AN EXPLORATION INTO INDIAN'S PERCEPTION ON FOOD PRODUCTS NUTRITIONAL LABELING

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Abstract

Healthy eating helps improve our health and reduce the risk of many chronic diseases .Labeling is an important component of product package. Food labels found on most pre-packaged food and drinks give important information to help us make healthy choices. The nutrition facts label is a label required on most packaged food in many countries. This paper examined the students' perception towards nutritional labeling in a South Indian context through personal interviews of 220 respondents using a structured questionnaire. Kolmogorov-Smirnov test, Shapiro-Wilk and Box plot jointly revealed that there was no normality in the distribution of the data for the identified questionnaire components. Kruskal Wallis test which was performed to identify the various dimensions among a set of nutritional labeling parameters using sex and age of the respondents as the grouping variable revealed that there were no significant differences in the perception of nutritional labeling of packed food products.

Keywords: Consumer, Labeling, Nutrition, Purchase

1. INTRODUCTION

Labeling is the display of information about a product on its container, packaging, or the product itself. It has been argued that labelling is necessary for communication.However, the use of the term labeling is often intended to highlight the fact that the label is a description applied from the outside, rather than something intrinsic to the labelled thing. For several types of consumer and industrial products, the type and extent of information that must be imparted by a label is governed by the relevant safety and shipping laws.Labels can improve financial competence by helping consumers assign expenditure towards more satisfying products (Golan et al., 2001; Wansink et al., 2004). Food labels can renovate the seeking attributes, and can persuade a person's awareness, qualitative inclination and prior beliefs.

The nutritional labeling literature has grown significantly in recent years.The nutrition facts label (also known as the nutrition information panel, and various other slight variations) is a label required on most packaged food in many countries. It is a panel found on a package of food which contains a variety of information about the nutritional value of the food item. There are many pieces of information which are

standard on most food labels, including serving size, number of calories, grams of fat, included nutrients, and a list of ingredients. This information helps people who are trying to restrict their intake of fat, sodium, sugar, or other ingredients, or those individuals who are trying to get enough of the healthy nutrients such as calcium or Vitamin C. The label provides each item with its approximate percent daily value, generally based on a 2,000 calorie diet.Nutritional labels can curtail the entire notion of healthy consuming. It helps to keep track of the quantity of fat and sugar, sodium and fiber, protein and carbohydrates. It also permits consumers to make a well-versed decision of a product's overall worth (Satin, 2002).

Public health and food safety are main consumer rights in the European Union (Prejmerean, 2006). However considering India as a growing processed and packaged food market, the analysis of governments food safety policies are only at a budding stage. The packed food products are now depicting the manufacturer's information regarding 'healthy eating fallacy' of packed food products. Today the competition in the Indian market is so strong that different manufacturers promote their product with diverse nutritional claims and nutritional information. But are consumers really influenced by nutritional labeling? Are consumers getting confused with information overload? Various studies in foreign countries revealed that consumers are highly heath conscious and nutritional labeling on food products mainly influenced their purchase pattern. Is nutritional labeling relevant to an Indian context? The present study examined such a senaraio.The study dwelled on the young consumers' perceptions towards nutritional labeling of food products south Indian context.

2. LITERATURE REVIEW

Guthrie et al. (1995) described that information on the characteristics of individuals using nutrition labeling and the effects of label use on diet quality could be utilized to guide the development of more efficient consumer education programs. For their study, data from the U.S. Department of Agriculture's (USDA) 1989 Continuing Survey of Food Intakes by Individuals (CSFII) and Diet and Health Knowledge Survey (DHKS) were utilized to identify socioeconomic, demographic, and health-related distinctiveness and the nutrition-related information and attitudes that were allied with label use. Their approach employed a theoretical model of determinants of label use that was inclined on an economic model of information search. Characteristics related to be directly associated with the likelihood of using nutrition labeling were having at least some college education, being female, living with others rather than living alone, being more well-informed about nutrition, believing that following the principles of the dietary guidelines for Americans is important, and being more anxious about nutrition and product safety and

less about taste when shopping for food. Having found out the characteristics of label users, this information was used in a model of nutrient use that was based on consumer demand theory. A selectivity analysis was also conducted to correct for potential self-selection bias on label use. Label use were found to be associated with the consumption of diets that were higher in vitamin C and lower in cholesterol.

