 (29.1 %)	0.2201
24-28	90 (22.5%)	52 (26.8%)	38 (18.4 %)	<b>0.0454</b>
29-35	92 (23%)	38 (19.1%)	54 (26.2 %)	0.1155
36-42	75 (18.8%)	37 (19.1%)	38 (18.4 %)	0.1602
>42	37 (9.3%)	21 (10.8%)	16 (7.8 %)	0.2915
<b>Marital Status</b>				
Married/previously married	179 (44.8%)	76 (39.2%)	103 (50.0 %)	<b>0.0296</b>
Never married	221 (55.3%)	118 (60.8%)	103 (50.0%)	
<b>Educational Status</b>				
Basic	170 (42.5%)	76 (39.2%)	94 (45.6 %)	0.1918
Secondary	109 (27.3%)	54 (27.8%)	55 (26.7 %)	0.7987
Post-Secondary	121 (30.3%)	64 (33.0%)	57 (27.7 %)	0.247
<b>Employment Status</b>				
Employed	149 (37.3%)	82 (42.3%)	67 (32.5 %)	<b>0.044</b>
Unemployed	251 (62.8%)	112 (57.7%)	139 (67.5 %)	
<b>Ethnicity</b>				
Akan	25 (6.3%)	17 (8.8%)	8 (3.9 %)	<b>0.0439</b>
Dagomba	276 (69%)	134 (69.1%)	142 (68.9 %)	0.9758
Other Northern tribes	78 (19.5%)	36 (18.6%)	42 (20.4 %)	0.644
Other Southern tribes	21 (5.3%)	7 (3.6%)	14 (6.8 %)	0.1531
<b>Household composition</b>				
couple with children	266 (66.5%)	128 (66.0%)	138 (67.0 %)	0.8305
couple with no children	14 (3.5%)	7 (3.6%)	7 (3.4 %)	0.9168
Single parent with children	37 (9.3%)	18 (9.3%)	19 (9.2 %)	0.9848
Others	83 (20.8%)	41 (21.1%)	42 (20.4 %)	0.8542
<b>Average monthly income (GHC)</b>				
No income	254 (63.5%)	112 (57.7%)	142 (68.9 %)	<b>0.0201</b>
≤500	40 (10%)	22 (11.3%)	18 (8.7 %)	0.3859
501-1000	73 (18.3%)	41 (21.1%)	32 (15.5 %)	0.1473
>1000	33 (8.3%)	19 (9.8%)	14 (6.8 %)	0.2761

Data presented as number (percentage), chi-square was used to compare categorical variables and  $p < 0.05$  was considered significant



#### 4.2 Level of Awareness and Understanding of Nutrition Labels

Table 4.2 shows level of awareness and understanding of nutrition labels. From the table, 92% of respondents were aware of food labels on pre-packaged foods, 89% have seen or looked at a food label before.

The majority of respondents (87.8%) were aware that food labels contain nutrition information about the food. Among those who were aware of the presence of nutrition labels on pre-packaged foods, 80.3% of them have ever read the nutrition information. 77.2% of respondents possessed a high awareness of nutrition labels.

In terms of respondents' levels of understanding of nutrition information 13.8% possessed high understanding, 54.5% possessed moderate understanding and 12.0% possessed a low understanding of nutrition information.

**Table 4.2: Level of awareness and understanding of food/nutrition labels**

<b>Variable</b>	<b>Number</b>	<b>Percent</b>
Participants who were aware that some pre-packaged foods carry food label	368	92
Participants who had noticed the food label on pre-packaged food	356	89
Participants who were aware that some pre-packaged foods contain nutrition information about the food	351	87.8
Participants who had ever noticed the nutrition information on pre-packaged food	321	80.3
Participants who had high awareness of nutrition labels	309	77.2
Participants who had low awareness of nutrition labels	91	22.8
Participants who had high understanding of nutrition information	55	13.8
Participants who had moderate understanding of nutrition information	218	54.5
Participants who had low understanding of nutrition information	48	12

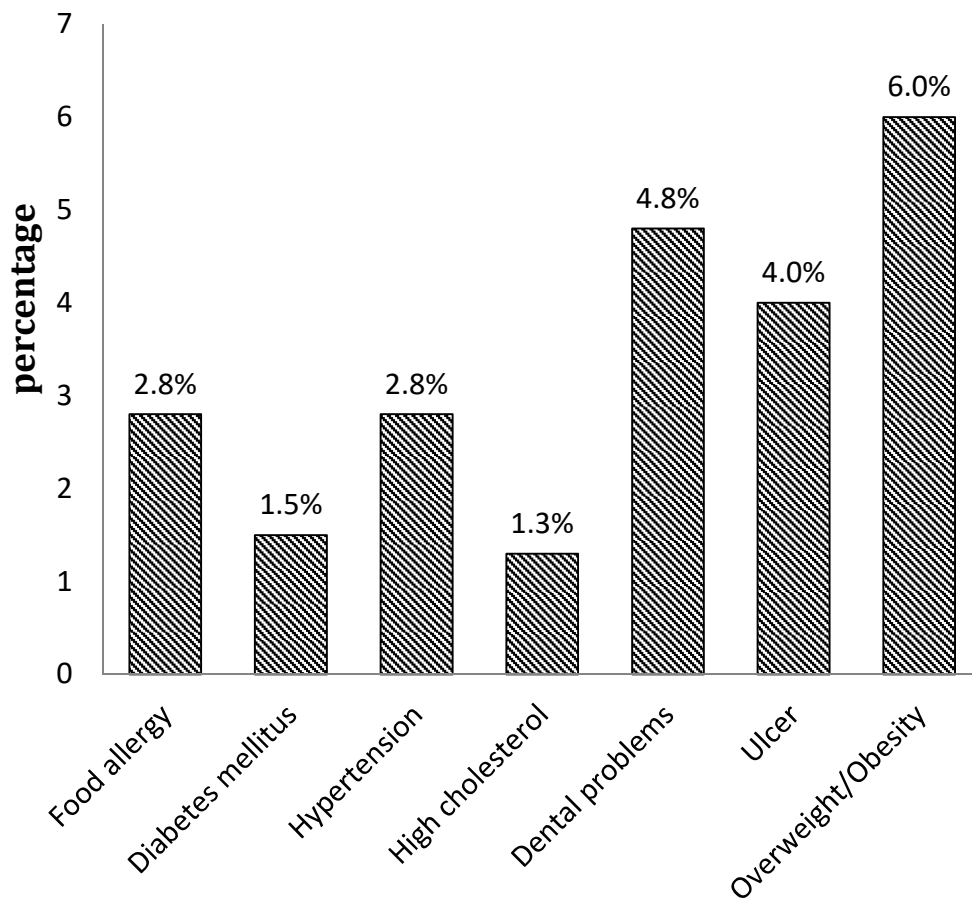




### 4.3 Prevalence of Diet-Related Health Conditions

The prevalence of diet-related health conditions among respondents has been presented in figure 4.1. In general, 23.2% of the study participants suffered from one diet-related health problem or the other.

Individuals suffering from overweight/obesity constituted 6%, making overweight/obesity the most prevalent diet-related health problem among participants. This was followed by dental problems (4.8%), ulcer (4.0%), food allergy/hypertension (2.8%), etc. The least health condition reported by respondents was the problem of high cholesterol (1.3%). The details are presented in the figure below.



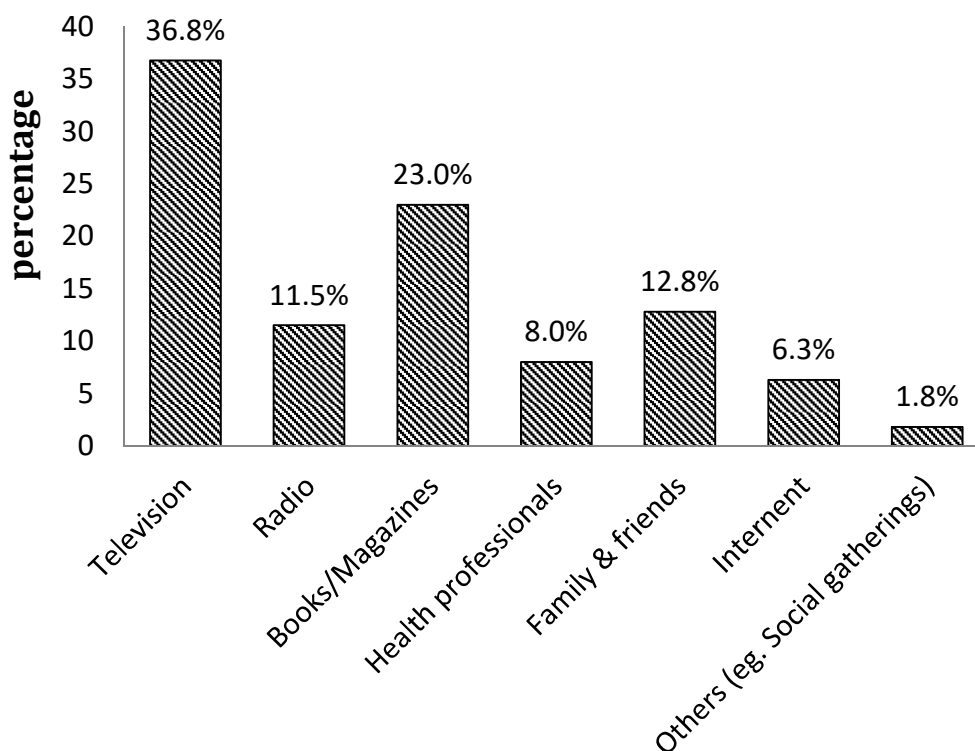
**Figure 4.1: Prevalence of current diet related health conditions reported by study participants**



#### 4.4 Common Sources of Nutritional Information

Figure 4.2 presents the common sources of nutrition information for respondents. Television served as the most popular source of nutrition information for most of the respondents (36.8%), it was followed by books/magazines (23.0%).

People within the social circles of respondents also served as a common source of nutrition information for as many as 12.8% of respondents, making it the third most common source of nutrition information for participants. The least popular source was other sources such as social gatherings, etc.

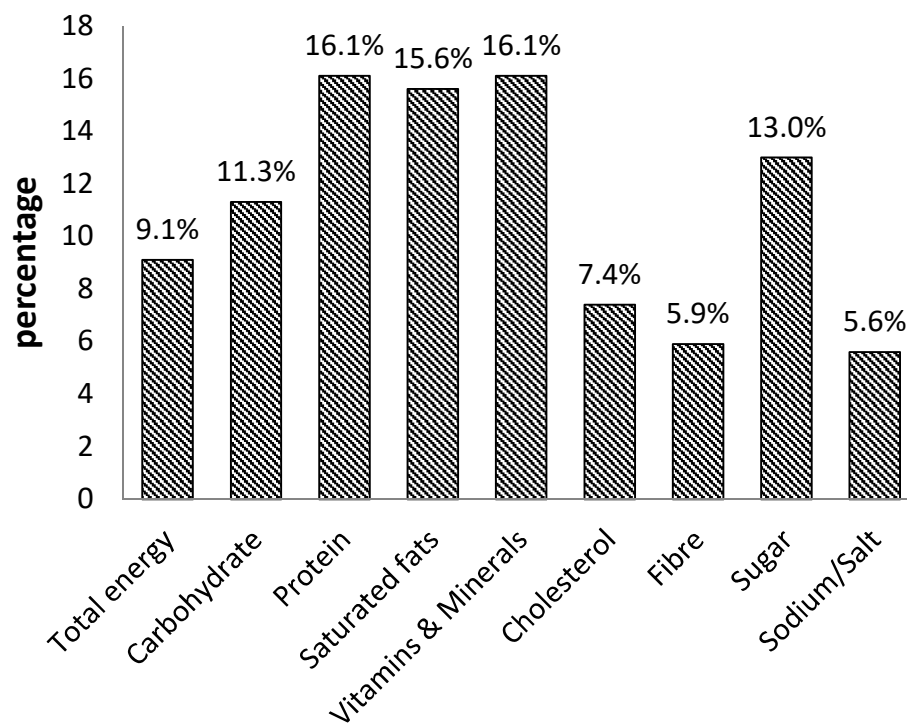


**Figure 4.2: Sources of nutritional information for study participants**



#### 4.5 Components of Nutrition Labels That Respondents Were Most Likely To Use

Figure 4.3 shows the components of nutritional labels that respondents were most likely to read before purchasing pre-packaged foods. The most commonly used nutrition information were protein and vitamins & minerals (16.1% for each). This was followed by saturated fats (15.6%), sugar (13.0%), carbohydrates (11.3%), total energy (9.1%), etc. More details are shown in figure 4.3 below.

