A Comprehensive Analysis of Problems Faced By The Allergic Consumers And Their Expectations With Respect To Indian Pre-Packaged Food Labelling- A Study of Northern India

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Abstract- **Indian food industry has played an indispensable part in Indian economy. With the advent of transportation, this sector has shown drastic development. Its scope is not limited to the country alone but has crossed the borders. So a number of regulations were framed to match Indian food labelling standards with international standards. With time various laws were introduced in the number of states to keep a check on the anti social elements. For the onslaught of food adulteration, a dire need for the Central legislation was felt which could bring with itself a hope for relief for the consumers. This hope was sustained by the introduction of The Prevention of Food Adulteration Act, 1954. Slowly its paradigm shifted to a more comprehensive approach by enlarging its parameters, thereby, introducing the new Act "Food Safety and Standards Act, 2006" that replaced PFA to meet the changing environment and rapid changing lifestyle of the people. Although efforts were made to make Indian food regulations abreast with the latest requirements but the latest challenge this industry is meeting is to fulfil the requirements of the allergic consumers. This study tries to evaluate the problems of the allergic consumers due to inadequate and inamicable food labelling. It also tries to understand the expectations of these consumers from the Indian food labels.**

Key Words- **Allergens, Celiac, Gluten, Grading, Licensing, Non celiac gluten sensitive (NCGS)**

1. INTRODUCTION

With the advent of liberalization and globalisation, Indian food industry sector has taken a huge leap and has a huge potential for further growth and development to play a significant role in the Indian economy. If we try to peep back in history, there was a time when even speedy transportation was missing leaving no option for the consumers but to depend upon the food that was produced out of fresh ingredients. Thanks to the advent of rapid transportation facility which when combined with refrigeration allowed food to be sold in the markets quite distant from the source of production **(Wakeland, W., et al, 2012)**. This change brought a revolution in Indian food processing industry. It necessitated the government to regulate this industry by enforcing several laws which cover various aspects like packaging, labelling, standardisation, grading, licensing, etc, which are normally required to start up and run a food business.

With the passage of time, certain laws were introduced to keep a check on the anti social elements but purity, freshness and health still seemed to be compromised. For the onslaught of food adulteration, a dire need for the Central legislation was felt. This hope was sustained by the bill The Prevention of Food Adulteration Act, 1954 which replaced all food adulteration laws. On finding it overlapping and inconsistent, the new Act "Food Safety and Standards Act, 2006" was introduced that replaced PFA to meet the changing environment and rapid changing lifestyle of the people. The Food Safety and Standards Authority of India (FSSAI) was shaped as per this Act to manage all the food related problems of improvising scientific standards for the manufacture, sale, distribution, import and export of food articles **(Mann,G, 2018)**.

Although steps have been taken to meet the various challenges but still much is needed to be done as still there is an alarming increase in health issues due to inappropriate nutritional habits. The latest problem engulfing this industry is of allergic population whose number is increasing in the overall consumer composition and posing a challenge to the labelling standards. They require specific information that can guide them in making informed decisions- whether to purchase or to avoid a particular product with ingredients they need to avoid or are allergic to.

The latest challenge faced by FSSAI is to cover Allergen Labelling in the food labelling regulations which was not included earlier in any of the regulations and was totally ignored here in India while other countries have clear guidelines to cater the needs of allergic consumers. FSSAI in its new draft New Labelling and Display Regulations 2018 has recognised few ingredients as allergens **(FSSAI, April 2018)**. If the product is having one of these allergen, this regulation requires it to separately declare it through the statement. The terms **"Gluten Free"** have also been added in the regulations to specify whether the product is safe for consumption for the allergic consumers or not. Although efforts are being made to update the regulations but it is still on paper as a proposal. Keeping these aspects in mind, a better and a complete package is expected to be developed which will make Indian food labelling quite extensive and comprehensive, at par with the international standards and to cater the needs of the Indian markets and Indian consumers.

