



## **An Examination of the Impact of Nutrition Facts Panel Perception and Understanding on Food Product Purchase Behaviour and Selection among College -Going Students- A Study of Knowledge Attitude and Practices**

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### **Abstract**

**Purpose:** Nutrition labels are widely used in modern culture as a result of the food industry's quick development, an increase in nuclear families, and a need for convenience in our dietary lives. However, education and exposure to nutrition information can positively influence the perception and understanding of the Nutrition Facts panel, leading to healthier food choices.

**Methodology:** A rapid assessment survey was conducted using pre tested questionnaire through Google Forms to acquire quantitative data from 384 respondents from college going students. The study hypothesis was tested using SPSS tools.

**Finding:** The findings showed that self-reported label viewing and objectively evaluated label viewing did not correlate with food purchase decisions. Labels on foods with less transparent nutritional composition or with well-established nutrition-related reputations (either healthy or unhealthy) were viewed more favourably than labels on food with more ambiguous nutritional composition, indicating that consumer expectations play a significant role in how food labels are perceived.

**Research Limitations:** More investigation is required into how consumer perceptions of food healthfulness or nutrient composition relate to the use of nutrition labels and how accurately these perceptions reflect healthfulness assessments.

**Practical Implications:** Food label reading impacts the consumer purchase decision. The confusion on the food labels makes it difficult for consumers to purchase the food products. A clean and conscious food label helps to make healthier and better food choices.

**Social Implications:** FSSAI & FDA to initiate more AI based label decoding projects/tools and build public awareness platforms for self- education to make consumer food choice transparent and easier.

**Originality/Value of Study:** The current study is the first to utilize eye tracking to determine how much attention people paid to nutrition labels as they considered whether to buy a variety of items. A conceptual framework was developed based on factors that potentially

caused changes in food consumption at the individual consumer level during the Pandemic, building on two strands of literature: food choice process and behaviour change.

Keywords: NFP panel, calories, Nutrition, calories, protein., purchase behaviour, buying behaviour, food label.

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## **1. Introduction**

The food fact panel makes it simple to cross compare the nutrition profile of common items by breaking down the quantity of calories, carbohydrates, fats, fiber, protein, vitamin and recommended dietary allowance. It's giving a bird view of the food serving size(portion), individual serve caloric count and daily values to fit ones needs. One crucial aspect that impacts consumers food choice is the value of food, which is conveyed to them through the nutritional label. Its clear post Covid19 pandemic the nutritional information on food products has received a lot attention to make a conscious decision about the foods, they eat. However, the prevalence of diet related illness and obesity has been noted on a global scale. Numerous illnesses, including gall bladder diseases, non -alcoholic fatty liver, several forms of cancer, hypertension, coronary heart diseases, type I and type-II diabetes have proven to be strongly connected with dietary habits and obesity with hiking incidences among younger generations.

The perception and understanding of the Nutrition Data panel on food products can significantly impact the purchase gesture and selection of council-going scholars (Christoph and Ellison, 2015). The Nutrition Data panel provides important information about the nutrient content of a food product, similar to serving size, calories, fat, sodium, and other nutrients. Research has shown that council scholars may have limited knowledge about nutrition and may not completely understand the information handed on the Nutrition Data panel. (Chrysochou and Grunert, 2014). This can lead to confusion when making food choices and may affect opting for foods that are high in calories, fat, and sodium. still, education and exposure to nutrition information can appreciatively impact the perception and understanding of the Nutrition Data panel, leading to healthier food choices. For illustration, furnishing nutrition education in seminaries and universities, as well as making nutrition information more accessible on food packaging and in food service surroundings can increase mindfulness and understanding of the Nutrition Data panel among council scholars (Cowburn and Stockley, 2005; Droms, 2009; Gabadamosi and Tlou, 2020). also, marketing and advertising of food products can also impact council scholars' perception and understanding of nutrition information. Companies may use deceiving claims or language to make their products appear healthier than they are (Drichoutis and Lazaradis, 2005). thus, it's important for scholars to critically estimate and compare food products grounded on the information handed in nutrition (Benson et al., 2018; Ballco and Magistris, 2019). The long period of majority and the forestalment of complaints in the majority or latterly depend on healthy eating habits in the early majority (Benson et al., 2013; Bhagyalaxmi et al., 2013). Gaining independence, studying, adulterous conditioning, part-time jobs on or off the lot, and job medication are the emblems of council life(Boutayeb and Boutayeb, 2005). These have an impact on womanish council scholars' eating patterns, which are characterized by skipping reflections, eating a limited variety of foods, consuming too many fruits, vegetables, or dairy