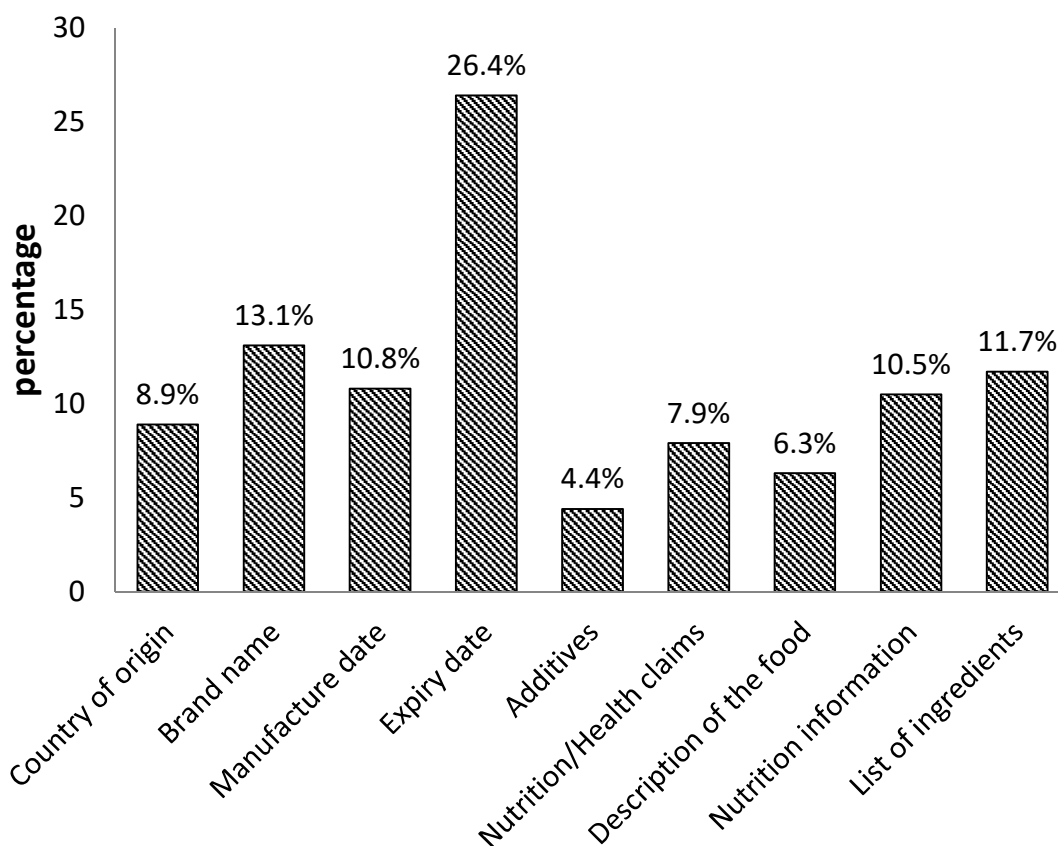


**Figure 4.3: Components of a nutrition label participants were most likely to use**



#### 4.6 Components of Food Labels That Respondents Were Most Likely to Use

The components of food label that respondents were most likely to use to inform their purchasing decision has been shown in figure 4.4 below. The most common food label information respondents were most likely to read when purchasing pre-packaged foods was expiry date (26.4%), followed by brand name (13.1%), which was also followed by list of ingredients (11.7%), then manufacture date (10.8%), etc.



**Figure 4.4: Components of a food label respondents were most likely to use**



#### **4.7 Factors Associated with Nutrition Label Awareness and Use of Nutrition**

##### **Label among Respondents**

Table 4.3 shows differences in socio-demographic and health characteristics of consumers who had a low awareness and those who had a high awareness of nutrition labels. Significant associations ( $p < 0.05$ ) were observed between educational status and nutrition label awareness.

No statistical significance was observed between, sex, age, marital status, educational status, employment status, household composition, household size, family history of health and special diet status and awareness of nutrition label.



**Table 4.3: Differences in socio-demographic characteristics and health characteristics of consumers who had a low awareness and those who had a high awareness of nutrition labels**

Variable	Awareness level		p-value
	low (n=91)	high (n=309)	
<b>Sex</b>			
Male	47 (51.6%)	147 (47.6%)	0.4942
Female	44 (48.4%)	162 (52.4%)	
<b>Age (years)</b>			
<24	22 (24.2%)	84 (27.2%)	0.5676
24-28	21 (23.1%)	69 (22.3%)	0.8808
29-35	22 (24.2%)	70 (22.7%)	0.7617
36-42	19 (20.9%)	56 (18.1%)	0.5538
>42	7 (7.7%)	30 (9.7%)	0.5595
<b>Marital Status</b>			
Married/previously married	42 (46.2%)	137 (44.3%)	0.7593
Never married	49 (53.8%)	172 (55.7%)	
<b>Educational Status</b>			
Basic	56 (61.5%)	114 (36.9%)	<0.0001
Secondary	17 (18.7%)	92 (29.8%)	0.0367
Post-Secondary	18 (19.8%)	103 (33.3%)	0.0134
<b>Employment Status</b>			
Employed	62 (68.1%)	189 (61.2%)	0.227
Unemployed	29 (31.9%)	120 (38.8%)	
<b>Household composition</b>			
couple with children	56 (61.5%)	210 (68.0%)	0.2539
couple with no children	6 (6.6%)	8 (2.6%)	0.0677
Single parent with children	8 (8.8%)	29 (9.4%)	0.8635
Others	21 (23.1%)	62 (20.1%)	0.8292
<b>Household size</b>			
<3	8 (8.8%)	20 (6.5%)	0.4461
4—5	30 (33.0%)	96 (31.1%)	0.7318
≥6	53 (58.2%)	193 (62.5%)	0.4674
<b>History of health</b>			
Yes	8 (8.8%)	46 (14.9%)	0.1348
No/Don't know	83 (91.2%)	263 (85.1%)	
<b>Special diet</b>			
Yes	2 (2.2%)	9 (2.9%)	
No	89 (97.8%)	300 (97.1%)	0.714

Data presented as number (percentage), chi-square was used to compare categorical variables and  $p < 0.05$  was considered significant



Table 4.4 shows differences in socio-demographic and health characteristics of consumers who did not use nutrition labels and those who used nutrition labels. No positive associations between sex, age, marital status, educational status, employment status, household composition, household size, family history of health and special diet status, and nutrition label use were observed.



**Table 4.4: Differences in socio-demographic characteristics and health characteristics of consumers who use nutrition labels and those who do not**

Variable	Nutrition label use		p-value
	Do not use (n=179)	Use (n=136)	
<b>Sex</b>			
male	90 (50.3%)	59 (43.4%)	0.2246
Female	89 (49.7%)	77 (56.6%)	
<b>Age (years)</b>			
<24	44 (24.6%)	39 (28.7%)	0.4138
24-28	43 (24.0%)	26 (19.1%)	0.2972
29-35	38 (21.2%)	36 (26.5%)	0.2771
36-42	37 (20.7%)	22 (16.2%)	0.3113
>42	17 (9.5%)	13 (9.6%)	0.9853
<b>Marital Status</b>			
Married/previously Married	98 (54.7%)	73 (53.7%)	0.8499
Never married	81 (45.3%)	63 (46.3%)	
<b>Educational Status</b>			
Basic	67 (37.4%)	45 (33.1%)	0.4252
Secondary	50 (27.9%)	41 (30.1%)	0.6676
Post-Secondary	62 (34.6%)	50 (36.8%)	0.696
<b>Employment Status</b>			
Employed	106 (59.2%)	86 (63.2%)	0.4691
Unemployed	73 (40.8%)	50 (36.8%)	
<b>Household composition</b>			
couple with children	117 (65.4%)	98 (72.1%)	0.206
couple with no children	3 (1.7%)	6 (4.4%)	
Single parent with children	17 (9.5%)	11 (8.1%)	0.6635
Others	42 (23.5%)	21 (15.4%)	
<b>Household size</b>			
<3	12 (6.7%)	10 (7.4%)	0.8229
4-5	48 (26.8%)	48 (35.3%)	0.1054
≥6	119 (66.5%)	78 (57.4%)	0.0974
<b>History of health</b>			
Yes	31 (17.3%)	15 (11.0%)	0.1174
No/Don't know	148 (82.7%)	121 (89.0%)	
<b>Special diet</b>			
Yes	4 (2.2%)	5 (3.7%)	0.4468
No	175 (97.8%)	131 (96.3%)	

Data presented as number (percentage), chi-square was used to compare categorical variables and  $p < 0.05$  was considered significant





#### **4.8 Factors That Predict Nutrition Label Awareness and Use among Respondents**

Univariate and multivariate logistic regression analysis of risk factors associated with nutrition label awareness among consumers is shown in Tables 4.5. Basic education was the sole predictor of nutrition label awareness. Those who had basic education had 7.54 (1.731, 32.844) ORs (95% CIs) of having high awareness compared to those with post-secondary education.

However, after adjusting for employment, basic education and secondary education were the only correlates of high level of nutrition label awareness. Respondents who had basic education had 8.3 (1.89, 36.28) ORs (95% CIs) of having high awareness, respondents who had secondary education had 5.0 (1.04, 23.75) ORs (95% CIs) of having high awareness, compared to those with post-secondary education.