2. LITERATURE REVIEW

Chantelle Anandan, Aziz Sheikh (Nov 2005) have tried to enlighten about the new European Union directives on food labelling which makes it mandatory for the packaged food industry to specify the existence of food allergens in the product. **Simons E, et al (Nov 2005)** conducted the research to study the behaviour of food allergic consumers in response to ingredient labelling. **Neal D. Fortin (Dec 2006)** tried to throw some light on the serious problem engulfing the nation with almost 2% adults and 5% infants and children suffering from this disease in the United States. **Judith R, et al (April 2008)** in their research have tried to judge whether the latest regulations fulfil the expectations of allergic consumers. **Chauhan, J.C., et al, (June 2010)** assessed the dietary compliance for Gluten Free patients and the barriers they face in its strict compliance in their study. They also studied the psychosocial impact of diet on the behavior of celiac disease children. **J. Singh & Whelan K. (Oct 2011)** tried to gather the information about the celiac patients and the compulsion of consuming a gluten free diet as the only alternative to remain healthy. The strictly following the diet is the only treatment for them but according to the research it is hindered by the high cost and the low availability of gluten free products. **Ukkola A, et al (March 2012)** in their study tried to investigate the celiac disease patient's perception about the disease, the problems faced by them, the treatment available for them and the problems associated with adopting gluten free diet. **Alison Joanne Lee, et al, (Jan 2013)** have taken Asia as their base of study assuming it to be a populous and diverse region which can provide vast information on the most sensitive issue of food allergy. **Stella Anne Cochrane, et al (Sept 2013)** investigated 500 food allergic consumers and 500 family members of allergic consumers who buy on their behalf of Great Britain online to understand their shopping behaviour. **Susan L Prescott, et al, (Dec 2013)** through their study have tried to emphasise on the fact that there is a dire need to work in the field of food allergies and gather reliable data on its prevalence in many developed and developing countries. **Carolina Ciacci, et al (April 2015)** have their research focussed on the celiac disease patients, their diet, gluten free diet available for them and regulations ruling gluten free diet. **Cori Jo Navarro (May 2016)** has tried to gain insight into impact gluten free labels have on the consumers suffering from celiac disease. **Wioleta Zysk, et al (Feb 2019)** through their research on the patients with celiac disease have tried to explore the gluten free labelling and its impact of influencing them.

3. SCOPE OF STUDY

Although Food Safety and Standards (Packaging and Labelling) Regulation, 2011 guidelines is in itself a complete package but to meet the requirements of the dynamic world , FSSAI has tried to bring certain amendments by drafting FSSAI Drafts New Labelling and Display Regulations 2018. Efforts are being made to update the regulations but it is still under consideration with few recommendations to make the modifications in this draft. One of the significant gaps is regarding missing one of the crucial aspects in labelling is the Allergen Labelling. This was the aspect which was totally ignored here in India while other countries have clear guidelines to cater the needs of allergic consumers. North Indian population is more prone to celiac disease (wheat allergy) where wheat forms their staple cereal and is primarily grown as compared to South Indian population. So, this study has made an effort to understand the perception of the allergic consumers of North India towards the pre packaged food labelling.

4. RESEARCH GAP

Many studies have been undertaken to study allergies, allergens and the problems and symptoms of the allergic people. But very few studies can be found on the allergic consumers studying their perception about the food labels. Literature review further suggests that the research whatever conducted has been conducted mainly in European and American countries and almost negligible research is available on India. Further, studies are confined to other parts of the country and no research on perception of allergic consumers is available in Northern India. So, the present study relates to the perception of allergic consumers of Northern India to understand their problems and expectations from food labels..

5. OBJECTIVES

This study aims at exploring, assessing and analysing the various aspects of labelling pre-packaged food:
1. To understand the problems food allergens and intolerant consumers face in the present labelling scenario.
2. To gain insight into the specific food labelling requirements of allergens.

6. RESEARCH METHODOLOGY AND DESIGN

Data Collection- Since the nature of the present study is descriptive and analytical, data has been collected from primary sources. Structured questionnaire has been framed to extract information from the various consumers.

Study Location- This study will cover the Northern India through its three states i.e. Haryana, Punjab and Himachal Pradesh.

Sample Size- In all a sample of 150 participants has been studied which consisted of allergic and intolerant consumers. The consumers chosen belong to all age groups bearing different kinds of allergies. Where the allergic consumer is too young to respond, he is represented by his parents or any of his family members who makes purchase decision on his behalf.

Sampling Technique- Multistage stratified sampling technique has been applied to draw the representative sample.

Research Design- Descriptive and Analytical research design has been used in this study.

Data Analysis Techniques- Descriptive analysis has been based on several demographics. However, Factor Analysis, T-Test, ANOVA, Post Hoc statistical measures and econometric techniques has been applied for the analysis of the data to help achieve the above stated goals of this study.