Drichoutis et al. (2006) explained in his work that diet-related health problems had increased dramatically over the last few years. Consequently, they mentioned that nutritional labeling had emerged as an important aspect of consumers' food purchase decisions. Nutritional content in food products was considered to be a belief attribute. However, they also mentioned that if trustworthy nutritional labels were available, nutritional labels could function as a search characteristic. They also opined that the regulatory environment in some countries (e.g. USA, Australia etc.) had long recognized the prospective of standardized on-pack nutrition information and has mandated the presence of nutritional labels on all processed food products. They further added that EU are also contemplating similar mandatory nutritional labeling regulations. In their paper they discussed more about the important literature and addressed some specific issues regarding the determinants of label use, the debate on mandatory labeling, the label formats preferred by consumers, and the effect of nutrition label use on purchase and dietary behaviour.

Legault et al. (2004) discussed the food label as an important tool for improving the public's understanding of the health benefits of following a nutritious diet. They mentioned in their literature that the Center for Food Safety and Applied Nutrition (CFSAN) of the Food and Drug Administration (FDA) has continued to study food labels with its Food Label and Package Survey (FLAPS). They found that the data from the 2000–2001 FLAPS characterized various aspects of the labeling of processed, packaged foods, including nutrition labeling and various types of label claims. Their secondary data investigation revealed that the FDA used a multistage, representative sample of food products from the Information Resources Inc (IRI) 1999 supermarket database as the basis for the FLAPS sample. The final FLAPS database consisted of 1,281 foods. An estimated 98.3% of FDA-regulated processed, packaged foods sold annually had nutrition labels, with an additional 1.7% of products exempt from nutrition labeling requirements. Health claims (4.4%), structure/function claims (6.2%), and nutrient content claims (49.7%) were identified on food labels. Apart from the resource, this survey provided CFSAN in assessing health and nutrition information on the food label, registered dietitians and other .The study also helped health professionals to use FLAPS data to assist consumers in choosing a more nutritious diet to improve their health and well-being.

Driskell et al. (2008) through their cross-sectional study examined the influence of the nutritional labeling of adults eating in dining halls at a Midwestern University and to assess differences between sexes. Dining hall patrons completed a descriptive 15-item written questionnaire that examined the use and nonuse of Nutrition Bytes, which contained much of the information included in the Nutrition Facts label. Results revealed that a significantly higher percentage of women than men patrons reported using Nutrition Bytes labels (P<0.001). Prime reasons for using Nutrition Bytes labels were: general knowledge, concern about overall health, calorie counting, and concern about a certain nutrient(s). Major reasons for not using Nutrition Bytes labels were: consumers were not willing to change their mind about food items selected and they did not have enough time. Reasons given by men and women for using or not using Nutrition Bytes labels were similar. It was found that significantly higher percentages of women than men using Nutrition Bytes labels indicated being interested in having serving sizes (P<0.005) and ingredients (P<0.0005) listed, whereas higher percentages of men than women indicated being interested in having protein listed (P<0.05). The percentages of consumers who indicated nearly always and sometimes changing their food choices after reading Nutrition Bytes labels inside the dining halls were 12% and 80%, respectively, whereas 23% and 65%, respectively, indicated changing their food choices after reading the nutrition label when eating outside the dining halls. It was concluded that Nutrition Bytes labeling had positive impact on food choices of these adult dining hall patrons.

Brecher et al. (2000) in their article highlighted the work carried out by the Food and Drug Administration (PDA). They mentioned that in 1994 PDA nutrition labeling rules were implemented and in 1997 the Food Label and Package Survey characterized various aspects of the labeling of processed, packaged foods, including nutrition labeling, health claims, and nutrient content claims. They mentioned that the PDA identified 58 product groups and selected those product classes from the database that accounted for 80% of sales in each group. From each product class, FDA selected the 3 top-selling product brands and randomly selected follower brands. Based on label information from a final sample of 1,267 food products, FDA determined the percentage of products sold that bear Nutrition Facts labels, health claims, and nutrient content claims. The purpose of their article was to present FDA findings regarding the status of food labels 3 years after implementation of the nutrition labeling rules.It was found out that the Nutrition-labeled products accounted for an estimated 96.5% of the annual sales of processed, packaged foods. An additional 3.4% of products sold were exempt from labeling regulations. Nutrient content claims and health claims appeared on an estimated 39% and 4%, respectively, of the products sold.