**Table 4.5: Logistic regression of factors that predict nutrition label awareness among consumers**

Variable	OR	(95% CI)	P-value	aOR	(95% CI)	P-value
<b>Sex</b>						
Male	1			1		
Female	0.932	0.452-1.921	0.848	1.03	0.497-2.134	0.936
<b>Age (years)</b>						
<24	0.447	0.135-1.476	0.186	0.498	0.150-1.657	0.256
24-28	0.847	0.220-3.262	0.809	1.3	0.305-5.541	0.723
29-35	1.041	0.404-2.684	0.934	1.427	0.516-3.951	0.493
36-42	0.835	0.290-2.405	0.738	1.26	0.390-4.064	0.699
>42	1			1		
<b>Marital Status</b>						
Married/previously married	1			1		
Never married	0.694	0.336-1.432	0.323	0.51	0.230-1.129	0.097
<b>Educational Status</b>						
Basic	7.54	1.731-32.844	<b>0.007</b>	8.283	1.891-36.283	<b>0.005</b>
Secondary	4.299	0.908-20.355	0.066	4.962	1.037-23.749	<b>0.045</b>
Post-Secondary	1			1		
<b>Employment Status</b>						
Employed	1			1		
Unemployed	1.569	0.706-3.488	0.269	1.852	0.822-4.172	0.137
<b>Average monthly income (GHC)</b>						
No income	3.883	0.510-29.586	0.19	1.766	0.047-65.733	0.758
100-500	3.184	0.385-26.305	0.282	3.247	0.392-26.934	0.275
>500	1			1		
<b>Household size</b>						
<3	0.407	0.054-3.101	0.386	0.444	0.058-3.401	0.434
>3	1			1		
<b>History of health</b>						
Yes	0.598	0.224-1.600	0.306	0.624	0.232-1.676	0.349
No/Don't know	1			1		
<b>Special diet</b>						
Yes	0.192	0.026-1.434	0.108	0.199	0.027-1.493	0.116
No	1			1		

OR: odds ratio, CI: Confidence Interval, aOR: Adjusted odds ratio



Univariate and multivariate logistic regression analysis of risk factors associated with nutrition label use among consumers is shown in Table 4.6 below. Basic education was the only predictor of nutrition label use. Compared to those who attained post-secondary education, respondents who had basic education had 1.675 (1.000, 2.806) ORs (95% CIs) of having high usage of nutrition label information. After adjusting for employment however, no significant predictors of nutrition label use were observed.



**Table 4.6: Logistic regression of factors that predict nutrition label use among consumers**

Variable	OR	95%CI	P-value	aOR	95% CI	P-value
<b>Sex</b>						
Male	1			1		
Female	0.732	0.483-1.110	0.142	0.732	0.482-1.112	0.144
<b>Age (years)</b>						
<24	1.433	0.784-2.619	0.242	1.429	0.775-2.636	0.253
24-28	1.075	0.492-2.349	0.857	1.066	0.452-2.515	0.885
29-35	0.905	0.509-1.610	0.735	0.9	0.476-1.700	0.745
36-42	1.402	0.743-2.646	0.296	1.391	0.676-2.862	0.37
>42	1			1		
<b>Marital Status</b>						
Married/previously married	1			1		
Never married	1.101	0.727-1.668	0.65	1.148	0.721-1.828	0.561
<b>Educational Status</b>						
Basic	1.675	1.000-2.806	<b>0.02</b>	1.664	0.988-2.800	0.075
Secondary	0.856	0.504-1.455	0.566	0.847	0.493-1.456	0.548
Post-Secondary	1			1		
<b>Employment Status</b>						
Employed	1			1		
Unemployed	0.969	0.631-1.487	0.885	0.967	0.629-1.485	0.879
<b>Income (GHC)</b>						
No income	0.728	0.347-1.527	0.401	0.765	0.141-4.153	0.756
100-500	0.679	0.305-1.510	0.342	0.678	0.305-1.509	0.341
>500	1			1		
<b>Household size</b>						
<3	0.922	0.413-2.057	0.843	0.915	0.408-2.051	0.829
>3	1			1		
<b>History of health</b>						
Yes	1.084	0.661-1.780	0.748	1.082	0.658-1.779	0.757
No/Don't know	1			1		
<b>Special diet</b>						
Yes	0.714	0.222-2.292	0.571	0.971	0.632-1.490	0.892
No	1			1		

OR: odds ratio, CI: Confidence Interval, aOR: Adjusted odds ratio



## CHAPTER FIVE

### 5.0 DISCUSSION

This study examined consumer awareness and usage of nutrition labels. To this end, the study sought to answer three questions to ascertain the level of awareness of consumers about the presence of nutrition labels on pre-packaged foods, the components of food and nutrition labels consumers most likely used by consumers, and the factors associated with awareness and use of nutrition labels among the study participants.

#### 5.1 Consumer Awareness of Nutrition Labels

The finding on the level of awareness of nutrition labels in the study was encouraging though a substantial fraction of respondents had low level of awareness. It was revealed that the majority of the respondents (77.3%) possessed high level of awareness of nutrition labels, which could be as a result of several possible reasons, including the fact that a substantial number of respondents (57.6%) had at least a secondary education.

Consumers with high educational attainments are more likely to read prints and are also more likely to have a considerable exposure on health and nutrition information, resulting in increased awareness of diet and issues about health (Nayga, 1996; Loureiro et al., 2006).

One study on nutrition label awareness reported that about 70% of participants were aware of nutrition labels, a large number of the participants of that study were individuals who attained high school education or greater (Mahgoub et al. 2007).

An important observation has been made by Washi (2012) concerning nutrition label awareness and education. The study found that a large number of participants who



said they were aware of nutrition labels also had high education. Similar observations were made in some two other studies (Schupp, Gillespie & Reed, 1998; Mahgoub et al., 2007).

It was reported in one of such studies that 52.2% of the participants were aware of the existence of nutrition labels on pre-packaged foods (Schupp et al., 1998). In conclusion, education plays a critical role in awareness of nutrition labels and that may be the reason for the high level of awareness of nutrition labels observed in this study.

## **5.2 Food Label Information Most Likely to be used by Consumers**

When asked which component of food label information participants were most likely to use at the point of purchase, as expected consumers demonstrated that they held some components more highly than others. It was observed that participants were most likely to use expiry date (26.4%), brand name (13.1%), list of ingredients (11.7%), manufacture date (10.8%) and nutrition label information (10.5%) and so on.

The most likely used food label information therefore was the expiry date. The brand name, the list of ingredients and manufacture date all ranked ahead of nutrition label information. With the exception of brand name, the observations made in this study regarding the above topmost components of food labels of interest to participants are consistent with those of Kumar and Pandit (2008); Jacobs, de Beer & Larney (2010) and Washi (2012).

In the case of Jacobs and others (2010), the study showed that the most likely used components of food label information on pre-packaged foods among study participants were nutritional label information, the list of ingredients and the expiry



date, in increasing order of importance. Washi (2012) on the other hand, found that his respondents used expiry date and production dates the most.

Whereas Washi (2012) suggested consumer health safety fears may have influenced the choice of expiry date as the primary interest, others have suggested that the search for expiry date was necessitated by the desire for products with longer expiry date and shelf-life (Jacobs et al., 2010). Peters-Teixeira and Badrie (2005) have also suggested that expiry date was most popular probably because it was proof of product freshness.

This study also found that as many as 87.8% of respondents were aware that some pre-packaged foods contain nutrition information about the food, but only a small proportion of them reported that they actually used nutrition labels often or some of the times to inform their purchasing decisions.

A study conducted by Borra (2006) on consumer perspectives on food labels made similar observations to that which has been found in this study regarding the disparity between the numbers that are aware of nutrition labels and the numbers that use nutrition labels on pre-packaged foods. Borra (2006) observed that the use of nutrition labels is generally low despite appreciable levels of awareness of the presence of nutrition information on food labels.

The fact that the largest percentage of the respondents in this study indicated that their understanding of the nutrition information on food labels was moderate could be the reason for the low use of nutrition labels despite the high awareness.

Given the observations in this study concerning respondents' interests in the various food label information, it goes without saying that when most respondents were satisfied with the expiry date of food products, and perhaps one or two other food



label information, they went right away to do the purchasing without caring so much about nutritional content.

### **5.3 Components of Nutrition Label Information Most Likely to be used by Consumers When Purchasing Pre-packaged Foods**

When asked which of the components of nutrition label information they were most likely to use when they read nutrition label, respondents who said they used nutrition labels demonstrated a certain kind of pattern of interests in the various nutrients, somehow similar to observations made by researchers such as Marietta, Welshimer & Anderson (1999) and Drichoutis and others (2005).

In the study conducted by Drichoutis and others (2005) for instance, it was observed that younger persons were more likely to use information on vitamin and mineral. They explained that vitamins and minerals were of most importance to that population sub-group probably because of the important functions the two micro-nutrients place in their physiological development.

They also observed that their younger female respondents were more likely than their male counterparts to search for information on energy, a nutrient notoriously associated with weight gain, probably because they were desirous of avoiding too much of the nutrient so as to prevent unwanted weight gain.

In the study carried out by Marietta and colleagues (1999), after observing the level of interest their respondents showed towards the various nutrients, the researchers believed that respondents who used carbohydrates and fibre information may have wanted to avoid excess carbohydrates and consume more fibre, obviously because of the negative implications of consuming too much carbohydrates and less fibre.





This study's findings on the specific nutrient information respondents were most likely to use showed that respondents were most likely to use information on protein (16.1%), vitamins & minerals (16.1%), fat (15.6%), sugar (13.0%), carbohydrates (11.3%) and total energy (9.1%).

The results of different studies show that consumers generally agree on some specific nutrients as being of very high interest to them. But there has hardly been any instance where the results of any study showed that the participants of that study demonstrated interest in the various nutrients that were entirely similar to those of another study in terms of order of interests in the nutrients.

For instance, the Food Standard Agency Food Labelling (2009) and Borra (2006) have noted calories, fat, and sugar contents as the most common concerns among consumers. In their study, Jacobs and others (2010) observed a high interest in fat content among users of nutrition label information.

The findings of a study among consumers in Malaysia conducted by Ambak, Tupang, Hasim, Salleh, Zulkafly, Salleh, ..., & Naidu (2018) showed a high interest in carbohydrate, sugar, fat and total energy contents, in descending order of interest, among those who took part in the study.

Therefore, it can be seen that the results of this study is in line with the observations made by the above research works because of the high interest of respondents in fat, sugar, carbohydrate and total energy contents. The point of divergence of the findings of this study on the nutrients most likely used by consumers from the works cited above is the high interest respondents of this study showed in relation to information on protein and vitamins and minerals.



The relatively high prevalence of diet-related chronic health conditions reported among respondents, which stood at 23.2%, or even a mere awareness of the link between diet and health may have been the reason consumers showed greater concern for some of the above nutrients, specifically those whose excessive intakes are noted for their association with poor health.

Some researchers who have worked on the subject of nutrition have noted that a positive effect of knowledge about the impact of diet on health greatly influence consumer interest in the various nutrients (Lin, Lee & Yen, 2004; Kim et al., 1999; Rasberry et al., 2007).

For instance, knowledge about the impact of diet on health has been noted to be associated with consumer interest in cholesterol information on nutrition labels (Lin et al., 2004). Furthermore, some studies have observed that knowledge on the relationship between diet and health leads to avoidance of certain nutrients, especially fat, calories and sugar (Kim et al., 1999; Rasberry et al., 2007).

It is therefore not out of place to suggest that the high prevalence of diet-related health conditions among respondents may have been the reason for their show of greater interests in nutrients such as protein (16.1%), fat (15.6%), sugar (13.0%), carbohydrates (11.3%) and total energy (9.1%) as these nutrients are largely associated with poor health. It has been suggested that consumers generally search for nutrition information on nutrients they desire to avoid (Shine et al., 1997). Therefore, the higher interest respondents demonstrated in the “negative” nutrients, as seen in the above, may have been part of their management strategy in dealing with their health conditions.



This assertion of consumers high interests in nutrients they want to avoid has been supported by studies conducted by Wandel (1997) and Lin and colleagues (2004) who have found that low-fat dieters were more likely to look for fat information.