Software- SPSS 21, EViews and XLStat software will be used for the purpose of data analysis.

7. ANALYSIS & FINDINGS

This study involves analysis of the perception of the allergic consumers. Descriptive analysis is applied to judge the background of the allergic consumers so as to understand their profile. Their questionnaire includes a section that extracts the information on the consumer's profile and these demographic variables explain the details regarding their age, gender, their educational qualifications, and occupation. In all, 150 allergic consumers have been studied to arrive at the conclusions. The problems and the food labelling requirements of the allergic respondents are studied through the questionnaire.

7.1. DEMOGRAPHIC PROFILE

The demographics of the respondents have been studied through the questionnaire which describes the details of the population. The information extracted has been summarised and presented in the table 7.1.1 below.

Table 7.1.1: Demographic Analysis of Respondents

Gender		
Demographic Predictors	**Frequency(N)**	**Percentage**
Male	39	26.0
Female	111	74.0
Total	**150**	**100.0**
Age Profile		
Below 25 years	16	10.7
26-40 years	68	45.3
Above 40 years	66	44.0
Total	**150**	**100.0**
Educational Profile		
Under Graduate	27	18.0
Graduate	49	32.7
Post Graduate	74	49.3
Total	**150**	**100.0**
Occupational Profile		
Student	12	8.0
Unemployed	6	4.0
Employed	56	37.3
Self Employed	40	26.7
Retired	6	4.0
Others	30	20.0
Total	**150**	**100.0**

Above table clearly shows that in this survey, in all 150 respondents are evaluated. The survey included both the genders- males as well as females. Out of the total sample size of 150 respondents, 26 percent are males and 74 percent are females.

Above table also highlights that majority of the respondents are above 25 years of age with almost equal weightage in the categories of 26-40 years and above 40 years but there are certain respondents with age less than 25 years with 10.7 percent of the total number. The category 26-40years has 45.3 percent respondents and the category above 40 years 44 percent.

Education has been taken as one of the parameter to judge the consumer on the awareness scale. Majority of the consumers were found to be highly educated, possessing the post graduate degree with their number touching 74 out of 150 respondents, making 49.3 percent of the total. Graduate consumers' number was also found to be significant with 32.7 percent. There were only 18 percent respondents in the category of under graduate. Thus majority of the respondents are either graduates or post graduates.

Occupation of the respondent has also been given due consideration. Out of the total 150 respondents 8 percent are students, only 4 percent are unemployed, majority of 37.3 percent belong to service sector being employed, 26.7 percent belong to business class depending upon self employment, 4 percent are retired and remaining 20 percent of the respondents are home makers. Thus the respondents have been divided among all the categories making every sector contribute in the survey.

7.2   STUDY OF THE PROBLEMS AND FOOD LABELLING REQUIREMENTS OF THE ALLERGIC RESPONDENTS

Through this survey, an effort has been made to analyse the problems faced by the allergic consumers while purchasing the products in the market. This study tries to understand the degree to which Indian food labelling is allergic friendly. This study

further analyses the problems allergic consumers face because of the unclear and unambiguous food labels. It also tries to highlight the expectations of the allergic consumers and the changes they feel and suggest to make the food labels more allergic friendly. The perspective of the allergic consumers has also been tried to categorise and analyse on the basis of their demographics. It has been tried to locate in this study whether the variables like gender, age, education and occupation of the allergic consumers have any impact on the perspective of the allergic consumer or not. To get an answer, T-test and Anova techniques have been applied.

Mean and Standard Deviation of the problems and requirements of the allergic respondents towards the food labels and nutritional labels is presented in the table 7.2.1 below:

Table 7.2.1: Mean and Standard Deviation for Problems and Requirements of Allergic Respondents