products, and constantly consuming reused or convenience foods (Udreviciute et al., 2020; Campous et al., 2011). Reused foods and convenience foods are decreasingly extensively available in contemporary culture as a result of the food assiduity's quick development, an increase in nuclear families, and a need for convenience in our salutary lives. It's vital to give nutrition information on reused foods or convenience foods so that consumers can make informed salutary choices (Carrillo et al., 2014; Ani et al., 2016; Annunziata and Mariani, 2019). Information about food products is given on the nutrition marker, including serving size, nutrient content, and the chance of diurnal values. Under the act of the food sanitation legislation, nutrition fact labelling was enforced in numerous other countries (Aryal et al., 2015).

Reading nutrition markers was linked to making opinions about what to eat, buying food, and engaging in healthy eating habits (similar to consuming lower sodium or calories) (Deepa et al., 2011; Devia et al., 2020). also, one study set up that people who used nutrition markers had lower rates of metabolic patterns than people who didn't use or were ignorant of nutrition markers (Graham and Jeffery, 2012). Utilizing nutrition markers will help guests in making informed food opinions and espousing healthy eating habits (like getting enough calories or fat, etc.). still, according to the 2012 Korea National Health and Nutrition Examination Survey (KNHANES), only 31.7 of grown-ups progressed 19 and overread nutrition markers when choosing reused foods. Population aged 19 to 29 were slightly more likely (45.4) than grown-ups to read nutrition markers (40.7). Data panel: In summary, the perception and understanding of the Nutrition Data panel on food products can significantly impact the purchase geste and selection of council- going scholars (Hieke et al., 2016; Jain et al., 2018; Georgescu et al., 2016). By adding education and availability to nutrition information and promoting critical evaluation of food products, we can help promote healthier food choices among council scholars.

### **Objectives of the study:**

The study was carried out with the following objectives;

1. To assess the perception and knowledge of the Nutrition Facts Panel among college going students
2. To assess and understand the Nutrition facts and serving size among college going students.

### **2. Materials and Methods**

Through Google Forms, a face-validated, well-structured questionnaire was used to carry out a quick assessment survey. Google Form was made available to student groups located all over the world through different social media channels.

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A well-structured online form with questions in multiple choice format, Likert scale format matrix questions was designed to get effective reliable data. The study hypothesis was tested using SPSS -Factor analysis, Fleiss' kappa was used to measure the response variable on a categorical scale.

### **3. Data Source**

**Primary data** is the new data collected from the respondents using a pre-tested questionnaire. A rapid assessment survey was conducted using pre tested questionnaire through Google Forms to acquire quantitative data from 384 respondents from college going students as preliminary data.

#### **Sampling Procedure**

Sampling is the selection of a group to obtain information about the whole is a group of persons that represents a particular community. The sampling method used was the random convenient sampling technique due to covid limitations

**Sample Size:** All items in any field of inquiry constitute a 'universe' or 'population.' A finite subject of the population gives a sample. The statistical units in the model are called sample units. The number of units in the model is called the size of the piece. The target sample consists of 384 respondents.

### **4. Conceptual Framework**

A conceptual framework was developed based on factors that potentially caused changes in food consumption at the individual consumer level during the Pandemic, building on two strands of literature: food choice process and behaviour change. The interplay between food-related behaviours forms the core of the framework. The methods of consuming (what, where, with whom, how often), obtaining (where, how, how often), and preparing food. Food-related behaviour is influenced by the personal food system, i.e., food-related values and strategies, are influenced by individual factors, resources, and ideals.

