Decoding Associates of Food Label Reading Habits and Awareness in Adults: A Cross-Sectional Study

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Abstract:

***Background**: The frequency of reading food labels reflects how actively consumers engage with nutrition information while purchasing. Regular label reading is often associated with greater nutrition awareness and healthier food choices, while infrequent use may indicate limited understanding or low perceived relevance. Studies show that food label reading behaviour varies widely based on age, education, health status, and interest in diet-related issues. This study was done to assess the frequency of food label use and to examine various associated factors, providing important insight into consumer awareness and informed decision-making.* ***Methodology**: A cross-sectional survey was performed among adults residing in Uttar Pradesh using convenience sampling, through a snowball approach. The study included 348 participants aged ≥ 20 years or older. The study aimed to assess awareness and practices related to food label reading, along with associated factors. Data were collected through a structured questionnaire administered via Google Forms, consisting of multiple-choice, Likert-scale, and open-ended questions. Data was analysed using SPSS software by applying the chi-square test.* ***Results**: Out of 348 respondents, 38.2%, 20.7%, and 14.9% respondents had a habit of reading food labels always, sometimes, and often, respectively. Respondents who always read food labels belong to the age group 20-29 (43.4%) and 30-39 (41.6%). Higher educational attainments (52.9%) and the business category were found to be significantly associated with a frequent habit of reading food labels.* ***Conclusion**: Increasing age, higher educational attainments, occupation, Dietary preferences, and presence of health issues like hypertension, diabetes, and cardiovascular health, were found to be significant ($p < 0.05$), whereas gender and food habit (Vegetarian/ non-vegetarian) were found to be insignificant.*

***Keywords:** Cardiovascular diseases**,** Dietary habits, Diabetes, Food labels, Hypertension.*

Introduction:

Food labels play a crucial role in guiding consumer preferences, choices, and promoting healthier dietary habits. They provide information about nutritional content, ingredient use, and quality standards. This helps respondents make informed decisions. However, despite widespread awareness of food labels, research indicates a gap in consumer knowledge and practical use. This is especially true in developing nations like India ***(Bhattacharya et al, 2022; Shireen et al., 2022)***. Factors such as education, age, gender, income, and dietary preferences influence engagement with food labels. Barriers like technical complexity and limited awareness of informative plans hinder effective use of resources ***(Srivastav et al., 2022; Pahlani et al., 2025; Aggarwal et al., 2025)***. This study examined the current state of food label awareness, reading habits and associated factors in the study group. It also identifies challenges and opportunities to improve food label design and consumer education. Addressing these gaps can help policymakers and stakeholders increase the effectiveness of food labels. This may lead to healthier food choices among diverse populations.

Methods & Materials:

A cross-sectional survey was conducted among the respondents residing in Uttar Pradesh to assess awareness of the habit of reading food labels and associated factors among the 348 adult population aged >20 years. Taking 50.8% prevalence of habit of reading food labels ***(Samiya Batey and Datta Patel, 2024)***, at permissible error of 7.5% (absolute) and a design effect of 1.5 and with a 10% non-response rate. At a confidence interval at 95%. The required sample size calculated was 348. Data was collected using a structured questionnaire using Google Forms, which comprised multiple-choice questions, Likert scale-based ***(Uebersax, John S., 2006)*** and open-ended questions. The questionnaire was pretested on a small sample (20 adults) to ensure precision and application and adjustments were made accordingly. Participants were engaged through snowball sampling via digital platforms (email and social media). Participation was entirely voluntary and informed consent of the participants was obtained electronically before they could access the questionnaire. Confidentiality of participants was maintained and no personally identifiable information was collected beyond what was necessary for the research. Respondents were informed about the purpose of the study, their right to withdraw at any time and measures taken to ensure confidentiality and data security. The Google Form was open for 2 months and responses were automatically logged in a secure spreadsheet to prevent duplication. Data were exported to SPSS software for analysis. Descriptive statistics, including frequencies and percentages, were calculated. Inferential tests, such as chi-square, were applied, with a significance level at $p < 0.05$.