Statements		Mean	Std Deviation
1.	I have always been able to find any information I need on a food label.	3.03	.158
2.	Food Labels give me the information to help me avoid the food I am allergic to.	3.25	.296
3.	I am often unsure about the ingredients present in the packaged food.	3.44	.102
4.	The statement **"May contain traces of…"** is quite useful to me.	3.81	.115
5.	I will avoid the product if a label on a product says **"May contain traces of …"**.	3.92	.046
6.	The statement **"Made in the same premises as products containing …"** is quite beneficial to me.	3.71	.201
7.	I will avoid the product if labelled **"Made in the same premises as products containing..**.	3.82	.037
8.	The statement **"Made on the same equipment as products containing …"** proves useful to me.	3.84	.188
9.	I will restrict buying the product if a label on a product says **"Made on the same equipment as products containing …"**.	3.80	.081
10.	Many times the product contains the ingredients I need to avoid even though it is not shown in the ingredient list.	4.15	.939
11.	Sometimes a product I was using safely from sometime suddenly shows a statement labelling it contains the problem ingredient I need to avoid.	3.98	.087
12.	I suffered a reaction from a product which didn't show the allergen ingredient in the ingredient list.	3.78	.128
13.	Despite knowing that the product doesn't have the allergen, I don't try it because of lack of proper labelling.	3.85	.169
14.	Special products available for allergic members are comparatively costly.	4.47	.880
15.	The products safe but not tried because of lack of proper labelling makes me shell out more money from my pocket to spend on better labelled products.	4.08	.120
16.	This lack of proper labelling restricts my choice.	4.35	.024
17.	There has been improvement in the way allergen information is labelled on the food products in the last 12 months.	3.81	.041
18.	These improvements have made things easier for me to recognise the ingredients I am allergic to.	3.92	.916
19.	Other countries like UK and USA are more sensitive to allergic and their labelling is more allergic friendly.	4.35	.037
20.	The allergen warning labels should be made a legal requirement in India.	4.61	.903

Above Table 7.2.1 shows the mean and standard deviation for the various statements depicting the problems and requirements of the allergic respondents towards the food labels. The mean scores revealed that the respondents give maximum weightage to the statement no. 20 with 4.61 mean scores. Then follows the statements no. 14, 16, 19, 10, 15, 11, 18, 5, 13, 8, 7, 4, 17, 9, 12, 6, 3, 2 and 1 in their order of importance with the mean scores 4.47, 4.35, 4.15, 4.08, 3.98, 3.92, 3.92, 3.85, 3.84, 3.82, 3.81, 3.81, 3.80, 3.78, 3.71, 3.44, 3.25 and 3.03 respectively highlighting the fact that maximum mean scores has been allotted to the problems faced by the allergic respondents with their main focus on making the food labelling allergic friendly.

Factor Analysis for Analysing the Problems and Requirements of the Allergic Respondents towards Food Labels

To understand the perspective of the allergic consumers, it becomes very imperative to study the problems faced by the allergic consumers and their expectations as to their requirements towards the food labels. To facilitate this aspect, factor analysis has been applied. The outputs obtained through factor analysis has been explained below through the table 7.2.2

Table 7.2.2: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.647
	Approx. Chi-Square	1340.866
	Df	190
Bartlett's Test of Sphericity	Sig.	.000

The table above shows the results obtained by applying Kaiser-Meyer-Olkin and Bartlett's test. This test studies the adequacy of data for applying factor analysis and whether variables formed are well correlated or not. Above table clearly indicates that KMO value is .647 which is more than .05 showing that the data is quite sufficient and qualifies the adequacy test for applying factor analysis. Bartlett's test shows sig value .000 which means that group formed variables are well correlated.

The output for Total variance suggests that total extracted factors are 5 in number and they are responsible for 59.530 percent of the variation. The first factor which is principal component is responsible for 14.057% of the variation, the second factor for 13.686 % variation, third factor is responsible for 12.042 percent variation while fourth factor for 11.631 percent variation and the last factor which is the fifth factor for 8.114 percent variation.

The results obtained in rotated component matrix have been presented in a table 7.2.3 below:

Table 7.2.3: Rotated Component Matrix

Rotated Component Matrixª					
	Component				
	1	2	3	4	5
I have always been able to find any information I need on a food label.				.613	
Food Labels give me the information to help me avoid the food I am allergic to.				.619	
I am often unsure about the ingredients present in the packaged food.		.390			
The statement "May contain traces of…" (the ingredient I am allergic to) is quite useful to me.					.939
I will avoid the product if a label on a product says "May contain traces of …" (the ingredient I am allergic to).	.930				
The statement "Made in the same premises as products containing …" (the ingredient I am allergic to) is quite useful to you.					.913
I will avoid the product if a label on a product says "Made in the same premises as products containing …" (the ingredient you are allergic to).	.922				
The statement "Made on the same equipment as products containing …" (the ingredient I am allergic to) is quite useful to me.					.941
I will avoid the product if a label on a product says "Made on the same equipment as products containing …" (the ingredient I am allergic to).	.935				
Many times the product contains the ingredients I need to avoid even though it is not shown in the ingredient list.		.765			
Sometimes a product I have been using safely from sometime suddenly shows a statement saying it contains the problem ingredient I need to avoid.		.659			
I suffered a reaction from a product that didn't show the problem ingredient in the ingredient list.		.810			
Despite knowing that the product doesn't have the ingredient I am allergic to, I don't try it because of lack of proper labelling.		.551			