The data collected through questionnaires on

1. Do you know the importance of Nutritive values?
2. What will you observe on a food label?
3. Do you know about Nutrition Facts panel?
4. What will you see in the NFP panel?
5. Do you understand “Artificial sweeteners “in the NEP?
6. Do you believe understanding the nutrition facts panel (NFP) is beneficial?
7. Do you look over “sugars” on the NFP?
8. Do you look over “proteins” on the NFP?
9. Do you look over “saturated fat” on the NFP?
10. Do you look over “Cholesterol” on the NFP?
11. Do you look over “sodium” on the NFP”?
12. Do you read health warnings/ Allergic reaction content on the Food labels?
13. Do you think information about Nutritive values and serving sizes on food labels are important?
14. The nutritional information on the food packages can be trusted.
15. Do you feel the information provided is confusing?

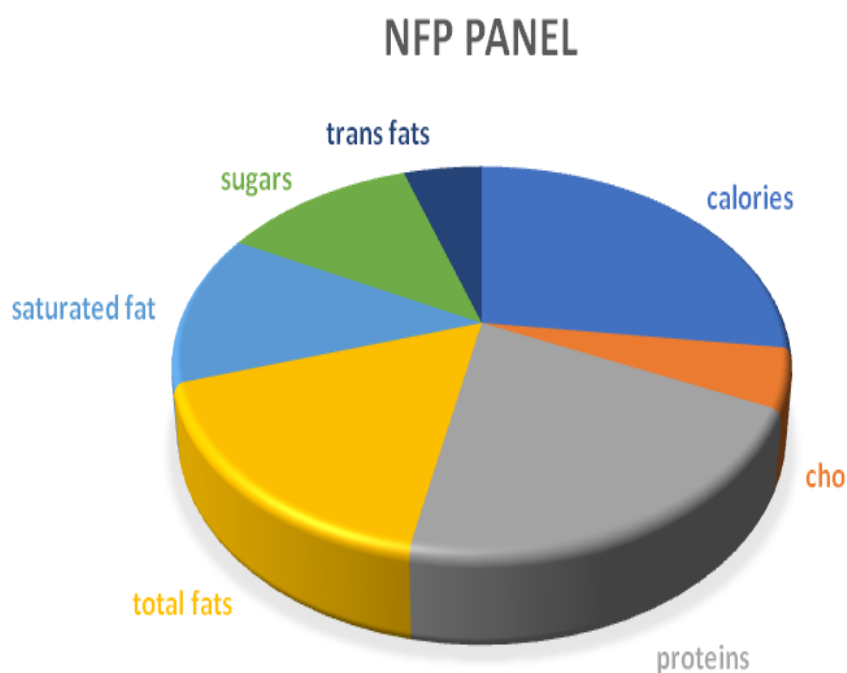
### **5. Results and Discussion**

For each of the comparisons, the findings of these analyses are shown below where several other factors were taken into consideration such as sample size, age, gender, education,

shopping frequency, education, and knowledge about food and food labels. The key analysis was carried out using label food characteristics including Calories, Cho, Proteins, Total fats, Saturated fat, Sugars, and Trans fats. Here, 104 participants were aware of the caloric value of packed food products and could use the criteria in buying the labelled food. Similarly, participants were also aware of the protein content (n=81), saturated fat (n=49), and sugar content (n =47) of labelled food products but do not have adequate information about Cho (n=19) and Trans fat (n=19).

**Table 1** summarizes knowledge about the characteristics of labelled food products that influence consumer buying behaviour.

| Characteristics | Number |
|-----------------|--------|
| Calories        | 104    |
| Cho             | 19     |
| Proteins        | 81     |
| Total fats      | 65     |
| Saturated fat   | 49     |
| Sugars          | 47     |
| Trans fats      | 19     |



**Figure 1;** The figure demonstrates the NFP Panel for the characteristics of labelled food products that influence consumer buying behaviour.