Results:

The responses from the survey on 348 respondents show that 70.1% respondents were aware about the importance of reading food labels on packaged food products, whereas 29.9% respondents were unaware of the importance of reading food labels. When the question was asked about "Do you know how to read food labels?" 67% respondents were aware of how to read food labels, whereas 33% respondents did not know how to read food labels. Questions related to the frequency of reading food labels showed that 14.9% respondents read the food label often, 38.2% respondents read food labels always, 20.7% respondents read food label sometime, whereas 13.2% and 12.9% respondents rarely and never read the food labels, respectively. Knowledge about vegetarian and non-vegetarian food labels was also assessed using the colour coding (*red and green*), where it was found that 77.3% respondents were aware of the colour coding of vegetarian and non-vegetarian food products, whereas 22.7% respondents were unaware of the colour coding. Awareness about the "*Zero trans-fat*" or "*trans-fat free*" label was found to be very low, with only 22.1% respondents being aware of the correct percentage, "which is less than 0.2 grams of industrial trans-fat/100 grams" and 77.9% were unaware of the exact percentage or the knowledge of "*zero trans-fat"* labelling. Respondents were also asked about the frequency of checking sodium content on the nutritional information label, where it was found that 23.6% of respondents always check the sodium/ salt content in the packaged food, 13.2% checked it often, whereas 23.3%, 19.5% and 20.4% check the sodium content sometimes, rarely and never, respectively. The knowledge about a healthy diet was also assessed, where it was observed that knowledge about a healthy and balanced diet was good enough in 55% respondents, whereas 44.5% respondents had partial knowledge about a healthy and balanced diet. *(Table-1)*

Table 1: Responses Based on Habits and Knowledge about Reading Food Labels While Purchasing Packaged Food

Questions	No.	%
Do you know the importance of reading the food labels on packaged products?		
No	104	29.9
Yes	244	70.1
Do you know how to read a food label?		
No	115	33.0
Yes	233	67.0
How often do you read food labels while purchasing packaged food?		
Always	133	38.2
Never	45	12.9
Often	52	14.9
Rarely	46	13.2

Sometimes	72	20.7
Awareness about vegetarian and non-vegetarian labels (Green/ Red)		
Aware	269	77.3
Unaware	79	22.7
Awareness about the "ZERO trans-fat"/ "Trans-fat free" label		
Aware	77	22.1
Unaware	271	77.9
How often do you check the sodium salt content on the nutritional information (Food Labels)?		
Always	82	23.6
Never	71	20.4
Often	46	13.2
Rarely	68	19.5
Sometimes	81	23.3
What do you understand about a healthy/ balanced diet?		
Knowledgeable	193	55.5
Have Partial Knowledge	155	44.5

Socio-demographic Associates of Food Labels Reading Habit:

The Socio-Demographic associates of the frequency of reading food labels while purchasing packaged food items have revealed that age of the respondents was significantly associated with frequency of reading food labels, where 43.4% and 41.6% respondents of age groups 20 to 29 and 30 to 39 always read food label, on the other hand it was observed that frequency of reading food label declined with increasing age 28.8%, 20.7% and 12.5% in age group 40 to 49 years 50 to 59 years and ≥60 years respectively. A positive trend was observed between the age groups and frequency of "*Never*" reading food labels while purchasing packaged food where it was observed that as the age increased, the frequency of "*Never*" reading food label also increased where 44.8% of respondents of age group 50 to 59 years and 25% of respondents from age group ≥60 years never read food labels while buying packaged food product. Educational attainment was also found to be closely associated with the frequency of reading food labels, where it was observed that respondents who had an intermediate level of education (52.9%) and graduate and above (40.3%) always read food labels as compared to those with primary and below (20%) and secondary and high school (17.1%). Occupation-wise, a significant link was observed with the frequency of reading food labels on packaged food. It was noted that 44.8% of Business class, 41.9% of service sector workers and 38.4% of students consistently read food labels. In contrast, 30.2% of self-employed respondents, 29.7% of unemployed people and 16.7% of retired respondents also frequently read food labels. *(Table- 2)*