Special products available for allergic members are comparatively costly.			.512		
The products safe but not tried because of lack of proper labelling makes me shell out more money from my pocket to spend on better labelled products.			.285		
This lack of proper labelling restricts my choice.			.621		
There has been improvement in the way allergen information is labelled on the food products in the last 12 months.				.767	
These improvements have made things easier for me to recognise the ingredients I am allergic to.				.810	
Other countries like UK and USA are more sensitive to allergic and their labelling is more allergic friendly.					.539
The allergen warning labels should be made a legal requirement in India.					.538
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.					
a. Rotation converged in 5 iterations.					

This table categorises the various statements in 5 broad categories. The first category includes the statements "I will avoid the product if a label on a product says "May contain traces of …" (the ingredient I am allergic to)", **"**I will avoid the product if a label on a product says "Made in the same premises as products containing …" (the ingredient you are allergic to)" and "I will avoid the product if a label on a product says "Made in the same premises as products containing …" (the ingredient you are allergic to)" which will help to analyse the allergic consumers on the base of their **"Trust/Reliability on food labels"**. The second category includes statements "I am often unsure about the ingredients present in the packaged food", "Many times the product contains the ingredients I need to avoid even though it is not shown in the ingredient list", "Sometimes a product I have been using safely from sometime suddenly shows a statement saying it contains the problem ingredient I need to avoid", "I suffered a reaction from a product that didn't show the problem ingredient in the ingredient list" and "Despite knowing that the product doesn't have the ingredient I am allergic to, I don't try it because of lack of proper labelling" which can analyse the problems on the basis of **"Unclear Labelling Related Problems"**. The third category includes statements "Special products available for allergic members are comparatively costly", "The products safe but not tried because of lack of proper labelling makes me shell out more money from my pocket to spend on better labelled products" and "This lack of proper labelling restricts my choice" have been categorised in one group which can be broadly recognised to analyse the allergic consumers on the basis of **"Labelling Related Other Problems"** they face because of poor labelling. The statements "I have always been able to find any information I need on a food label", "Food Labels give me the information to help me avoid the food I am allergic to", "There has been improvement in the way allergen information is labelled on the food products in the last 12 months" and "These improvements have made things easier for me to recognise the ingredients I am allergic to" have been categorised in a group which can be broadly recognised to analyse the opinion of the allergic consumers on the basis of **"Present Scenario of Food Labels"** of the food labels. The statements "The statement "May contain traces of…" (the ingredient I am allergic to) is quite useful to me", "The statement "Made in the same premises as products containing …" (the ingredient I am allergic to) is quite useful to you", "The statement "Made on the same equipment as products containing …" (the ingredient I am allergic to) is quite useful to me", "Other countries like UK and USA are more sensitive to allergic and their labelling is more allergic friendly" and "The allergen warning labels should be made a legal requirement in India" have been categorised in one group which can be broadly recognised to analyse the perception of allergic consumers on the basis of **"Expectations from the Food Labels"** they feel our Indian food labelling should fulfil to be upto their expectation.

The first three factors **"Trust/Reliability on food labels", "Unclear Labelling Related Problems"** and **"Labelling Related Other Problems"** specify the problems of the allergic consumers due to insufficient information available on the food labels while the next two factors **"Present Scenario of Food Labels"** and **"Expectations from the Food Labels"** highlights the expectations and requirements of the allergic consumers related to the food labels. After this categorisation, the impact of these factors on the problems and requirements of the allergic consumers have been studied with further categorisation of the allergic consumers on the basis of their demographics like gender, age, education and occupation.