But the assertion by Shine and others (1997) on greater interests in “negative nutrients” may not apply to the high interests shown by respondents of this study in the micronutrients, since generally the public suffer micronutrients deficiencies. It may therefore be suggested that the high interest in the micronutrients, as observed in this study, may have been as a result of respondents’ consciousness of the fact that they are highly likely to have deficiencies in vitamins and minerals, or due to some awareness of the importance of micronutrients nutrients in maintaining good health.

#### **5.4 Factors Associated with Awareness and Use of Nutrition Information on Pre-packaged Foods**

Many studies have found a link between some socio-demography factors, health status, special diet status and other factors like nutritional knowledge, time spent in the grocery shop, price and taste, and awareness and use of nutrition labels (Nayga, 1996; Drichoutis et al. 2005; Loureiro et al. 2006; Mahgoub et al. 2007; Wiles, Paterson & Meaker, 2009; Kasapila and Shawa, 2011).

However, in the case of this study, only educational status was found to be associated with awareness of nutrition labels. Educational status was also found to be the sole predictor of awareness of nutrition labels, but only after adjusting for employment. This shows that people who had both education and employment were more likely to be aware of nutrition labels than those who were educated but were unemployed.



In terms of level of education, one study found that respondents who had lesser education were less likely to be aware of and use nutrition information on food labels than those who had high school education or above (Schupp *et al.* 1998). Similar observations have been made in other studies which have noted greater awareness and use of nutrition label information among degree holders (Guthrie *et al.* 1995; Nayga, 2000; Drichoutis *et al.* 2005; Kumar and Pandit, 2008; Wiles *et al.* 2009).

It has been suggested that individuals with higher educational level are more likely to understand and interpret nutrition label information (Guthrie *et al.*, 1995; Drichoutis *et al.*, 2005). As a result, it has been argued that this may reflect in higher awareness and use of nutrition label information among such individuals than those with lower educational status.

The results of this study showed that the proportion of respondents who had post-secondary education and had high awareness of nutrition labels exceeded the proportion of respondents who had secondary education and had high awareness. In a rather interesting twist, the study also showed that respondents with basic education were generally more aware of nutrition labels on pre-packaged foods than those with secondary and post-secondary education.

This observation is similar to one made by Aygen (2012) whose study, involving Turkish consumers, found greater use of nutrition label information among respondents who had high school education than those who had university or post-graduate education.

Though the findings of the study conducted by Agyen (2012) were on nutrition label use rather than awareness, it is not out of place to compare Agyen (2012) observation with the findings in this study on educational status and nutrition label awareness.



This is because nutrition label use naturally correlates with awareness of nutrition labels.

To understand why a greater proportion of respondents with basic education could have a higher awareness of nutrition labels than the proportion with secondary or post-secondary education, examining the possible sources of nutrition information of the study participants would be of great help.

The point has been made that high income consumers depend more on sources such as newspapers, books/magazines and food labels, and hence, are less likely to use the source of a doctor, nurse, home economist or extension agent, which are more popular with low income consumers, as sources of their nutrition information (Wang, Fletcher & Carley, 1995).

Given the high probability of the existence of a correlation between higher income and higher education (Loureiro et al., 2006), it can be argued that perhaps, the lack in the Ghanaian society of adequate nutrition information on sources commonly associated with people belonging to the higher income group, who are also more likely to have higher educational status, may be the reason basic education, rather than secondary or post-secondary education, had greater association with awareness of nutrition labels in this study.

With regards to the other socio-demographic and health-related factors examined in the study, though some studies have found association between sex (Satia et al., 2005; Aboulnasr, 2010), age (Drichoutis et al., 2008), marital status (Washi, 2012), employment status (Drichoutis et al., 2005), household composition/household size (McArthur et al., 2001), history of diet-related health condition and special diet status



(Drichoutis et al., 2005; Loureiro et al., 2006; Bayar, 2009; Lewis et al., 2009), and nutrition label use, this study did not establish the existence of any such associations.

Other studies on the nutrition label use have been unable to establish any link between the above mentioned demographic factors, and health-related factors and, nutritional label use. For instance, on the issue of the lack of association between age and nutrition label use, this study agrees with those conducted by Satia and others (2005), Jensen and others (1996) and Misra (2007) whose studies found that age was neither associated with awareness nor use of nutrition labels.

The non-existence of association between age and nutrition label use is quite puzzling because it has been suggested that the aged, because of their tendency to have health problems relating to their old age, were more likely to use nutrition label information, especially on cholesterol, fat and other label information of health benefits to them (Drichoutis *et al.*, 2005).

Studies conducted by Loureiro and others (2006) and Mannell and others (2006) also show that age is associated with nutrition label use. However Loureiro and others (2006) and Mannell and others (2006) both differ from Drichoutis and others (2005) on the particular age group associated with the use of the nutrition label.

Whereas Drichoutis and others (2005) observed that the aged were more likely to use nutrition label information, Loureiro and others (2006) and Mannell and others (2006) found that it is rather the middle aged or younger adults who were more likely to use nutrition labels. They suggest the middle aged or younger adults were more likely to do so than older individuals probably because the elderly perceived nutrition labels as difficult to understand.



This study believe, the non-existence of association between any age group and nutrition label use as the findings contained in it suggest, may be because the various age groups have had equal exposure to nutrition information, thereby resulting in no significant differences in the levels of use of the nutrition label on pre-packaged foods among them.

When it comes to gender and nutrition label use, the finding in this study agrees with Klopp and MacDonald (1981) and Nayga Jr (2000) who both found no link between the two. The lack of association between gender and nutrition label use observed in this study could be explained by Wang and colleagues (1995); Szykman, Bloom & Levy (1997) and Nayga Jr (2000), who suggest that because of increased awareness of the relationship between diet and health between the two sexes, any differences observed between the two in relation to nutrition label information use will depend on the particular sex with the greatest perception of the importance of diet to their lifestyle.

The finding of this study on gender and nutrition label use contradicts those of Satia and others (2005) and Aboulnasr (2010). Though the two have found sex to be associated with the use of nutrition labels, they differ on the particular sex that is more likely to use the label in their respective observations. Whereas Satia and others (2005) found women to be more likely than men to use nutrition labels, Aboulnasr (2010) have observed the contrary.

In explaining their observation, Satia and others (2005) suggested that women's gender roles and their responsibility to provide healthy food for their families could be the possible reason for their greater use of nutrition labels. Aboulnasr (2010) on the



other hand, has suggested that perhaps men's higher perceptions about disease risk could be the reason they were more likely to use the nutrition label than women.

Other factors such as marital status, employment status, household size and health-related factors, specifically family history of diet-related health conditions and special diet status, and their possible association with nutrition label use were also examined.

The findings of this study on marital status and nutrition label use showed the existence of no association between the two. There were a limited number of studies on the effects of marital status on nutrition label use, though marital status has been widely perceived to influence nutrition label use. Li and colleagues (2012) study is one of the few available which looked at the effects of marital status on nutrition label use. Just like theirs, the finding of this study on marital status found no association whatsoever between the marital status and nutrition label use.

The finding of this study on employment showed that employment status was not associated with nutrition label use. Employment correlates with income, which Blitstein and Evans (2006) have observed to be associated with nutrition label use. Blitstein and Evans (2006) found individuals belonging to the lower income bracket to use the nutrition label less.

Nayga Jr (2000) has also observed lower income earners to have a lower level of nutrition knowledge, which Guthrie and others (1995) have found to be associated with poor label use. Given the correlation between employment and income, it was highly expected that employment, just as income, would be associated with nutrition label use, but that was not the case for this study.

In respect of household size and nutrition label use, this study did not observe any association even though a study by McArthur and others (2001) found one, which





shows that larger households and households with children are associated with label use.

Finally, the findings of this study on the relationship between diet-related health conditions and nutrition label use showed that diet-related health status was not associated with the use of the nutrition label, even though individuals suffering from diet-related health conditions are generally expected to read the nutrient content information on food products before purchasing them.

The finding on the effect of diet-related health conditions on nutrition label use as contained in this study are therefore contrary to studies conducted by Lewis and colleagues (2009) and Bayar (2009) who have observed higher awareness and use of nutrition labels among the chronically sick.

In a nutshell, the fact that no associations were observed between marital status, employment status, household size, and diet-related health conditions, and nutrition label use in this study may be explained by the possible influence of motivation on nutritional information use.

Motivation has been identified as a major factor behind the use of food labels. Low motivation to use nutrition labels may be as a result of the lack of trust in the accuracy of nutrition label information, a lack of perceived importance of nutrition or resistance in accepting information consumers may feel as being coercive (Hieke and Taylor, 2012; Cowburn and Stockley, 2005).

It is therefore not out of place to assume that a lack of motivation, on the part of the participants of this study, owing to any or some of the reasons above, and even others not mentioned here, may be the underlying reason no associations were found



between marital status, employment status, household size, and diet-related health conditions, and nutrition label use as in observed in this study.

### **5.5 Limitations**

A substantial proportion of the municipality's population (41.4 %), were not literate in the English language and for that reason, were not represented in the sample for the study. The omission of such a large segment of the population from the study is legitimate because food label information in the country is mostly written in the English language and therefore inaccessible by individuals who are not literate in that language. What this means is that the lack of representation from that population segment limits the possibility of generalising the findings contained in this study about the entire municipality.



## CHAPTER SIX

### 6.0 CONCLUSION AND RECOMMENDATIONS

#### 6.1 Conclusion

In conclusion, the majority of the participants of this study were aware of nutrition labels but usage was low in comparison to the numbers that had awareness of the presence of nutrition labels on pre-packaged foods. Participants who did not use nutrition labels though they had awareness of their presence on pre-packaged foods probably had moderate or low understanding of nutrition label information and therefore lacked self-confidence in applying the nutrition information on food labels. It could also be because of the lack of motivation to use nutrition labels for one reason or the other.

Education was the only factor that was found to have association with nutrition label awareness. It was also the only factor that predicted awareness of nutrition label. The level of awareness of nutrition labels on pre-packaged foods was high.

Participants used nutrition label information less than expiry date, brand name, list of ingredients and manufacture date, in descending order of use, when purchasing pre-packaged foods. Expiry date was therefore the most used food label information in consumer purchasing decisions. Protein, vitamins & minerals, fat, sugar, carbohydrates and total energy were the most sought for nutrient information among participants who used nutrition labels.



## 6.2 Recommendations

First and foremost, it must be stated that the use of nutritional labels can be of enormous benefit to the health of consumers and the health system as a whole. Therefore, the fact that awareness of nutrition labels was high is something to rejoice over. However, because usage of nutrition labels was relatively lower, I recommend more education be conducted by the district health directorate, and other NGO's in health, embark on vigorous education of the public on how to use nutrition information so that those with low and moderate understanding of nutrition information will have the competence to apply nutrition label information.



## REFERENCES

- Abbott, R. (1997). Food and Nutrition Information: A Study of Sources, Uses, and Understanding. *British Food Journal*, 99(2), 42-44
- Aboulnasr, K.S. (2010). Gender differences in the processing of nutrition information on food products. *Journal of Academy of Business and Economics*, 10(1), 145-152.
- Australian Certified Organic (2013) Standard 2013
- Alaunyte, I., Perry, J.L., & Aubrey T. (2015). Nutritional knowledge and eating habits of professional rugby league players: does knowledge translate into practice? *Journal of the International Society of Sports Nutrition*, 12(1), 18.
- Ambak R., Tupang L., Hasim M.H., Salleh N.C., Zulkafly N., Salleh R., ..., & Naidu B.M. (2018). Who Do Not Read and Understand Food Label in Malaysia? Findings from a Population Study. *Health Science Journal*, 12(1).
- Anderson J., Young L. and Perryman S. (2010) Understanding the food label.
- Andrews J.C., Burton S. and 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.
- Andrews J.C., Netemeyer R.G. and Burton S. (1998) Consumer generalization of nutrient content claims in advertising. *The Journal of Marketing*, 62-75.
- Ares G., Giménez A., Bruzzone F., Antúnez L., Sapolinski A., Vidal L. & Maiche A. (2012). Attentional capture and understanding of nutrition labelling: A study based on response times. *International Journal of Food Sciences and Nutrition*, 63(6), 679-688.