Table-2: Socio-demographic Factors Associated with the Frequency of Reading Food Labels While Purchasing Packaged Food								
		Always	**Often**	**Sometimes**	**Rarely**	**Never**	**Total**	**Test of Sig.**
Age (Years)								
20-29	No.	79	27	40	23	13	182	**χ^2= 54.476 df= 16 p =0.000**
	%	43.4	14.8	22.0	12.6	7.1	100	
30-39	No.	32	13	18	9	5	77	
	%	41.6	16.9	23.4	11.7	6.5	100	
40-49	No.	15	11	9	5	12	52	
	%	28.8	21.2	17.3	9.6	23.1	100	
50-59	No.	6	0	4	6	13	29	
	%	20.7	0.0	13.8	20.7	44.8	100	
>60	No.	1	1	1	3	2	8	
	%	12.5	12.5	12.5	37.5	25.0	100	
Gender								
Male	No.	90	32	51	34	35	242	χ^2= 3.705 df= 4 p = 0.447
	%	37.2	13.2	21.1	14.0	14.5	100	
Female	No.	43	20	21	12	10	106	
	%	40.6	18.9	19.8	11.3	9.4	100	
Education								
Primary and Below	No.	2	3	3	0	2	10	**χ^2= 65.668 df= 12 p = 0.000**
	%	20.0	30.0	30.0	0.0	20.0	100	
Secondary and High School	No.	7	6	5	3	20	41	
	%	17.1	14.6	12.2	7.3	48.8	100	
Intermediate	No.	18	1	6	5	4	34	
	%	52.9	2.9	17.6	14.7	11.8	100	
Graduate and Above	No.	106	42	58	38	19	263	
	%	40.3	16.0	22.1	14.4	7.2	100	
Occupation								
Business	No.	13	7	4	0	5	29	**χ^2= 40.359 df= 20 p =0.004**
	%	44.8	24.1	13.8	0.0	17.2	100	
Retired	No.	1	1	1	3	0	6	
	%	16.7	16.7	16.7	50.0	0.0	100	
Self-employed	No.	13	6	14	7	3	43	
	%	30.2	14.0	32.6	16.3	7.0	100	
Service (Government/ Private)	No.	67	20	34	19	20	160	
	%	41.9	12.5	21.3	11.9	12.5	100	
Student	No.	28	12	13	15	5	73	
	%	38.4	16.4	17.8	20.5	6.8	100	
Unemployed	No.	11	6	6	2	12	37	
	%	29.7	16.2	16.2	5.4	32.4	100	

Dietary/ Nutritional Associates of Food Labels Reading Habit:

Dietary/nutritional habits of the respondents were also assessed and it was found that 46% respondents who followed a specific kind of diet habit, like the keto diet, gluten-free diet or

intermittent fasting, "always" read the food label. 42.6% respondents having no health issues always read the food label, whereas 26.8% respondents having health issues always read food labels. Hypertension was observed that 15.8% respondents with hypertension always read the food label, whereas 38.6% respondents with hypertension never read the food label in the package food. A significant association was also observed among the respondents having diabetes, where it was found that 40.9 % non-diabetic respondents read the food labels; on the other hand, 37.1% diabetic respondents "never" read food labels. Respondents having cardiovascular disease were also found to be associated with the frequency of reading food label where it was found that 11.1% respondents with cardiovascular disease read food labels, whereas 55.6% respondents with cardiovascular disease "*never"* read food labels. *(Table- 3)*