T- Test Between Gender and Problems and Requirements of the Allergic Respondents Towards Food Labels
For analysing the differences between the means of gender of the allergic respondents and their problems and requirements towards food labels, T- Test has been applied and the table 7.2.4 has been prepared. The following hypothesis has been formulated to study the differences in mean between these two variables.
H₀1: "There is no significant difference between the means of gender of the allergic respondents and the problems and requirements towards food labels."
The table 7.2.4 below shows the T values to study the difference in means of these two variables.

Table 7.2.4: T Test: Gender Vs Problems and Requirements of the Allergic Respondents Towards Food Labelling

Factors	T	Sig.	Mean	
			Male	Female
Problems				
Trust/Reliability on food labels	-1.127	.537	3.6923	3.9009
Unclear Labelling Related Problems	.264	.595	3.8667	3.8324
Labelling Related Other Problems	-.010	.883	4.2991	4.3003
Requirements				
Present Scenario of Food Labels	.857	.819	3.5962	3.4685
Expectations from the Food Labels	-.259	.818	4.0410	4.0775

Above table clearly shows that problems of the allergic respondents on the basis of **"Problems based on Trust/Reliability on food labels", "Problems due to Unclear Labelling Related Problems" and "Labelling Related other Problems"** has sig. value .537, .595 and .883 which is higher than .05 and thus has no significant difference in means of the gender of the allergic respondents and the their problems towards the food labels. Above data clearly indicates that the allergic respondents are facing similar problems irrespective of their gender.

Above table also clearly indicates that requirements of the allergic respondents covering the **"Present Scenario of Food Labels" and "Expectations from Food Labels"** has sig. value .819 and .818 which is higher than .05 and thus has no significant difference in means of the gender of the allergic respondents and the their requirements of the food labels. Above data clearly indicates that the allergic respondents irrespective of their gender have similar requirements of making food labels allergic friendly.

ANOVA

For analysing the differences between the means of the age of the respondents and the problems and requirements towards food labels, analysis of variance table 7.2.5 has been prepared. Further results have also been analysed using Post Hoc table presented in table 7.2.6. The following hypothesis has been formulated to study the differences in mean between these two variables.

H_02: **"There is no significant difference between the mean of age of the allergic respondents and their problems and requirements towards food labels."**

The table 7.2.5 below shows the ANOVA values to study the difference in means of these two variables.

Table 7.2.5: ANOVA: Age Vs Problems and Requirements of Allergic Respondents Towards Food Labelling

1. Statements	F	Sig
Problems		
Trust/Reliability on food labels	4.356	.001
Unclear Labelling Related Problems	.613	.543
Labelling Related Other Problems	2.731	.068
Requirements		
Present Scenario of Food Labels	2.363	.098
Expectations from the Food Labels	5.498	.005

Table 7.2.6: Post Hoc: Age Vs Problems and Requirements of Allergic Respondents Towards Food Labelling

Multiple Comparisons (Tukey HSD)			
Tukey HSD (Dependent Variable)	Age (I)	Age (J)	Mean Difference (I-J)
Trust/Reliability on food labels	Below 25	Between 26-40	2.125[*]
		Above 40	1.867[*]
Expectations from the Food Labels	Below 25	Above 40	.00152[*]
	Between 26-40	Above 40	.39848[*]
*. The mean difference is significant at the 0.05 level			

Above table clearly shows that the problems of the allergic respondents on the basis of their **Trust/Reliability on the food labels** has sig. value .001 which is below .05 and thus has significant difference between different ages of the respondents and their problems related to the trust and reliability on the food labels. So null hypothesis will be rejected and alternative hypothesis will be accepted. The Post Hoc table also shows that problems of the allergic respondents below 25 years of age are more influenced by the trust factor towards the food labels than the respondents between 26 – 40 years of age.

The problems of the allergic respondents with reference to statements covered under the category of **Unclear Labelling Related Problems** and **Labelling Related Other Problems** has Sig. Value of .543 and .068 which is higher than .05 showing no significant difference in means of different ages and the problems of the allergic consumers due to unclear labelling and other labelling related problems. Thus, null hypothesis is accepted and alternate hypothesis is rejected.