**Table 2** summarizes statistical findings and validations for characteristics of labelled food products that influence consumer buying behaviour.

| Fleiss Kappa | Standard Error | lower 95% CI | upper 95% CI | p     |
|--------------|----------------|--------------|--------------|-------|
| 0.2          | 0.01           | 0.19         | 0.22         | <.001 |

An inter-rater reliability analysis was performed between the dependent samples of Do you know the importance of Nutritive values, Do you know about Nutrition Facts panel, What will you see in the NFP panel, Do you believe understanding The nutrition facts panel (NFP) is beneficial?, Do you look over “carbohydrates” on the NFP”?, Do you look over “sugars” on the NFP, Do you look over “ proteins” on the NFP, Do you look over “saturated fat” on the NFP?, Do you look over “Cholesterol” on the NFP?, Do you look over “ sodium” on the NFP”?, Do you read health warnings/ Allergic reaction content on the Food labels?, Do you think information about Nutritive values and serving sizes on food labels are. The nutritional information on the food packages can be trusted and do you feel the information provided is confusing? For this purpose, the Fleiss Kappa was calculated, which is a measure of the agreement between more than two dependent categorical samples. The Fleiss Kappa showed that there was a fair agreement between samples Do you know the importance of Nutritive values, Do you know about the Nutrition Facts panel, What will you see in the NFP panel, Do you believe understanding The nutrition facts panel (NFP) is beneficial?, Do you look over “carbohydrates” on the NFP”?, Do you look over “sugars” on the NFP, Do you look over “ proteins” on the NFP, Do you look over “saturated fat” on the NFP?, Do you look over “Cholesterol” on the NFP?, Do you look over “ sodium” on the NFP”?, Do you read health warnings/ Allergic reaction content on the Food labels?, Do you think information about Nutritive values and serving sizes on food labels are, The nutritional information on the food packages can be trusted and Do you feel the information provided is confusing with  $\kappa = 0.2$ .

**Table 2:** Summarizes the statistical findings of respondents’ opinions on Nutritive values in the Labels.

| Do you know the importance of Nutritive values | Frequency | %      |
|------------------------------------------------|-----------|--------|
| Yes                                            | 270       | 70.31% |
| No                                             | 112       | 29.17% |
| no                                             | 2         | 0.52%  |
| Total                                          | 384       | 100%   |
| Invalid                                        | 0         | 0%     |
| Total                                          | 384       | 100%   |

In the present study, the knowledge about the importance of nutritive values was questioned. The majority of the respondents recognize the importance of nutritive values. The results indicate that 70.3%(n=270) said “YES”, when questioned did they know the importance of nutritive values, and the remaining 29.1%(n=112) were not known the importance.

providing a comprehensive breakdown of the nutritional content of a food product, including information on calories, macronutrients (protein, carbohydrates, and fats), vitamins, minerals, fiber, and sodium content, food labels empower consumers to make more informed choices about the foods they consume. Consumers can use this information to understand the overall nutritional profile of a food product and its potential impact on their dietary needs and health goals. (Moz-Christofoletti & Wollgast, 2021) Moreover, the presence of nutritive values on food labels allows consumers to compare the nutritional content of similar products. This enables them to make healthier choices by selecting products that are lower in saturated fat, sodium, sugar, or other potentially harmful nutrients. (Prates et al., 2022)

**Table 3:** Summarizes the statistical findings of respondents' observations on Food labels

| What will you observe on a food label?      | Frequency | %      |
|---------------------------------------------|-----------|--------|
| Expiry date                                 | 111       | 28.91% |
| Expiry date, manufacturer, nutritive values | 89        | 23.18% |
| Expiry date, manufacturer                   | 85        | 22.14% |
| manufacturer                                | 62        | 16.15% |
| Expiry date, nutritive values               | 22        | 5.73%  |
| Nutritive values                            | 14        | 3.65%  |
| manufacturer, nutritive values              | 1         | 0.26%  |
| Total                                       | 384       | 100%   |
| Invalid                                     | 0         | 0%     |
| Total                                       | 384       | 100%   |

In the present study, the variables selected for the observations include Expiry date, Expiry date, Manufacturer details, and Nutritive values, Majority of the respondents n=111 had shown interest in the Expiry date. Reading the expiry date in the food label its importance cannot be overlooked. Indeed, the expiration date on food labels holds immense importance for consumers. This information allows consumers to determine the freshness and safety of a food product, ensuring that they are making informed decisions about what they consume. The remaining respondents n=89 said they observe the Expiry date, manufacturer details, and Nutritive values, another set of combinations n=85 included only the Expiry date and manufacturer detail. The remaining data indicates that n=62, manufacturer details, n=22 Expiry date, and nutritive values, n=1 manufacturer and nutritive values. The individual choice of selection varies depending on their knowledge, awareness, and the purpose of the purchase.