Williams (2005) in his work mentioned that health claims for foods are permitted in number of countries, but there are very few studies evaluating their effect on purchase behavior and consumer health. He mentioned that there are significant differences between countries but, in general, consumers saw health claims as useful; they preferred short, concise wording rather than long and complex claims; and they believed that claims should be approved by the government. Consumers viewed a food as healthier if it carried a health claim and this "halo" effect discouraged them from seeking further nutrition information. Consumers did not clearly distinguish between nutrient content, structure-function, and health claims. There were also some evidence that the use of health claims improved the quality of dietary choices and knowledge of diet-disease relationships.

Golan et al. (2001) in their article mentioned the federal intervention in food labeling with the aim of achieving a social goal such as improving human health and safety, mitigating environmental hazards, averting international trade disputes, or supporting domestic agricultural and food manufacturing industries. Economic theory suggested that mandatory food-labeling requirements were best suited to alleviating problems of asymmetric information and are rarely effective in redressing environmental or other spillovers associated with food production and consumption. The theory also suggested that the appropriate role for government in labeling depended on the type of information involved and the level and distribution of the costs and benefits of providing that information. This report traced the economic theory behind food labeling and presented three case studies in which the government has intervened in labeling and two examples in which government intervention has been proposed.

Cowburn and Stockley (2004) analysed the secondary data and concluded that enhancement in nutrition labeling could make a little but critical role towards making the existing point-of-purchase environment more favorable .They opined that the selection of healthy choices and interpretational aids can assist consumers examine the nutrient contribution of specific foods in general diet. Jones and Richardson (2006) investigated the client's insight of nutrition label using two determinants: eye movements and healthiness ratings. The results indicated that the clients had a lack of perceptive on how to understand nutrition information for normal labels. The traffic light model helped to restructure this trouble by representing essential nutrients to which the clients noticed. Pavol & Jamal(2010) described a research conducted on Slovakian consumers mentioning how fast food consumer's in Slovakia were influenced by sensory factors of products, such as great tasting meal, touch, smell, look, price, preferencesand consumption of fast foods.Grunert and Wills (2007) examined the secondary data and concluded that there were widespread interests for nutrition information on food packages among the customers. The results indicated that consumers usually understood the association between food

and health, liked the design of easy front of pack information, documented the most common signposting designs, had slight insight on how labeling information would be used in a real-world shopping situation, and how it would persuade consumers' dietary patterns.

Lion and Van (2008) showed the impact of varied labeling layouts on consumer easiness (understanding, liking and trustworthiness) and also calculated the outcomes of the labeling formats on decision-making. They concluded that respondents needed significantly less time to assess simpler front-of-pack labeling, and it appeared more suitable in shopping circumstances in contrast to the more difficult labeling formats. Borgmeier and Westenhoefer (2009) evaluated the buyer's interest towards nutrition labeling, nutritional claims, the information consumers believed to be indispensable during their purchasing choices and the core uniqueness of those consumers paying attention in nutrition claims and nutrition labeling use. The results portrayed that nutrition labeling was a vital tool for product choice. But a greater part of the respondents did not use the labeled information at the time of food shopping. Consumers using nutrition labeling mentioned a higher interest in food safety concerns, used specialists as their resource of information and had specific dietary habits Consumers concerned about nutrition claims showed substantial links with features influencing purchasing behaviour such as price, brand, certification etc.

Vyth et al. (2010) examined a sample of Dutch consumers to test the real use of nutrition label at the point of purchase. The results showed that the 'Choices logo' played an important role in the food purchases of people who were health-conscious and weight-conscious. Drewnowski et al. (2010) used conjoint analysis to understand customers' perception of nutrition content claim. The authors claimed that the buyer perception of healthfulness was strongly motivated by the presence of protein, fibre, calcium and vitamin C and by the declaration of absence of saturated fat and sodium. Roberto et al. (2011) examined the amount to which products tagged 'Smart Choices' could be classified as healthy choices on the base of the Nutrient Profile Model (NPM), a non-industry-developed, authorized nutritional standard. It was found that there was considerable danger in nutritional criteria developed and executed by the food industry; even with scientists engaged, leading to mislead labeling. Van et al. (2012) monitored the capability of consumers to locate and use food label information; reviewed the exactness of nutrient content claims; reviewed which health/nutrient claims were permissible; and recognized symbols on food labels. The results indicated that most respondents showed the skill to locate and use label information, identify symbols and some nutrient content claims, but an inability to identify some permitted health/nutrient claims and fake claims.