- Ares, G., Giménez, A. & Deliza, R. (2010). Influence of three non-sensory factors on consumer choice of functional yogurts over regular ones. *Food Quality and Preference*, 21(4), 361-367.
- Aygen, F.G. (2012). Determinants of Nutrition Label Use among Turkish Consumers. *International Journal of Humanities and Social Science*, 2(7), 53-70.
- Baba, N.H., Sawaya S., Torbay, N., Habbal Z., Azar, S. & Hashim, S.A. (1999). High protein versus high carbohydrate hypoenergetic diet for the treatment of obese hyperinsulinemic subjects. *International Journal of Obesity*, 23,1202– 1206
- Baltas, G. (2001). Nutrition labelling: issues and policies. *European Journal of Marketing*, 35(5/6), 708-721.
- Banterle, A., & Stranieri, S. (2008). Information, Labelling, and Vertical Coordination: An Analysis of the Italian Meat Supply Networks. *Agribusiness* 24(3 ), 320-331
- Barreiro-Hurlé J., Gracia A. and de-Magistris T. (2010) Does nutrition information on food products lead to healthier food choices? *Food Policy* 35(3), 221-229
- Bassett M.T., Dumanovsky T., Huang C., Silver L.D., Young C., Nonas C., Matte T.D., Chideya S. and Frieden T.R. (2008) Purchasing behavior and calorie information at fast-food chains in New York City, 2007. *American Journal of Public Health* 98(8), 1457-1459.
- Bayar E. (2009) The Importance of Nutrition Label Usage in the Context of Obesity: A Cross-Country Study of the USA and Turke Masters Theses. Paper 598.
- Bech-Larsen T. and Grunert K.G. (2003) The perceived healthiness of functional foods: A conjoint study of Danish, Finnish and American consumers' perception of functional foods. *Appetite* 40(1), 9-14.



- Bender M.M. and Derby B.M. (1992) Prevalence of reading nutrition and ingredient information on food labels among adult Americans: 1982–1988. *Journal of Nutrition Education* 24(6), 292-297.
- Besler H.T., Buyuktuncer Z. and 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.
- Blitstein J.L. and Evans W.D. (2006) Use of nutrition facts panels among adults who make household food purchasing decisions. *Journal of nutrition education and behavior* 38(6), 360-364.
- Bonsmann G., Storcksdieck S., Celemín L.F. and Grunert K.G. (2010) Food labelling to advance better education for life. *European journal of clinical nutrition* 64(S3), S14.
- Borra S. (2006) Consumer perspectives on food labels. *American Journal of Clinical Nutrition* 83(5).
- Bovell-Benjamin A.C. and Bromfield E. (2010) Nutrition and bioavailability: Sense and nonsense of nutrition labeling. In *Ensuring Global Food Safety*, pp. 289-309: Elsevier.
- Brécard D., Hlaimi B., Lucas S., Perraudau Y. and Salladarré F. (2009) Determinants of demand for green products: An application to eco-label demand for fish in Europe. *Ecological economics* 69(1), 115-125.
- Brecher S.J., Bender M.M., Wilkening V.L., McCABE N.M. and 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.



- Brehm B.J., Spang S.E., Lattin B.L., Seeley R.J., Daniels S.R. and D'Alessio D.A. (2005) The role of energy expenditure in the differential weight loss in obese women on low-fat and low-carbohydrate diets. *The Journal of Clinical Endocrinology & Metabolism* 90(3), 1475-1482.
- Britten P., Haven J. and Davis C. (2006) Consumer research for development of educational messages for the MyPyramid Food Guidance System. *Journal of nutrition education and behavior* 38(6), S108-S123.
- Bryman A. (2004) *Social Research Methods* 2nd ed. Oxford: Oxford University Press
- Bryman A. and Bell E. (2003) *Business Research Methods* Oxford: Oxford University Press.
- Burke S.J., Milberg S.J. and Moe W.W. (1997) Displaying common but previously neglected health claims on product labels: understanding competitive advantages, deception, and education. *Journal of Public Policy & Marketing* 242-255.
- Burros M. (2004) Read Any Good Nutrition Labels Lately? *New York Times*(14).
- Burton S. and Andrews J.C. (1996) Age, product nutrition, and label format effects on consumer perceptions and product evaluations. *Journal of Consumer Affairs* 30(1), 68-89.
- Burton S., Creyer E.H., Kees J. and Huggins K. (2006) Attacking the obesity epidemic: the potential health benefits of providing nutrition information in restaurants. *American Journal of Public Health* 96(9), 1669-1675.
- Burton S., Howlett E. and Tangari A.H. (2009) Food for thought: how will the nutrition labeling of quick service restaurant menu items influence consumers' product evaluations, purchase intentions, and choices? *Journal of Retailing* 85(3), 258-273.





- Campos S., Doxey J. and Hammond D. (2011) Nutrition labels on pre-packaged foods: a systematic review. *Public health nutrition* 14(8), 1496-1506.
- Carrillo E., Varela P. and Fiszman S. (2012) Packaging information as a modulator of consumers' perception of enriched and reduced-calorie biscuits in tasting and non-tasting tests. *Food Quality and Preference* 25(2), 105-115.
- Centres for Disease Control and Prevention (2015) *The Food Production Chain - How Food Gets Contaminated*.
- Charles G. (2002) Costs versus consciences. *Marketing Week* 22-22.
- Cheftel J.C. (2005) Food and nutrition labelling in the European Union. *Food Chemistry* 93(3), 531-550
- Chien-Huang L. and Hung-Chou L. (2010) How health information affects college students' inclination toward variety-seeking tendency. *Scandinavian journal of psychology* 51(6), 503-508.
- Cochran W.G. (1963) *Sampling Techniques*, 2nd ed. New York: John Wiley and Sons, Inc.
- Codex (1985) *General Standard for the Labelling of Prepackaged Foods*. Codex Stan 1(1985). Amended 1991, 1999, 2001, 2003, 2005, 2008 and 2010. , pp. 1-7.
- Cowburn G. and Stockley L. (2005) Consumer understanding and use of nutrition labelling: a systematic review. *Public health nutrition* 8(1), 21-28.
- Cranage D.A., Conklin M.T. and Lambert C.U. (2005) Effect of nutrition information in perceptions of food quality, consumption behavior and purchase intentions. *Journal of Food service Business Research* 7(1), 43-61.
- Creswell J.W. (2008) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*: SAGE Publications.



- Dasgupta R., Kumar R., Pillai R. and Arora N.K. (2015) Sugar, Salt, Fat, and Chronic Disease Epidemic in India: Is There Need for Policy Interventions? . Indian Journal of Community Medicine 40(2), 71-74.
- De Magistris T. and Gracia A. (2008) The decision to buy organic food products in Southern Italy. British Food Journal 110(9), 929-947.
- Dean M., Lampila P., Shepherd R., Arvola A., Saba A., Vassallo M., Claupein E., Winkelmann M. and Lähteenmäki L. (2012) Perceived relevance and foods with health-related claims. Food Quality and Preference 24(1), 129-135.
- Dean M., Shepherd R., Arvola A., Vassallo M., Winkelmann M., Claupein E., Lähteenmäki L., Raats M. and Saba A. (2007) Consumer perceptions of healthy cereal products and production methods. Journal of Cereal Science 46(3), 188-196.
- Dimara E. and Skuras D. (2005) Consumer demand for informative labeling of quality food and drink products: a European Union case study. Journal of consumer marketing 22(2), 90-100.
- Donna P.B., Rhoda Z.B. and Anna C. (2001) Food Labelling issues- consumer qualitative research: ANZFA – Australia New Zealand Food Authority.
- Dooley D.A., Novotny R. and Britten P. (1998) Integrating research into the undergraduate nutrition curriculum: Improving shoppers' awareness and understanding of nutrition facts labels. Journal of nutrition education and behavior 30(4), 225-231.
- Doyle M., Carus D. and Pridham M. (2005) A system to retrieve consumer-facing product information. British Food Journal 107(10), 781-791.



- Draper A.K., Adamson A.J., Clegg S., Malam S., Rigg M. and Duncan S. (2013) Front-of-pack nutrition labelling: are multiple formats a problem for consumers? . *European Journal of Public Health* 23(3), 517-521
- Drichoutis A.C., Lazaridis P. and Nayga Jr R.M. (2005) Who is Looking for Nutritional Food Labels?: Wer sucht nach Nährwertangaben auf Lebensmitteln?: Mais qui donc s' occupe du contenu nutritionnel sur les étiquettes? . *Eurochoices* 4(1), 18-23
- Drichoutis A.C., Lazaridis P. and Nayga Jr R.M. (2006) Consumers' use of nutritional labels: a review of research studies and issues. *Academy of marketing science review* 20061.
- Drichoutis A.C., Lazaridis P., Nayga R.M., Kapsokefalou M. and Chrysochoidis G. (2008) A theoretical and empirical investigation of nutritional label use. *The European Journal of Health Economics* 9(3), 293-304.
- Drichoutis A.C., Nayga J., Rodolfo M and Lazaridis P. (2009) Can nutritional label use influence body weight outcomes? *Kyklos* 62(4), 500-525.
- European Heart Network. (2003) A systematic review of the research on consumer understanding of nutrition labeling. Brussels: European Heart Network.
- Edge M.S., Toner C., Kapsak W.R. and Geiger C.J. (2014) The impact of variations in a fact-based front-of-package nutrition labeling system on consumer comprehension. *Journal of the Academy of Nutrition and Dietetics* 114(6), 843-854. e848.
- Engels S.V., Hansmann R. and Scholz R.W. (2010) Toward a sustainability label for food products: An analysis of experts' and consumers' acceptance. *Ecology of food and nutrition* 49(1), 30-60.
- FAO (1993) Codex Guidelines on Nutrition Labelling



- FAO (2009a) United Nations Food and Agriculture Organisation. Codex Guidelines on Nutrition Labelling (CAC/GL 2-1985). Rome: FAO.
- FAO (2009b) United Nations Food and Agriculture Organisation. Codex Guidelines for Use of Nutrition and Health Claims (CAC/GL 23-1997). Rome: FAO.
- FAO (2016) Codex Alimentarius; understanding codex.
- Fatimah S., Ismail N. and Tee E. (2010) Consumer understanding and preferences for different nutrition information panel formats. Malaysian journal of nutrition 16(2).
- FDA (1994) Guide to Nutrition Labelling and Education Act (NLEA) Requirements. Silver Spring, MD: Division of Field Investigations, Office of Regional Operations, Office of Regulatory Affairs, US Food & Drug Administration
- FDA (1999) Definition of "Healthy Food", Medical Dictionary.
- Feunekes G.I., Gortemaker I.A., Willems A.A., Lion R. and Van Den Kommer M. (2008) Front-of-pack nutrition labelling: testing effectiveness of different nutrition labelling formats front-of-pack in four European countries. Appetite 50(1), 57-70.
- Fitzherbert E.B., Struebig M.J., Morel A., Danielsen F., Brühl C.A., Donald P.F. and Phalan B. (2008) How will oil palm expansion affect biodiversity? Trends in ecology & evolution 23(10), 538-545.
- Foster G.D., Wyatt H.R., Hill J.O., McGuckin B.G., Brill C., Mohammed B.S., Szapary P.O., Rader D.J., Edman J.S. and Klein S. (2003) A randomized trial of a low-carbohydrate diet for obesity. New England Journal of Medicine 348(21), 2082-2090.
- Food Standard Agency (2009) Qualitative research to explore people's use of food labelling information, Ipsos MORI. .