**Table 4:** Summarizes the statistical findings of respondents' observations on the nutritional information on the food packages can be trusted

| The nutritional information on the food packages can be trusted | Frequency | %      |
|-----------------------------------------------------------------|-----------|--------|
| Agree                                                           | 108       | 28.2%  |
| Neutral                                                         | 104       | 27.15% |
| Disagree                                                        | 75        | 19.58% |
| partially agree                                                 | 55        | 14.36% |
| partially disagree                                              | 41        | 10.7%  |
| Total                                                           | 383       | 100%   |
| Invalid                                                         | 0         | 0%     |
| Total                                                           | 383       | 100%   |

Consumers trust that Food Labels make a huge impact on purchase behaviour. In the present study, the statistics observations present that n=108, agree that the labels can be trusted, n=104 said they were neutral in the trusting, n=75 disagree with the statement, n=55 partially agree, and n=41 respondents partially disagree. Again predominantly this analysis brings the light that making consumers aware of the understanding of Food labels, and governing bodies' certifications are highly important for the better choice of food product selection.

Consumers' observations on food labels play a crucial role in influencing their purchase decisions and shaping their attitudes toward different food products. Numerous studies have shown that food labels greatly influence consumers' buying behaviour, as they provide valuable information about the nutritional content, ingredients, and potential allergens or dietary restrictions associated with the product (Hettiarachchi et al., 2021). These labels serve as a means of communication between producers or sellers and consumers, allowing individuals to make informed decisions based on their individual needs and preferences.

**Table 5:** Summarizes the statistical findings of respondents' observations on whether the information provided is confusing.

| Do you feel the information provided is confusing | Frequency | %      |
|---------------------------------------------------|-----------|--------|
| agree                                             | 157       | 40.99% |
| neutral                                           | 90        | 23.5%  |
| partially agree                                   | 65        | 16.97% |
| disagree                                          | 58        | 15.14% |
| partially disagree                                | 12        | 3.13%  |
| Total                                             | 383       | 100%   |

Consumers should not be confused by technical terms placed on the label. On the contrary, since label information seems to affect consumer purchasing decisions, the information appearing on food package labels should be unambiguous. Labels are indeed helpful for consumers but can also cause confusion (Newman et al., 2020). Many studies have found that



food labels have a significant impact on consumer demand and influence their purchasing decisions. In the present study, consumers were questioned whether they feel any confusion about the food labels. The observations state that 40% (n=157) agree that the labels are confusing, 23% (n=90) mentioned they were neutral, 16.97% (n=65) partially agree, another percentage 15.14%,(n=58) disagree, the remaining 3%(n=12) partially disagree.

A study by Liaukonyte et al conducted a study examining the effects of labels, and primary and secondary information on consumers' perception and willingness to pay for certain food products. Their findings suggest that labels displaying clear and concise information, such as "contains X" or "free of X," are more effective in helping consumers make informed choices and reducing confusion. The confusion on the food labels makes it difficult for consumers to purchase the food products.

**Table 6:** Summarizes the statistical findings Expected frequencies for perfectly independent variables

|                                                                 |                    | Do you feel the information provided is confusing? |         |                 |                    |          |                 |       |
|-----------------------------------------------------------------|--------------------|----------------------------------------------------|---------|-----------------|--------------------|----------|-----------------|-------|
|                                                                 |                    | Agree                                              | Neutral | Partially Agree | Partially Disagree | Disagree | Partially Agree | Total |
| The nutritional information on the food packages can be trusted | Disagree           | 31                                                 | 16      | 8               | 3                  | 17       | 0               | 75    |
|                                                                 | Partially Agree    | 13                                                 | 15      | 18              | 1                  | 8        | 0               | 55    |
|                                                                 | Partially Disagree | 13                                                 | 9       | 12              | 1                  | 5        | 1               | 41    |
|                                                                 | Neutral            | 47                                                 | 28      | 16              | 3                  | 10       | 0               | 104   |
|                                                                 | Agree              | 53                                                 | 22      | 11              | 4                  | 18       | 0               | 108   |
|                                                                 | Total              | 157                                                | 90      | 65              | 12                 | 58       | 1               | 383   |