Table-3:		**Nutritional Factors Associated with the Frequency of Reading Food Labels While Purchasing Packaged Food**						
		Always	**Often**	**Sometimes**	**Rarely**	**Never**	**Total**	**Test of Sig.**
Food Habit								
Non-vegetarian	No.	35	12	22	12	10	91	χ^2= 3.786 df= 8 p = 0.876
	%	38.5	13.2	24.2	13.2	11.0	100	
vegetarian	No.	81	35	39	26	30	211	
	%	38.4	16.6	18.5	12.3	14.2	100	
Ovatarian	No.	17	5	11	8	5	46	
	%	37.0	10.9	23.9	17.4	10.9	100	
Following a specific Diet- keto/ gluten-free/ Intermittent fasting etc.								
Yes	No.	40	12	22	4	9	87	**χ^2= 10.237** **df= 4** **p = 0.037**
	%	46.0	13.8	25.3	4.6	10.3	100	
No	No.	93	40	50	42	36	261	
	%	35.6	15.3	19.2	16.1	13.8	100.0	
Presence of Health Issues								
Yes	No.	26	17	19	13	22	97	**χ^2= 15.153** **df= 4** **p = 0.004**
	%	26.8	17.5	19.6	13.4	22.7	100	
No	No.	107	35	53	33	23	251	
	%	42.6	13.9	21.1	13.1	9.2	100.0	
Hypertension								
Yes	No.	9	7	14	5	22	57	**χ^2= 45.533** **df= 4** **p = 0.000**
	%	15.8	12.3	24.6	8.8	38.6	100	
No	No.	124	45	58	41	23	291	
	%	42.6	15.5	19.9	14.1	7.9	100	
Diabetes								
Yes	No.	5	7	6	4	13	35	**χ^2= 24.470** **df= 4** **p = 0.000**
	%	14.3	20.0	17.1	11.4	37.1	100	
NO	No.	128	45	66	42	32	313	
	%	40.9	14.4	21.1	13.4	10.2	100	
Cardiovascular diseases								
Yes	No.	3	3	4	2	15	27	**χ^2= 48.278** **df= 4** **p = 0.000**
	%	11.1	11.1	14.8	7.4	55.6	100	
No	No.	130	49	68	44	30	321	
	%	40.5	15.3	21.2	13.7	9.3	100	

Discussion:

The present study, based on responses from the 348 respondents, revealed that the 70.1% respondents knew the importance of reading food labels while buying packaged food products. A similar observation was found in a study from Varanasi (89%) ***(Srivastav et al, 2022)*** and Bangladesh (56.2%) ***(Islam et al., 2024),*** whereas a study from South India showed a lower (19%) prevalence of the importance of reading food labels ***(Robert, S. D., and A. Chandran, 2017)***. In this study, knowledge of reading food labels disclosed that 67% respondents were aware of how to read food labels, whereas in other studies, a higher (95.8%, 80%) prevalence has been noticed ***(Donga, Gautam, and Naresh Patel, 2017; Srivastav et al, 2022)***. Whereas, only 5% of respondents from Ernakulam and Coimbatore were aware of the proper method of reading food labels ***(Robert, S. D., and A. Chandran, 2017)***. The study assessed the frequency of reading food labels, and it was observed that 38.2% respondents read food labels always, 14.9% respondents read the food label often, 20.7% respondents read food label sometime, whereas 13.2% and 12.9% respondents rarely and never read the food labels, respectively. A review study based on Indian consumers and another study from Zimbabwe had a higher (90% and 77.2%) instance of reading food labels, respectively (***Shireen et al., 2022; Donga, Gautam, and Naresh Patel,2017)***, and a study from Tamil Nadu also had a comparatively higher (52%) instance than the present study ***(Murugesan et al, 2025)***.

The respondents' knowledge about vegetarian and non-vegetarian food labels revealed their understanding of basic label elements, where 77.3% of respondents were aware of the colour coding of vegetarian and non-vegetarian food products, whereas 22.7% of the respondents were unaware of the colour coding. A similar assessment was conducted in a review study, where most respondents were able to identify the element ***(Pahlani et al., 2025)***. In terms of Awareness about the "*Zero trans-fat*" label, a very low prevalence of awareness was found, where 22.1% were only aware of the correct percentage and 77.9% were unaware of the exact amount considered as *Trans-fat free* or "*zero trans-fat"* labelling. A study from Zimbabwe had a lower prevalence (14%) of interest in any type of fat/cholesterol content in packaged food ***(Chopera et al, 2014)***, whereas a high awareness interest rate was observed from Gujarat based study [10]. Respondents were also asked regarding the frequency of checking sodium content on the nutritional information label, where it was found that 23.6% of respondents always check the sodium/ salt content in the packaged food, 13.2% checked it often, whereas 23.3%, 19.5% and 20 .4% check the sodium content sometimes, rarely and never, respectively. Studies from Bathinda and Zimbabwe reported a lower prevalence than the current study ***(Aggarwal et al., 2025; Chopera et al, 2014)***. The knowledge about a healthy and balanced diet was also assessed, where it was observed that knowledge about a healthy and balanced diet was good