It is evident from the review of literature that nutritional labeling is of paramount importance and has intense influence on purchase behaviour .However,the majority of the studies are outside our country. So far, no attempt has been made to understand this pattern in an Indian context .Thus the present study will dwell in examining young consumers' perception of nutritional labeling in South Indian perspective.

3. RESEARCH METHODOLOGY

The study was descriptive in nature and elicited responses from young consumers of Kannur district of Kerala State, India. Convenient sampling was used as the sampling technique and a total of 220 responses were collected from various schools and colleges. Primary data was collected from these students by means of a questionnaire. The questionnaire was structured to capture various aspects of nutritional labeling and young consumers' perceptions. 60% of the respondents were females. The mean age group of the respondents was 19 years.

The Kolmogorov-Smirnov (K-S) test and Shapiro-Wilk test are commonly used to test the normality of the data. The K-S test is based on the empirical distribution function (EDF), which is defined as a set of N independent observations $x1, x2 …xn$ with a common distribution function F(x). The Shapiro-Wilk W is the ratio of the best estimator of the variance to the usual corrected sum of squares estimator of the variance. The statistic is positive and less than or equal to one. Being close to one indicates normality. The nine identified questions used in the survey were first treated with both Kolmogorov-Smirnov and Shapiro-Wilk tests to confirm the normality of the data. Kruskal–Wallis, one-way analysis of variance by ranks is a non-parametric method for testing whether samples originate from the same distribution. It is used for comparing more than two samples that are independent, or not related. All the 9 variables identified were subjected to Kruskal Wallis test .Data obtained through the questionnaires were analyzed using SPSS software package (Version 12) in 95 percent confidence interval.

The Hypotheses of the entire study were designed as follows.

HI: There was no normality in the distribution of the data.

H2:   The perception of nutritional labeling was insignificant as far as sex of the respondents were concerned.

H3:   The perception of nutritional labeling was insignificant as far as age of the respondents were concerned.

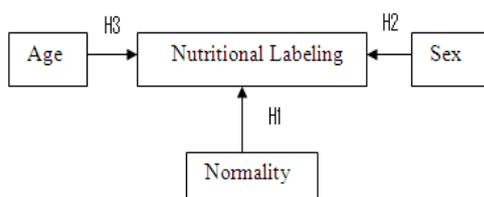The conceptual framework of the study is shown in Figure 1

FIGURE1 - CONCEPTUAL FRAMEWORK

4. RESULTS AND DISCUSSIONS

TABLE 1 - RELIABILITY STATISTICS

Cronbach's Alpha	N of Items
.648	9

Source: Survey data

Cronbach alpha was used for measuring the reliability of the questionnaire. Malhotra (2008) stated that the coefficient varies from 0-1.Value of 0.6 or less generally signifies unsatisfactory internal consistency reliability. Alpha coefficients below 0.6 are weak in reliability, 0.6-0.8 is moderate strong and 0.8-1.0 is very strong in reliability. For the questionnaire used in the study, the amount of Cronbach alpha coefficient was obtained as 0.648.Hence it was concluded that the desired questionnaire enjoyed acceptable reliability level. The box plot and Kolmogorov-Smirnov (K-S) test on 220 cases across nine identified questions/variables yielded the following results as shown in Figure 2 and Table 2 respectively.

TABLE 2 - TESTS OF NORMALITY

Variables	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
I am interested in nutrition	.271	220	.000	.808	220	.000
With regard to packed food purchase, nutrition is highly important	.242	220	.000	.852	220	.000
I feel the amount of information given on labels are adequate	.189	220	.000	.912	220	.000
I am confident about the quality of nutrition information on labels	.197	220	.000	.899	220	.000
When I buy food products for the first time, I often read the labels on the packages	.262	220	.000	.828	220	.000
The information about the content influence my buying decision	.236	220	.000	.898	220	.000
The information about the content on food packages is quite understandable	.268	220	.000	.869	220	.000
I know a lot about nutrition	.237	220	.000	.890	220	.000
I am certain about the accuracy of the nutrition information on food labels	.216	220	.000	.889	220	.000