|                                                                 |                    | Do you feel the information provided is confusing |         |                 |                    |          |                   |       |
|-----------------------------------------------------------------|--------------------|---------------------------------------------------|---------|-----------------|--------------------|----------|-------------------|-------|
|                                                                 |                    | Agree                                             | Neutral | Partially Agree | Partially Disagree | Disagree | L Partially Agree | Total |
| The nutritional information on the food packages can be trusted | Disagree           | 30.74                                             | 17.62   | 12.73           | 2.35               | 11.36    | 0.2               | 75    |
|                                                                 | Partially Agree    | 22.55                                             | 12.92   | 9.33            | 1.72               | 8.33     | 0.14              | 55    |
|                                                                 | Partially Disagree | 16.81                                             | 9.63    | 6.96            | 1.28               | 6.21     | 0.11              | 41    |
|                                                                 | Neutral            | 42.63                                             | 24.44   | 17.65           | 3.26               | 15.75    | 0.27              | 104   |
|                                                                 | Agree              | 44.27                                             | 25.38   | 18.33           | 3.38               | 16.36    | 0.28              | 108   |
|                                                                 | Total              | 157                                               | 90      | 65              | 12                 | 58       | 1                 | 383   |

**Table 7:** Chi-square test.

|                  |       |
|------------------|-------|
| Chi <sup>2</sup> | 39.44 |
| df               | 20    |
| p                | .006  |

A Chi<sup>2</sup> test was performed between The nutritional information on the food packages can be trusted and Do you feel the information provided is confusing. At least one of the expected cell frequencies was less than 5. Therefore, the assumptions for the Chi<sup>2</sup> test were not met. There was a statistically significant relationship between The nutritional information on the food packages can be trusted and Do you feel the information provided is confusing,  $\chi^2(20) = 39.44$ ,  $p = .006$ , Cramér's V = 0.16

The calculated p-value of .006 is lower than the defined significance level of 5%. The Chi<sup>2</sup> test is therefore significant and the null hypothesis is rejected.

## 6. Conclusion

The current study is the first to use eye shadowing to determine how important attention people paid to nutrition markers as they considered whether to buy a variety of food particulars.

Consumer knowledge was tested in areas: label segmentation knowledge, dietary advice, nutritional sources, and selecting food products related buying behaviour influence.

According to the findings, those who are better able to interpret nutritional information are more inclined to use them. The research has a significant policy and marketing implications since it demonstrates that increase label use is possible with improved nutritional information understanding. This thereby, necessitates the use of user-friendly label formats for consumers **The findings showed that tone-reported marker viewing and objectively estimated marker viewing didn't relate to food purchase opinions. The further disquisition of the most important nutrients for consumers and the most stoner-friendly marker designs that impact healthy food selection calls for further studies with objectively estimated nutrition marker use.**

Results also showed that markers on foods with lower transparent nutritive composition or with well-established nutrition-related reports (either healthy or unhealthy) were viewed more positively than markers on foods with further nebulous nutritive composition, indicating that consumer prospects play a significant part in how food markers are perceived. further disquisition is needed into how consumer comprehensions of food healthfulness or nutrient composition relate to the use of nutrition markers, as well as how directly these comprehensions reflect healthfulness assessments. Due to nature of study conducted amongst targeted gender based choice among different professions segment of population the study can we scaled up across various age groups and sample the results can be generalised to student population in around Andhra Pradesh.

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**Author Contributions:**

Pradeep Kumar Patnaik and Surya Deepti conceptualize the study, Surya Deepti collected data and interpreted the results, Pradeep Kumar Patnaik and Surya Deepti wrote the manuscript and Pradeep Kumar Patnaik edited and revised the draft.

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**Competing interest:**

The authors declare that they have no conflict of interest.

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