- Gadema Z. and Oglethorpe D. (2011) The use and usefulness of carbon labelling food: a policy perspective from a survey of UK supermarket shoppers. *Food Policy* 36(6), 815-822.
- Garretson J.A. and 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.
- Geiger C., Wyse B., Parent C. and Hansen R. (1991) Review of nutrition labeling formats. *Journal of the American Dietetic Association* 91(7), 808-812, 815.
- Graham D.J. and Jeffery R.W. (2011) Predictors of Nutrition Label Viewing During Food Purchasing Decision Making: An Eye Tracking Investigation. *Public health nutrition* 15(2), 189-197.
- Grunert K.G. and 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., Wills J.M. and 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.
- Guthrie J.F., Fox J.J., Cleveland L.E. and Welsh S. (1995) Who Uses Nutritional Labelling, and What Effect Does Label Use Have on Diet Quality? . *Journal of Nutrition Education* 27(4), 163–172.
- Guthrie J.F. and Saltos E.A. (1995) Personal characteristics and fat intakes of individuals who use food labels to check the fat content of foods. *Journal of the American Dietetic Association* 95(9), A66.
- Haldeman L., Pérez-Escamilla, R., Ferris, A. M., Drake, L., Himmelgreen, D., Bonello, H., ... & Romero-Daza, N. (2000) Development of a color-coded



bilingual food label for low-literacy Latino caretakers. *Journal of Nutrition Education* 32(3), 152-160.

Hall C. and Osses F. (2013) A review to inform understanding of the use of food safety messages on food labels. *International Journal of Consumer Studies* 37(4), 422-432.

Hansen T., Thomsen T.U. and Beckmann S.C. (2013) Antecedents and consequences of consumers' response to health information complexity. *Journal of Food Products Marketing* 19(1), 26-40.

Hawkes C. (2004) Nutrition labels and health claims: the global regulatory environment. World Health Organization.

Hawkes C. (2006) Uneven dietary development: linking the policies and processes of globalization with the nutrition transition, obesity and diet-related chronic diseases. *Globalization and health* 2(1), 4.

Health Canada (2010) Nutritional Labelling.

Heilbronn L., Noakes M. and Clifton P. (2001) Energy restriction and weight loss on very-low-fat diets reduce C-reactive protein concentrations in obese, healthy women. *Arteriosclerosis, thrombosis, and vascular biology* 21(6), 968-970.

Heimbach J.T. (1981) Defining the problem: The scope of consumer concern with food labeling. *ACR North American Advances*.

Herring D., Britten P., Davis C. and Tuepker K. (2002) Serving Sizes in the Food Guide Pyramid and on the Nutrition Facts Label: What's Different and Why? . *Family Economics & Nutrition Review* 12(1), 71.

Hieke S. and Taylor C.R. (2012) A critical review of the literature on nutritional labelling. *Journal of Consumer Affairs* 46(1), 120-156.



- Hoback J. (2008) Inside the mind of the consumer. *Natural Foods Merchandiser* 295-18.
- Hoffman K.D., Czinkota M.R., Dickson P.R., Dunne P., Griffin A., Hutt M.D., Krishnan B.C., Lusch R.F., Ronkainen I.A., Rosenbloom B., Sheth J.N., Shimp T.A., Siguaw J.A., Simpson P.M., Speh T.W. and Ur-Bany J.E. (2005) *Marketing Principles and Best Practices*, 3rd ed. Mason, Ohio: Thomson.
- Huang T.T.-K., Kaur H., McCarter K.S., Nazir N., Choi W.S. and Ahluwalia J.S. (2004) Reading nutrition labels and fat consumption in adolescents. *Journal of Adolescent Health* 35(5), 399-401.
- Hyman D.J., Simons-Morton D.G., Ho K., Dunn J.K. and Rubovits D.S. (1993) Cholesterol-related knowledge, attitudes, and behaviors in a low-income, urban patient population. *American journal of preventive medicine* 9(5), 282-289.
- Jacobs S.A., de Beer H. and Larney M. (2010) 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 Nutr.* 14(3), 510–522
- Jacobs S.A., de Beer H. and 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.
- James W. and others (2004) Overweighth and Obesity. In: *Comparative Quantification of Health Risks: Global and regional burden of disease attributable to selected major risk factors* Geneva, World Health Organization.



- Jensen K., Adams L., Hollis S. and Brooker J. (1996) The new nutrition labels: a study of consumers' use for dairy products. *Journal of Food Distribution Research* 2749-57.
- Jones C.S. (2007) Exploring the factors affecting food choice at restaurants with special emphasis on the roles played by menus, health information, and health icons: Robert Morris University.
- Jones G. and Richardson M. (2007) An objective examination of consumer perception of nutrition information based on healthiness ratings and eye movements. *Public health nutrition* 10(3), 238-244.
- Josiam B. and Foster C. (2009) Nutritional information on restaurant menus: Who cares and why restaurateurs should bother. *International Journal of Contemporary Hospitality Management* 21(7), 876-891.
- Jun S., Kwon S., Park H., Kim S., Kwon K. and Jung H. (2009) Consumers' use and demand of restaurant foods nutrition labeling. *J Consumer studies* 20(2), 279-306.
- Kahn B.E. and Wansink B. (2004) The influence of assortment structure on perceived variety and consumption quantities. *Journal of consumer research* 30(4), 519-533.
- Kapsak W.R., Schmidt D., Childs N.M., Meunier J. and White C. (2008) Consumer perceptions of graded, graphic and text label presentations for qualified health claims. *Critical Reviews in Food Science and Nutrition* 48(3), 248-256.
- Kasapila W. and Shawa P. (2011) Use and understanding of nutrition labels among consumers in Lilongwe (Malawi). *African Journal of Food, Agriculture, Nutrition and Development* 11(5), 5171-5186.





- Keenan D.P., AbuSabha R. and Robinson N.G. (2002) Consumers' understanding of the Dietary Guidelines for Americans: insights into the future. *Health education & behavior* 29(1), 124-135.
- Kempen E.L., Muller H., Symington E. and Van Eeden T. (2012) A study of the relationship between health awareness, lifestyle behaviour and food label usage in Gauteng. *South African Journal of Clinical Nutrition* 25(1), 15-21
- Kent R.A. (2007) *Marketing Research: Approaches, methods and applications in Europe*. London: Thomson Learning.
- Kim J.Y., Kang E.J., Kwon O. and Kim G.-H. (2010) Korean consumers' perceptions of health/functional food claims according to the strength of scientific evidence. *Nutrition research and practice* 4(5), 428-432.
- Kim S., Nayga R.M.J. and Capps O. (1999) The effect of new food labelling on nutrient intakes: an endogenous switching regression analysis. . Annual Meeting of the American Agricultural Economics Association
- Kim S.Y., Nayga Jr, R. M., & Capps Jr, O. (2000) The effect of food label use on nutrient intakes: an endogenous switching regression analysis *Journal of Agricultural and resource Economics* 215-231
- Kimura A., Wada Y., Tsuzuki D., Goto S.I., Cai D. and Dan I. (2008) Consumer valuation of packaged foods. Interactive effects of amount and accessibility of information. *Appetite* 51(3), 628-634.
- Kish L. (1965) *Survey Sampling*. New York: John Wiley and Sons.
- Klopp P. and MacDonald M. (1981) Nutrition labels: an exploratory study of consumer reasons for nonuse. *Journal of Consumer Affairs* 15(2), 301-316.



- Kozup J., Burton S. and Creyer E.H. (2006) The provision of trans fat information and its interaction with consumer knowledge. *Journal of Consumer Affairs* 40(1), 163-176.
- Kreuter M.W., Brennan L.K., Scharff D.P. and Lukwago S.N. (1997) Do nutrition label readers eat healthier diets? Behavioral correlates of adults' use of food labels. *American journal of preventive medicine* 13(4), 277-283.
- Kumar S. and Pandit A. (2008) Food Labels: Assessing Awareness and Usage Level of Indian Consumer and Influences on Food Buying Behavior. IIML WPS 2008-09/15
- Kumekpor T.K.B. (1993) *Research Methods and Techniques of Social Research*. Accra: Sonlife Press and Services.
- Lähtenmäki L. (2013) Claiming health in food products. *Food Quality and Preference* 27(2), 196-201.
- Lähtenmäki L., Lampila P., Grunert K., Boztug Y., Ueland Ø., Åström A. and Martinsdóttir E. (2010) Impact of health-related claims on the perception of other product attributes. *Food Policy* 35(3), 230-239.
- Lasztity R., Petro-Turza M. and Foldesi T. (2004) History Of Food Quality Standards, in *Food Quality and Standards*, [Ed. Radomir Lasztity], in *Encyclopedia of Life Support Systems (EOLSS)*, Developed under the Auspices of the UNESCO, Oxford: Eolss Publishers [<http://www.eolss.net>].
- Layman D.K., Boileau R.A., Erickson D.J., Painter J.E., Shiue H., Sather C. and Christou D.D. (2003) A reduced ratio of dietary carbohydrate to protein improves body composition and blood lipid profiles during weight loss in adult women. *The Journal of nutrition* 133(2), 411-417.



- Leech M. (2006) The Industry's Role in Food and Health. *Journal of the Institute of Food Science and Technology* 20(2), 11.
- Lewis J.E., Arheart K.L., LeBlanc W.G., Fleming L.E., Lee D.J., Davila E.P., Cabañ-Martinez A.J., Dietz N.A., McCollister K.E., Bandiera F.C. and Clark J.D.J. (2009) Food Label Use and Awareness of Nutritional Information and Recommendations Among Persons with Chronic Disease<sup>1-3</sup> *American Journal of Clinical Nutrition* 90:1351-1357.
- Li K.K., Concepcion R.Y. and al. Lee H et al. (2012) An Examination of Sex Differences in Relation to the Eating Habits and Nutrient Intakes of University Students. *Journal of Nutrition Education & Behaviour* 44:246-250.
- Lin C.-T.J. and Lee J.-Y. (2003) Dietary fat intake and search for fat information on food labels: New evidence. *Consumer Interests Annual* 491-3.
- Lin C.-T.J., Lee J.-Y. and Yen S.T. (2004) Do dietary intakes affect search for nutrient information on food labels? *Social Science & Medicine* 59(9), 1955-1967.
- Liu R., Hoefkens C. and Verbeke W. (2015b) Chinese consumers' understanding and use of a food nutrition label and their determinants. *Food Quality and Preference* 41:103-111.
- Lokesh K. (1997) *Methodology of Educational Research*. Vishal Printer, Delhi-110032
- Save the Children (UK). (2001) [www.Crin.org.Pdf](http://www.Crin.org.Pdf), 5p. 89-93) Country Report of Ethiopia
- Loureiro M.L., Gracia A. and Nayga Jr R.M. (2006) Do consumers value nutritional labels? . *European Review of Agricultural Economics* 33(2), 249-268



- Ma R.C.W., Ko G.T.C. and Chan J.C.N. (2008) Health hazards of obesity: An overview. In: Obesity: Science and Practice G. Williams and G. Frühbeck, eds. : John Wiley and Sons, Ltd.
- Madrigal D. and McClain B. (2012) Strengths and weaknesses of quantitative and qualitative research. UX matters.
- Magnotti M. and Futterweit W. (2007) Obesity and the polycystic ovary syndrome. Medical Clinics of North America 91(6), 1151-1168
- Mahgoub S.E., Lesoli P.P. and Gobotswang K. (2007) Awareness and Use of Nutrition Information on Food Packages among Consumers in Maseru (Lesotho). African Journal, Of Food, Agriculture, Nutrition and Development 7(6), 1-16.
- Mannell A., Brevard P., Nayga Jr R., Combris P., Lee R. and Gloeckner J. (2006) French consumers' use of nutrition labels. Nutrition & Food Science 36(3), 159-168.
- Marietta A.B., Welshimer K.J. and 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.
- Mayer J.A., Maciel T.L., Orlaski P.L. and Flynn-Polan G. (1998) Misleading nutrition claims on cracker packages prior to and following implementation of the nutrition labeling and education act of 1990. American Journal of Preventive Medicine 14:189-195.
- Mazis M.B. and Raymond M.A. (1997) Consumer perceptions of health claims in advertisements and on food labels. Journal of Consumer Affairs 31(1), 10-26.