Source: Survey data
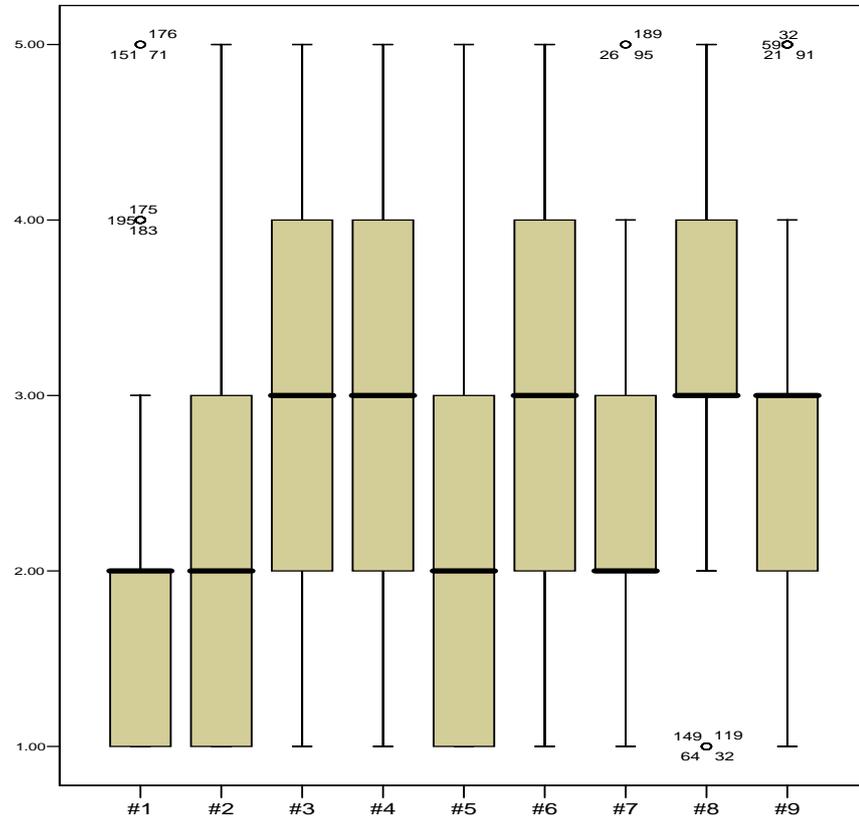
a Lilliefors Significance Correction

FIGURE 2 - BOX PLOT
Source: Survey data

Note:

#1:   I am interested in nutrition

#2:   With regard to packed food purchase, nutrition is highly important

#3:   I feel the amount of information given on labels is adequate

#4:   I am confident about the quality of nutrition information on labels

#5:   When I buy food products for the first time, I often read the labels on the packages

#6:   The information about the content influence my buying decision

#7:   The information about the content on food packages is quite understandable

#8:   I know a lot about nutrition

#9:   I am certain about the accuracy of the nutrition information on food labels

From box plot (Figure 2) it was observed that for variables 'The information about the content on food packages is quite understandable' and 'I know a lot about nutrition', the median was found to be at the bottom of the box indicating a positively skewed distribution for these variables.

For variables named 'I am interested in nutrition' and 'I am certain about the accuracy of the nutrition information on food labels', the median was found to be at the top of the box indicating a negatively skewed distribution for these variables.

A close scrutiny of the seven numbers summary for variables named 'I feel the amount of information given on labels are adequate', 'With regard to packed food purchase', 'Nutrition is highly important', 'I am confident about the quality of nutrition information on labels', 'When I buy food products for the first time I often read the labels on the packages', 'The information about the content influence my buying decision' indicated that the locations of the seven marks on the box plot were unequally spaced. Further, Kolmogorov-Smirnov (K-S) and Shapiro-Wilk tests results from Table 2 yielded $p < 0.05$ for all the cases.

This goes well to conclude that there were clear deviations from the normality pattern of distribution for all the nine variables under study. Hence H1 is accepted. I.e. there was no normality in the distribution of the data across these nine variables.

As there were clear deviations from the pattern of normality, to ascertain H2 and H3, all the variables were subjected to Non Parametric test namely Kruskal Wallis Test. The descriptive statistics and details of the Kruskal Wallis test are as shown in Tables 3, 4 and 5 respectively.