Above table also clearly indicate that the requirements of the allergic respondents on the basis of their **Expectations from the food labels** has sig. value .005 which is below .05 and thus has significant difference between different ages of the allergic respondents and their requirements related to their expectations. So null hypothesis will be rejected and alternative hypothesis will be accepted. The Post Hoc table also shows that allergic respondents above 40 years of age have lesser expectations from food labels and thus have lesser requirements as compared to the respondents below 25 years of age and between 26 – 40 years of age. The requirements of the allergic respondents with regard to the **Present Scenario of the Food Labels** has Sig. Value of .098 which is higher than .05 showing no significant difference in means of different ages and the requirements of the allergic consumers depicting the present scenario of food labels. Thus, null hypothesis is accepted and alternate hypothesis is rejected.

For analysing the differences between the means of the education level of the allergic respondents and their problems and requirements towards food labelling, analysis of variance table 7.2.7 has been prepared. Further results have also been analysed using Post Hoc table presented in table 7.2.8. The following hypothesis has been formulated to study the differences in mean between these two variables.

H_03: "There is no significant difference between the mean of education of the allergic respondents and their problems and requirements towards food labels."

The table 7.2.7 below shows the ANOVA values to study the difference in means of these two variables.

Table 7.2.7: ANOVA: Education Vs Problems and Requirements of Allergic Respondents Towards Food Labelling

2. Statements	F	Sig
Problems		
Trust/Reliability on food labels	.072	.931
Unclear Labelling Related Problems	3.954	.021
Labelling Related Other Problems	1.249	.009
Requirements		
Present Scenario of Food Labels	.365	.695
Expectations from the Food Labels	1.761	.007

Table 7.2.8: Post Hoc: Education Vs Problems And Requirements of Allergic Respondents Towards Food Labelling

Multiple Comparisons (TukeyHSD)			
Tukey HSD(Dependent Variable)	Education (I)	Education (J)	Mean Difference (I-J)
Unclear Labelling Related Problems	Post Graduate	Graduate	.31837[*]
Labelling Related Other Problems	Post Graduate	Graduate	. 21755[*]
		Under Graduate	. 23710[*]
Expectations from the Food Labels	Post Graduate	Graduate	. 30327[*]
*. The mean difference is significant at the 0.05 level			

Above table clearly shows that the problems of the allergic respondents on the basis of **Unclear Labelling** and **Labelling Related Other Problems** has sig. value of .021 and .009 which is below .05 and thus has significant difference between the two variables. So null hypothesis will be rejected and alternative hypothesis will be accepted for these problems. The Post Hoc table also shows that the post graduate allergic respondents are finding more problems due to unclear labelling or other labelling related problems rather than the graduate allergic respondents.

The problems of the allergic respondents with reference to statements covered under the category of **Trust/Reliability on the food labels** has Sig. Value of .931 which is higher than .05 showing no significant difference and thus, null hypothesis is accepted and alternate hypothesis is rejected for these two variables.

Above table also clearly indicate that the requirements of the allergic respondents on the basis of their **Expectations from the food labels** has sig. value .007 which is below .05 and thus has significant difference and so null hypothesis will be rejected and alternative hypothesis will be accepted. The Post Hoc table also shows that post graduate allergic respondents have higher expectations from food labels and thus have more requirements as compared to the graduate and under graduate allergic respondents.

The requirements of the allergic respondents with regard to the **Present Scenario of the Food Labels** has Sig. Value of .695 which is higher than .05 showing no significant difference in means of education level of the allergic respondents and their requirements depicting the present scenario of food labels. Thus, null hypothesis is accepted and alternate hypothesis is rejected.

The differences between the means of occupation of the allergic respondents and their problems and requirements towards the food labels has also been analysed in this study and the results of analysis of variance has been prepared in table 7.2.9. Further results have also been analysed using Post Hoc table presented in table 7.2.10. The following hypothesis has been formulated to study the differences in means between these two variables.

H_04: "There is no significant difference between the means of occupation of the allergic respondents and their problems and requirements towards food labels."

The table 7.2.9 below shows the ANOVA values to study the difference in means of these two variables.