enough in 55% respondents, whereas 44.5% respondents had partial knowledge about a healthy and balanced diet. A study from North Carolina revealed that respondents reading food labels also had self-efficacy for healthy eating ***(Satia et al, 2005)***.

In this study, the younger adults of the age groups 20-29 and 30-39 years were more frequent in reading food labels (always read) (43.4% and 41.6%) while purchasing packaged food item and a similar trend was observed in 2 studies from India, and other studies from Varanasi and Bangladesh, ***(Bhattacharya et al, 2022; Pahlani et al., 2025; Srivastav et al, 2022; Islam et al., 2024)*** whereas older adults were found to be more engaged in a study from North Carolina ***(Murugesan et al, 2025)***. The study revealed that educational attainment was closely associated with the prevalence of reading food labels, where it was observed that respondents who had an intermediate level of education (52.9%) and were graduate and above (40.3%) always read food labels as compared to those with primary and below (20%), and secondary and high school (17.1%). A similar positive association was observed in a study from Ernakulam & Coimbatore, Tamil Nadu, Bangladesh, Bathinda, Gujarat, North Carolina and China ***(Robert, S. D., and A. Chandran, 2017; Murugesan et al, 2025; Islam et al., 2024; Aggarwal et al., 2025; Satia et al, 2005; Yang, Ling et al., 2024)***, where respondents with higher educational attainments were found to read food labels more frequently/always. Occupation-wise, a significant link was observed with the frequency of reading food labels on packaged food. It was noted that 44.8% of Business class, 41.9% of service sector workers, and 38.4% of students consistently read food labels. In contrast, 30.2% of self-employed respondents, 29.7% of unemployed people, and 16.7% of retired respondents also frequently read food labels. A study from Bathinda city indicates that Professionals and semiprofessionals were more frequent readers of food labels as compared to other occupational categories like service and business ***(Aggarwal et al., 2025)***. Dietary/nutritional habits of the respondents were also assessed and it was found that 46% respondents who followed a specific kind of diet habit, like the keto diet, gluten-free diet or intermittent fasting, “always” read the food label. 42.6% respondents having no health issues always read the food label, whereas 26.8% respondents having health issues always read food labels. A review study from India and another study from North Carolina found a close association with various dietary preferences and food label reading frequency in adults ***(Pahlani et al., 2025; Satia et al, 2005)***. A significant association was also observed, where it was found that respondents who rarely or never have the habit of reading food labels were having hypertension, diabetes, and cardiovascular disease. In this context, no study was found in the literature review showing a relation between the habit of reading food labels and the presence of any of the above diseases.

Implications:

The study examined habits of food label reading and its associated demographic and nutritional factors. Age, education, occupation, dietary preferences and the presence of health issues such as hypertension, diabetes and abnormal cardiovascular conditions emerged as the most significant associates ($p < 0.05$), whereas gender and food habits (Vegetarian/non-vegetarian) were found to be insignificant. The findings signify an urgent need to pay attention to the habit of reading food labels on packaged food by buyers, while purchasing. This could help protect future generations from metabolic imbalances that may lead to diseases like hypertension, diabetes, and cardiovascular issues. Identification and assessment of these breaches may help policymakers and stakeholders improve food label efficacy. This may encourage healthier and more informed choices in different population groups.

Conflict of Interests:

No potential conflict of interest by the authors.

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Use of Generative Artificial Intelligence (GenAI):

AI tools such as ChatGPT and Grammarly were used merely to improve the sentences and to enhance the clarity of the manuscript. The tools were, however, not used for generating technical content, analyzing or interpreting the data.

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