- McArthur L., Chamberlain V. and Howard A.B. (2001) Behaviors, attitudes, and knowledge of low-income consumers regarding nutrition labels. *Journal of health care for the poor and underserved* 12(4), 415-428
- McEachern M.G. and Warnaby G. (2008) Exploring the relationship between consumer knowledge and purchase behaviour of value-based labels. *International Journal of Consumer Studies* 32(5), 414-426.
- Mench J.A. and Tienhoven V.A. (1986) Farm Animal Welfare: Behavioral and physiological studies are providing a basis for the development of innovative housing. *American Scientist* 74(6), 598-603.
- Mhurchu C.N. and Gorton D. (2007) Nutrition labels and claims in New Zealand and Australia: a review of use and understanding. *Australian and New Zealand Journal of Public Health* 31(2), 105-112.
- Michel P.M., Korslund M.K., Finan A. and Johnson J. (1994) Food label reading habits of WIC clients. *Journal of nutrition education and behavior* 26(3), 146-148.
- Miles S., Valovirta E. and Frewer L. (2006) Communication needs and food allergy: a summary of stakeholder views. *British Food Journal* 108(9), 795-802.
- Miller L.M.S. and Cassady D.L. (2015) The effects of nutrition knowledge on food label use. A review of the literature. *Appetite* 92207-216.
- Misra R. (2007) Knowledge, attitudes, and label use among college students *Journal of the American Dietetic Association* 107(12), 2130-2134
- MORI (2010) Qualitative Research to Explore Peoples' Use of Food Labelling Information In Executive Summary Social Science Research Unit



- Murphy M.M., Spungen J.H., Barraji L.M., Bailey R.L. and Dwyer J.T. (2013) Revising the Daily Values May Affect Food Fortification and in Turn Nutrient Intake Adequacy. *Journal of Nutrition* 143(12), 1999-2006
- Nammi S., Koka S., Chinnala K.M. and Boini K.M. (2004) Obesity: an overview on its current perspectives and treatment options *Nutrition Journal* 33
- Nayga Jr. R.M. (1999) Toward an understanding of consumers' perceptions of food labels. *The International Food and Agribusiness Management Review* 2(1), 29-45.
- Nayga Jr. R.M. (2000) Nutrition knowledge, gender, and food label use. *Journal of Consumer Affairs* 34(1), 97-112.
- Nayga Jr. R.M., Lipinski D. and Savur N. (1998) Consumers' use of nutritional labels while food shopping and at home. *Journal of Consumer Affairs* 32(1), 106-120.
- Nayga Jr. R.M. (1996) Determinants of consumers' use of nutritional information on food packages. *Journal of Agricultural and Applied Economics* 28(2), 303-312.
- Naylor R.W., Droms C.M. and Haws K.L. (2009) Eating with a purpose: Consumer response to functional food health claims in conflicting versus complementary information environments. *Journal of Public Policy & Marketing* 28(2), 221-233.
- National Nutrition Surveillance Council (2009) *The Interrelationship between Obesity, Physical Activity, Nutrition and other Determinates*
- National Research Centre of USA (1989) *Diet and Health: implications for reducing chronic disease risk*. Washington, DC: National Academy Press



- Ollberding N.J., Wolf R.L. and Contento I. (2011) Food label use and its relation to dietary intake among US adults. *Journal of the American Dietetic Association* 111(5), S47-S51.
- Onozaka Y., Melbye E.L., Skuland A.V. and Hansen H. (2014) Consumer intentions to buy front-of-pack nutrition labeled food products: The moderating effects of personality differences. *Journal of Food Products Marketing* 20(4), 390-407.
- Patten D., Hodges I. and Lange C. (1994) What's in a Label? New Zealand Consumers' Perspectives on Food Labelling Information. Wellington: Ministry of health.
- Pérez-Escamilla R., Himmelgreen D., Bonello H., González A., Haldeman L., Méndez I. and Segura-Millán S. (2001) Nutrition knowledge, attitudes, and behaviors among Latinos in the USA: influence of language. *Ecology of Food and Nutrition* 40(4), 321-345.
- Peters-Teixeira A. and Badrie N. (2005) Consumers' perception of food packaging in Trinidad, West Indies and its related impact on food choices. *International Journal of Consumer Studies* 29(6), 508-514.
- Petrovici D., Fearne A., Nayga Jr R.M. and Drolias D. (2012) Nutritional Knowledge, nutritional labels, and health claims on food: A study of supermarket shoppers in the South East of England *British Food Journal* 114(6), 768-783
- Philip D., Kristen M. and Emma F. (2010) Public Attitudes Towards, and Use of, General Food Labelling: Social Science Research Unit
- Philip D., Kristen M. and Emma P. (2010a) Evidence review of public attitude towards and use of general food labelling final report.
- Pires G. and Ricardo C. (2008) Product Characteristics and Quality Perception, University at Aut`Onoma De Barcelona.



- Post R.E., Mainous A.G. III, Diaz V.A., Matheson E.M. and Everett C.J. (2010) Use of the nutrition facts label in chronic disease management: results from the National Health and Nutrition Examination Survey *Journal of the American Dietetic Association* 110(4), 628-632
- Prathiraja P.H.K. and Ariyawardana A. (2003) Impact of nutritional labeling on consumer buying behavior *Sri Lankan Journal of agricultural economics* 51.
- Pulos E. and Leng K. (2010) Evaluation of a voluntary menu-labeling program in full-service restaurants. *American Journal of Public Health* 100(6), 1035-1039.
- Putnam J.J. and Weimer J. (1981) Nutrition Information–Consumer’s views. *National Food Review* 14(2), 18-20.
- Qiao Q. and Nyamdorj R. (2010) Is the association of type 2 diabetes with waist circumference or waist to hip ratio stronger than that with body mass index? . *European journal of clinical nutrition* 64 30-34.
- Rasberry C.N., Chaney B.H., Housman J.M., Misra R. and Miller P.J. (2007) Determinants of nutrition label use among college students. *American Journal of Health Education* 38(2), 76-82.
- Rauschnabel P.A., Herz M., Schlegelmilch B.B. and Ivens B.S. (2015) Brands and religious labels: A spillover perspective. *Journal of Marketing Management* 31(11-12), 1285-1309.
- Royal College of Physicians (1983) Obesity Report *Journal of the Royal College of Physicians of London* 173-58.
- Rimal A. (2005) Meat labels: consumer attitude and meat consumption pattern. *International Journal of Consumer Studies* 29(1), 47-54
- Robert M.G. (2004) *Survey Errors and Survey Costs*, ISBN 0-471-67851-1.





- Roberto C.A., Agnew H. and Brownell K.D. (2009) An observational study of consumers' accessing of nutrition information in chain restaurants. *American Journal of Public Health* 99(5), 820-821.
- Roberto C.A., Bragg M.A., Schwartz M.B., Seamans M.J., Musicus A., Novak N. and Brownell K.D. (2012) Facts up front versus traffic light food labels: a randomized controlled trial. *American journal of preventive medicine* 43(2), 134-141.
- Roe B., Levy A.S. and 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* 89-105.
- Rolls B.J. and Bell E.A. (2000) Dietary approaches to the treatment of obesity. *Med Clin North Am* 84401-418.
- Russo J.E., Staelin R., Nolan C.A., Russell G.J. and Metcalf B.L. (1986) Nutrition information in the supermarket. *Journal of Consumer Research* 13(1), 48-70.
- Sabbe S., Verbeke W. and Van D. (2009) Perceived Motives, Barriers and Role of Labelling Information on Tropical Fruit Consumption: Exploratory Findings. *Journal of Food Products Marketing* 15(2), 119-138
- Samant S.S. and Seo H.-S. (2016) Quality perception and acceptability of chicken breast meat labeled with sustainability claims vary as a function of consumers' label-understanding level. *Food quality and preference* 49151-160.
- Sarantakos S. (1998). *Social Research* (2 ed.). Basingstoke: Macmillan.
- Saris W., Astrup A., Grunwald G., Melanson E. and Hill J. (2000) The role of low-fat diets in body weight control: a meta-analysis of ad libitum dietary intervention studies. *International journal of obesity* 24(12), 1545.



- Satia J.A., Galanko J.A. and 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.
- Schlegelmilch B.B., Khan M.M. and Hair J.F. (2016) Halal endorsements: stirring controversy or gaining new customers? *International Marketing Review* 33(1), 156-174.
- Schupp A., Gillespie J. and Reed D. (1998) Consumer awareness and use of nutrition labels on packaged fresh meats: a pilot study *Journal of Food Distribution Research* 2924-30
- Shine A., O'Reilly S. and O'Sullivan K. (1997) Consumer use of nutrition labels *British Food Journal* 99(8), 290-296
- Silayoi P. and Speece M. (2004) Packaging and purchase decisions: An exploratory study on the impact of involvement level and time pressure. *British Food Journal* 106(8), 607-628.
- Silverglade B. and Heller I.R. (2010) Food labeling chaos: the case for reform: Center for Science in the Public Interest.
- Silverglade B.A. (1991) A Comment on" Public Policy Issues in Health Claims for Foods". *Journal of Public Policy & Marketing* 54-62.
- Singh A.S. and Masuku M.B. (2014) Sampling techniques & determination of sample size in applied statistics research: An overview. *International Journal of Economics, Commerce and Management* 2(11), 1-22.
- Skov A., Toubro S., Rønn B., Holm L. and Astrup A. (1999) Randomized trial on protein vs carbohydrate in ad libitum fat reduced diet for the treatment of obesity. *International journal of obesity* 23(5), 528.