TABLE 3 - DESCRIPTIVE STATISTICS

Variables	N	Mean	Std. Deviation
I am interested in nutrition	220	1.9000	.84885
With regard to packed food purchase, nutrition is highly important	220	2.0682	.95079
I feel the amount of information given on labels are adequate	220	2.8273	1.07150
I am confident about the quality of nutrition information on labels	220	3.2455	1.00398
When I buy food products for the first time, I often read the labels on the packages	220	2.0682	1.06839
The information about the content influence my buying decision	220	2.7455	1.10570
The information about the content on food packages is quite understandable	220	2.5727	.87020
I know a lot about nutrition	220	3.2682	.88925
I am certain about the accuracy of the nutrition information on food labels	220	2.8955	.88260

Source: Survey data

TABLE 4 - TEST STATISTICS AB

Variable	Statistics	Statistics
I am interested in nutrition	Chi-Square	0.390
	df	1
	Asymp. Sig.	0.533
With regard to packed food purchase, nutrition is highly important	Chi-Square	0.335
	df	1
	Asymp. Sig.	0.563
I feel the amount of information given on labels are adequate	Chi-Square	0.872
	df	1
	Asymp. Sig.	0.896
I am confident about the quality of nutrition information on labels	Chi-Square	0.179
	df	1
	Asymp. Sig.	0.896
When I buy food products for the first time, I often read the labels on the packages	Chi-Square	.004
	df	1
	Asymp. Sig.	0.950
The information about the content influence my buying decision	Chi-Square	0.665
	df	1
	Asymp. Sig.	0.415
The information about the content on food packages is quite understandable	Chi-Square	1.127
	df	1
	Asymp. Sig.	0.288
I know a lot about nutrition	Chi-Square	0.959
	df	1
	Asymp. Sig.	0.328
I am certain about the accuracy of the nutrition information on food labels	Chi-Square	0.023
	df	1
	Asymp. Sig.	0.880

Source: Primary data

a)   *Kruskal Wallis Test; b. Grouping Variable: Sex*

Table 4 indicated that the test was insignificant (p > 0.05) for all the nine variables under study. This goes well to show that as far as the sex of the respondents were considered, the perception of nutritional labeling were clearly insignificant. Thus H2 was accepted. I.e. The perception of nutritional labeling was insignificant as far as sex of the respondents were concerned.

b)   *Kruskal Wallis Test; b. Grouping Variable: Age*

Table 5 also indicated that the test was insignificant (p > 0.05) for all the nine variables under study. This goes well to show that as far as the age of the respondents were considered, the perception of nutritional labeling were clearly insignificant. Thus H3 was accepted. I.e. The perception of nutritional labeling was insignificant as far as age of the respondents were concerned.

TABLE 5 - TEST STATISTICS AB

Variable	Statistics	Statistics
I am interested in nutrition	Chi-Square	.004
	df	2
	Asymp. Sig.	0.950
With regard to packed food purchase, nutrition is highly important	Chi-Square	2.379
	df	2
	Asymp. Sig.	0.304
I feel the amount of information given on labels are adequate	Chi-Square	0.245
	df	2
	Asymp. Sig.	0.885
I am confident about the quality of nutrition information on labels	Chi-Square	5.580
	df	2
	Asymp. Sig.	0.061
When I buy food products for the first time, I often read the labels on the packages	Chi-Square	0.390
	df	2
	Asymp. Sig.	0.533.
The information about the content influence my buying decision	Chi-Square	1.917
	df	2
	Asymp. Sig.	0.384
The information about the content on food packages is quite understandable	Chi-Square	4.182
	df	2
	Asymp. Sig.	0.124
I know a lot about nutrition	Chi-Square	0.760
	df	2
	Asymp. Sig.	0.684
I am certain about the accuracy of the nutrition information on food labels	Chi-Square	0.176
	df	2
	Asymp. Sig.	0.916

Source: Primary data

5. CONCLUSIONS

The paper examined student's perception towards nutritional labeling in making informed purchase decisions. The findings revealed that perception on nutritional labeling of packed food products did not significantly vary across age and sex of the respondents.

Limitations and scope for future research

The study was limited to a Northern district of Kerala State; India .The sample size drawn was also small. Future studies may be extended to broader area covering a large number of participants. As packed foods are consumed irrespective of age groups, the research could even be extended to a large number of people. Such an extended study would throw more insights in understanding the significant differences across several demographic factors. The study can even be cut down to specific product

categories or brands. The study can also be extended to understand the difference in nutritional labeling perceptions of consumers (if any) across urban and rural areas and consumer behavior patterns can be interpreted with different methods of analysis such as discriminant analysis, factor analysis, conjoint analysis etc.

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