Table 7.2.9: ANOVA: Occupation Vs Problems and Requirements of Allergic Respondents Towards Food Labelling

3. Statements	F	Sig
Problems		
Trust/Reliability on food labels	.860	.510
Unclear Labelling Related Problems	1.647	.151
Labelling Related Other Problems	1.113	.356
Expectations		
Present Scenario of Food Labels	1.403	.226
Requirements in the Food Labels	3.179	.009

Table 7.2.10: Post Hoc: Occupation Vs Problems and Requirements of Allergic Respondents Towards Food Labelling

Multiple Comparisons (Tukey HSD)			
Tukey HSD (Dependent Variable)	Occupation (I)	Occupation(J)	Mean Difference (I-J)
Requirements in the Food Labels	Unemployed	Self Employed	.08392*
	Employed	Self Employed	.39293*
*. The mean difference is significant at the 0.05 level			

Above table clearly shows that the problems of the allergic respondents with reference to statements covered under the category of **Trust/Reliability on the food labels, Unclear Labelling** and **Labelling Related Other Problems** has Sig. Value of .510, .151 and .356 which is higher than .05 showing no significant difference and thus, null hypothesis is accepted and alternate hypothesis is rejected for these two variables.

Above table also clearly indicate that the requirements of the allergic respondents on the basis of their Expectations from the food labels have sig. value .009 which is below .05 and thus has significant difference between the two variables. So null hypothesis will be rejected and alternative hypothesis will be accepted. The Post Hoc table also shows that unemployed and employed allergic respondents have higher expectations from food labels and thus have more requirements as compared to the self employed allergic respondents.

The requirements of the allergic respondents with regard to the **Present Scenario of the Food Labels** has Sig. Value of .226 which is higher than .05 showing no significant and thus, null hypothesis is accepted and alternate hypothesis is rejected.

8.   SUGGESTIONS, IMPLICATIONS & RECOMMENDATIONS

Through this study on the basis of observation and research, various problems that surfaced the Indian food labelling were noticed that needs immediate action so as to make food labelling consumer friendly. On the basis of these findings various suggestions have been recommended:

1. Improvement in awareness level of Manufacturers and Retailers
2. Improvement in the legal laws to deal with the adulteration and the defaulters
3. Curb Contamination of food products to make its ingredients match its list of ingredients on its labels.
4. Encourage Industries Producing Allergic Friendly Products
5. Warning Labels for Allergic Food Products like "May contain traces of…" (the ingredient I am allergic to) ; "Made in the same premises as products containing …" (the ingredient I am allergic to); "Made on the same equipment as products containing …" (the ingredient I am allergic to), etc.
6. Compulsory regulation requiring Pictorial Allergen Label
7. Allergen Friendly Food like UK and USA

9. CONCLUSION

Although India is showing the concern and trying to make new laws making it mandatory to declare allergen warning but still there seems some gaps in implementing these regulations. Actually the citizens of India are quite ignorant about the food allergy and its adverse reactions. The manufacturers have little or no knowledge about the offending allergens and so declaring the allergens in the ingredient list can be a daunting task for them. Minute amounts of allergens may be used in preparing the food articles but some food companies who use them may not realize that their food product contains an offending ingredient. Further, on being unsure about the presence of allergen as a potential ingredient, they prefer to indicate that the product "May contain" a certain ingredient on the food label to avoid any hassle **(F.Bekes, et al., 2017)**C:\Users\MIS\Desktop\(https:\www.fda.gov\Food\GuidanceRegulation\...\Allergens\ucm106890.htm). The allergic consumers are also unconvinced that despite new labelling regulations, the food labels will provide them with the sufficient allergy information. The fact that bothers them is the fear of cross-contamination which is beyond the comprehension of the small manufacturers. The continued availability of unlabelled products and the difficulties in understanding or interpreting information contained on labels worsen the situation. To handle such confusions, food-allergic and food-intolerant consumers find it safer to spend more time on grocery shopping in order to look out for better and safer food choices **(S.Besnoff, 2014).** But the only

solution available is to evolve clearer, unambiguous and comprehensive food labelling to maximize the food-allergic consumer's ability to interpret the implications for their own allergy.

10. LIMITATIONS OF THE STUDY

This study has made an effort to contribute in the existing knowledge in the field of Indian pre-packaged food product labels and the perception of allergic and non- allergic consumers to make food labels consumer friendly. However, this research has its own limitations and constraints.

1. The data collected through the survey method is normally collected through direct and indirect interviews. This research is also based on the data collected through this method and so chances of biasness cannot be illuminated.
2. The perception, preference and attitude of the respondents might have impacted their response and thus sacrificed the accuracy of the data collected.
3. The objective of the research might have guided the creation of the instrument and thus might not be suitable in all circumstances.
4. Samples were confined to only 3 states of North India i.e., Punjab, Haryana and Himachal

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