- Sloth B., Krog-Mikkelsen I., Flint A., Tetens I., Björck I., Vinoy S., Elmståhl H., Astrup A., Lang V. and Raben A. (2004) No difference in body weight decrease between a low-glycemic-index and a high-glycemic-index diet but reduced LDL cholesterol after 10-wk ad libitum intake of the low-glycemic-index diet. *The American journal of clinical nutrition* 80(2), 337-347.
- Smithers R. (2013) Global Fairtrade sales reach £4.4bn following 15% growth during 2013
- Spronk I., Kullen C., Burdon C. and O'Connor H. (2014) Relationship between nutrition knowledge and dietary intake. *British Journal of Nutrition* 111(10), 1713-1726.
- Steinfeld H. and Wassenaar T. (2007) The role of livestock production in carbon and nitrogen cycles. *Annu. Rev. Environ. Resour.* 32:271-294.
- Steyn N.P., Mann J., Bennett P.H., Temple N., Zimmet P., Tuomilehto J., Lindstrom J. and Louheranta A. (2004) Diet, nutrition and the prevention of type 2 diabetes. *Public health nutrition* 7:147–165.
- Sunelle J.A., Hanli d.B. and Ment L. (2010) Adult consumers understanding and use of information on food labels. A study among consumers living in the Potchefstroom and Klerksdrorp regions, South Africa. .
- Szykman L.R., Bloom P.N. and Levy A.S. (1997) A Proposed Model of the Use of Package Claims and Nutrition Labels. *Journal of Public Policy and Marketing* 16(2), 228-241.
- Taylor C.L. and Wilkening V.L. (2008) How the nutrition food label was developed, part 1: the Nutrition Facts panel. *Journal of the American Dietetic Association* 108(3), 437-442.



The Council of European Communities (1990) Council Directive of 24 September 1990 on nutrition labelling for foodstuffs Official Journal of the European Communities 40-44.

Teisl M.F., Radas S. and Roe B. (2008) Struggles in optimal labelling: how different consumers react to various labels for genetically modified foods. *International Journal of Consumer Studies* 32(5), 447-456.

Tessier S., Edwards C.A. and Morris S.E. (2000) Use and knowledge of food labels of shoppers in a city with a high proportion of heart disease. *Journal of Consumer Studies & Home Economics* 24(1), 35-40.

Tieman M. and Hassan F.H. (2015) Convergence of food systems: Kosher, Christian and Halal. *British Food Journal* 117(9), 2313-2327.

Todd J.E. and Variyam J.N. (2008) The decline in consumer use of food nutrition labels, 1995-2006: United States Department of Agriculture, Economic Research Service.

Tuttle C.R. (2001) Consumer understanding of the food guide pyramid and dietary guidelines. *Journal of Extension* 39(4).

United States Daily Allowance. (2010) *Dietary Guidelines for Americans, 2010* (7th ed.). Washington, DC: Government Printing Office.

Van L., Ellen J.C., Nayga V.J., Rodolfo M. and Verbeke W. (2014) Consumers' valuation of sustainability labels on meat. *Food Policy* 49:137-150.

Van Trijp H.C. and Van der Lans I.A. (2007) Consumer perceptions of nutrition and health claims. *Appetite* 48(3), 305-324.

Varela P., Ares G., Giménez A. and Gámbaro A. (2010) Influence of brand information on consumers' expectations and liking of powdered drinks in central location tests. *Food Quality and Preference* 21(7), 873-880.



- Verbeke W., Pieniak Z., Vermeir I., Bruns K. and Olsen S.O. (2007) Consumer interest in fish information and labelling: exploratory insights. *Journal of International Food & Agribusiness Marketing* 19(2-3), 117-141.
- Verhagen H., Vos E., Francé S., Heinonen M. and van Loveren H. (2010) Status of nutrition and health claims in Europe. *Archives of Biochemistry and Biophysics* 501(1), 6-15
- Wandel M. (1997) Food Labelling From a Consumer Perspective. *Br Food J* 99212–219.
- Wang G., Fletcher S.M. and Carley D.H. (1995) Consumer Utilization of Food Labelling as a Source of Nutrition Information. *Journal of Consumer Affairs* 29368–380.
- Wang L., Ding L., Jones C.A. and Jones R.S. (2002) Drosophila Enhancer of zeste protein interacts with dSAP18. *Gene* 285(1), 119-125.
- Wansink B. and Chandon P. (2006) Can “low-fat” nutrition labels lead to obesity? *Journal of marketing research* 43(4), 605-617.
- Wardle J., Parmenter K. and Waller J. (2000) Nutrition knowledge and food intake. *Appetite* 34(3), 269-275.
- Washi S. (2012) Awareness of Food Labelling Among Consumers in Groceries in Al-Ain, United Arab Emirates. *International Journal of Marketing Studies* 4(1).
- Watson L.C., Kwon J., Nichols D. and Rew M. (2009) Evaluation of the nutrition knowledge, attitudes, and food consumption behaviors of high school students before and after completion of a nutrition course. *Family and Consumer Sciences Research Journal* 37(4), 523-534.
- World Cancer Research Fund. (2007) Food, Nutrition, Physical Activity and the Prevention of Cancer: a Global Perspective In Second Expert Report London



- Whitney E. and Rolfes S.R. (2007) Understanding nutrition: Cengage Learning.
- WHO (2000) Obesity: Preventing and managing the global epidemic. Report of World Health Organization Consultation on Obesity. Geneva
- WHO (2003) Diet, nutrition and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation. In WHO Technical Report Series. Geneva, Switzerland: : World Health Organization.
- WHO (2004) Appropriate body mass index for Asian populations and its implications for policy and intervention strategies. The Lancet 363:157-163
- WHO (2008) 2008-2013 Action Plan for the global strategy for the prevention and control of non-communicable diseases.
- Wier M., O'Doherty J.K., Andersen L. and Millock K. (2008) "The Character of Demand in Mature Organic Food Markets: Great Britain and Denmark Compared". Food Policy 33(5), 406-421
- Wiles N.L., Paterson M. and Meaker J.L. (2009) What Factors Determine the Use of the Nutrition Information on the Food Label When Female Consumers from Pietermaritzburg Select And Purchase Fat Spreads? . S Afr J Clin Nutr 22(2), 69-73.
- Williams M. (2007) Avatar watching: participant observation in graphical online environments. Qualitative Research 7(1), 5-24.
- Williams P. (2005) Consumer understanding and use of health claims for foods. Nutrition reviews 63(7), 256-264.
- Wills J.M., genannt Bonsmann S.S., Kolka M. and Grunert K.G. (2012) European consumers and health claims: attitudes, understanding and purchasing behaviour. Proceedings of the Nutrition Society 71(2), 229-236.



**APPENDIX**

UNIVERSITY FOR DEVELOPMENT STUDIES

SCHOOL OF ALLIED HEALTH SCIENCES

DEPARTMENT OF COMMUNITY HEALTH

CONSUMER AWARENESS AND USAGE OF NUTRITION LABELS IN

SAGNARIGU DISTRICT

Respondent's code: .....

1. Sex

[i] Male

[ii] Female

2. Age

[i] Less than or equal to 23 years

[ii] 24-28

[iii] 29-35

[iv] 36-42

[v] Greater than or equal to 43 years

3. What is your ethnicity/tribe? .....

4. What is your level of formal education?

[i] Basic education

[ii] Secondary school

[iii] Vocational school

[iv] Technical school

[v] Certificate/Diploma

[vi] Degree/Postgraduate degree

5. What is your marital status?



[i] Never married      [ii] Currently married      [iii] Previously married

6. Where do you live? .....

7. What is the size of your household? .....

8. How many members of your household are less than 18 years? .....

9. What is your household composition?

[i] Single parent with child/children

[ii] Couple with no child/children

[iii] Couple with children

[iv] Others (specify).....

10. What is your employment status?

[i] Unemployed      [ii] Student      [iii] Employed (employee)

[iv] Self-employed      [v] Retired      [vi] Homemaker

[vii] Other (specify) .....

11. What is your average monthly income?

[i] GH¢100-GH¢500

[ii] GH¢501-GH¢1000

[iii] More than GH¢1000

12. Which of the following conditions apply to you?

[i] Food allergy/intolerance      [ii] Diabetes      [iii] Cancer

[iv] Hypertension      [v] High cholesterol      [vi] Dental problems

[vii] Gout      [viii] Kidney disease      [ix] Ulcer

[x] Other (specify).....

13. Do you have any family history of any of the above conditions?

[i] Yes      [ii] No      [iii] Don't know





14. If yes, which of the above conditions?.....
15. How do you perceive your current weight status?
- [i] I am satisfied with my weight
  - [ii] I wish I could gain a little weight
  - [iii] I wish I could lose a little weight
  - [iv] Don't know
16. Are you on a special diet prescribed by a doctor or nutritionist/dietitian for a health condition?
- [i] Yes
  - [ii] No
17. What is your main source of nutrition information (choose only one response)?
- [i] Television
  - [ii] Radio
  - [iii] Newspapers
  - [iv] Books and magazines
  - [v] Nutritionist/dietician
  - [vi] Other health professionals
  - [vii] Family and Friends
  - [viii] Internet
  - [ix] Others (specify).....
18. Are you aware that some pre-packaged foods carry a food label?
- [i] Yes
  - [ii] No
19. Have you ever noticed or seen the food label on any pre-packaged food?
- [i] Yes
  - [ii] No
20. Are you aware that some food labels contain nutrition information about the food?
- [i] Yes
  - [ii] No
21. Have you ever noticed or seen the nutrition information on any pre-packaged food?
- [i] Yes
  - [ii] No
22. How would you rate your level of understanding of the nutrition information provided on food Labels?



[i] High                      [ii] Moderate              [iii] Low

If you answered 'Yes' to any of the questions 18- 21 then complete questions 23-30.

If you answered 'No' to questions 18-21 then skip questions 23-30.

23. Do you ever read food labels on pre-packaged foods that you buy?

[i] No, never                      [ii] Yes, sometimes              [iii] Yes, often

24. a. If you answered 'sometimes' or 'often' to Question-23, what information are you most likely to look out for when you read a food label (choose all that apply)?

- [i] Country of origin                      [ii] Brand name
- [iii] Manufacture Date                      [iv] Expiry Date
- [v] Additives                      [vi] Nutrition/health claims
- [vii] Description of the Food                      [viii] Nutrition Information
- [ix] List of Ingredients                      [x] Other (Specify).....

b. If you answered 'Never' to Question 23, Why not?

.....  
.....

25. Have you ever used nutrition information on food labels on the pre-packaged foods that you buy?

[i] No, I never do                      [ii] Yes, sometimes                      [iii] Yes, often

26. If "Never" to Question-20, what is your main reason for not using the nutrition information on pre-packaged foods that you buy?

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27. If you answered 'sometimes' or 'often' to Question-20, what is your main reason for using the nutrition information on pre-packaged foods that you buy?



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28. What information are you most likely to use when you read or look at a nutrition label? (choose all that apply)

- [i] Total Energy (total calories)    [ii] Carbohydrate
- [iii] Protein                    [iv] Fats                    [v] Vitamins and minerals
- [vi] Cholesterol    [vii] Fibre                    [viii] Saturated Fats
- [ix] Sugars                    [x] Sodium/salt
- [xi] Others (Specify).....

29. How do reading nutrition labels help you when deciding on what pre-packaged foods to buy? (choose only one response)

- [i] To distinguish between different products
- [ii] To help avoid some nutrients
- [iii] To select foods which contain nutrients I need
- [iv] To help me to compare the nutrient content of different products
- [v] Others (specify)

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.....

30. Under what circumstances do you usually use the nutrition information provided on pre-packaged foods? (choose only one response)

- [i] All circumstances                    [ii] When buying a new product
- [iii] When buying a new version of an existing product
- [iv] Other (specify)

.....  
.....



31. Do you think it is necessary for pre-packaged foods to carry a food label with nutrition information?

[i] Yes

[ii] No

[iii] Don't know

32. Why "Yes" or "No"?

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