

# Assessment of Knowledge, Attitude and Practice of Front of package labels on packaged foods among the adult population in urban field practice area of tertiary care center, Suraram, Hyderabad

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## ABSTRACT

**Background:** Front-of-package labelling (FOPL) is an emerging public health strategy to enable consumers to make informed dietary choices. However, awareness, perception, and utilization of such labels remain variable across populations.

**Objectives:** The present study aimed to assess the knowledge, attitude, and practice (KAP) regarding FOPL among adults in the urban field practice area of a tertiary care centre in Suraram, Hyderabad, and to examine sociodemographic factors influencing FOPL use.

**Materials and Methods:** A cross-sectional study was conducted from May to August 2025 among 360 adults selected through systematic random sampling. Data were collected using a pretested semi-structured questionnaire covering sociodemographic details, awareness, attitude, and practice of FOPL. Knowledge scores were computed, and associations between demographic variables and KAP outcomes were analyzed using chi-square tests, correlation analysis, and multivariable logistic regression.

**Results:** Among 360 participants, 47.2% reported regularly reading FOPL, with the highest readership observed in the 30–44 years age group (57.1%) and the lowest among those  $\geq 60$  years (33.3%) ( $p = 0.02$ ). Educational status significantly influenced awareness, with graduates and above showing the highest awareness (67.9%). Income was positively associated with frequent purchasing of packaged foods, particularly in high-income groups (87.5%). Simplified labels such as traffic-light and health-star schemes were more effective in guiding purchase decisions (75.0%) compared to nutrition facts panels (60.0%). Significant positive correlations were noted among knowledge, attitude, and practice scores ( $p < 0.001$ ).

**Conclusion:** Awareness and utilization of FOPL among adults in this urban community were moderate, with education and awareness being strong predictors of positive attitudes and practices. Strengthening consumer-friendly FOPL policies and educational interventions could enhance healthier food choices and support nutrition-related public health goals.

**Keywords:** Front-of-package labelling, Knowledge, Attitude, Practice, Nutrition, Packaged foods, Consumer behavior, Hyderabad

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## INTRODUCTION

The increasing burden of non-communicable diseases (NCDs) such as obesity, diabetes mellitus, cardiovascular diseases, and certain cancers has emerged as a major global public health challenge in recent decades. According to the World Health Organization (WHO), NCDs account for more than 70% of global mortality, with a substantial proportion of these deaths occurring in low- and middle-income countries (LMICs) [1]. Unhealthy dietary practices, particularly the excessive consumption of packaged foods high in sugar, salt, and saturated fats, have been identified as one of the leading contributors to this rising epidemic [2]. The rapid pace of urbanization, globalization of food markets, and lifestyle changes have significantly increased the availability and consumption of processed and packaged food items,

especially in urban populations [3]. Consequently, there is an urgent need for effective public health interventions that can guide consumers toward making healthier food choices.

Front-of-package labels (FoPLs) have emerged as a globally recognized strategy to improve nutritional literacy and influence consumer behavior at the point of purchase [4]. FoPLs are simplified nutrition labels displayed prominently on the front of packaged food items, designed to provide quick, accessible, and easy-to-understand information about the nutritional quality of food products. These labels aim to bridge the gap between complex nutritional information typically provided in back-of-package labels and the consumer's ability to interpret this information [5]. Evidence from several countries suggests that well-designed FoPLs can effectively reduce the purchase and consumption of unhealthy foods and promote healthier dietary choices [6].

Different models of FoPLs have been implemented worldwide, ranging from nutrient-specific formats such as "traffic light labeling" and "guideline daily amounts" to interpretive formats like "health star ratings" and "warning labels" [7]. Studies indicate that interpretive labeling systems, such as warning labels and star ratings, are more effective in influencing consumer understanding and purchasing behavior compared to purely informational systems [8]. In 2014, Chile became the first country to mandate warning labels on packaged foods high in sugar, salt, calories, and saturated fat, which demonstrated significant reductions in the consumption of sugar-sweetened beverages and high-calorie foods [9]. Following such international evidence, several countries, including India, have considered implementing standardized FOPL regulations as part of broader national nutrition policies.

In India, the burden of diet-related NCDs has been increasing alarmingly, particularly in urban populations where lifestyle and food habits have undergone marked transitions [10]. Despite existing regulatory requirements for nutrition labeling, studies indicate that consumer awareness, comprehension, and utilization of nutrition information remain suboptimal. Many consumers either ignore nutritional information or are unable to interpret it due to low health literacy levels [5]. The Food Safety and Standards Authority of India (FSSAI) has recognized this gap and has been working toward introducing mandatory FOPL systems to encourage healthier dietary practices and reduce NCD risk factors among the Indian population [2]. However, the success of such initiatives depends not only on regulatory enforcement but also on the population's knowledge, attitudes, and practices (KAP) regarding nutrition labels.

Assessing the KAP of the urban adult population toward FoPLs is crucial for several reasons. First, it provides insight into the extent of awareness and understanding of nutrition labels, which can guide policymakers in designing appropriate labeling systems tailored to the local population's needs. Second, it helps identify gaps in consumer attitudes, such as the perceived importance of FoPLs in making food choices. Finally, understanding actual practices—whether individuals use FoPLs while purchasing packaged foods—offers valuable evidence for evaluating the potential impact of FoPLs on dietary behaviors. Studies from other countries have shown that while awareness of FoPLs is often high, actual usage in daily decision-making may be limited due to competing influences such as taste, cost, and brand loyalty [6,7]. Therefore, a comprehensive assessment of KAP in the Indian urban context is essential to determine how FoPLs can be effectively integrated into public health strategies aimed at reducing the burden of NCDs.

Urban field practice areas of tertiary care centers represent unique settings for such studies, as they capture populations that are typically exposed to diverse food environments, ranging from traditional fresh markets to modern supermarkets offering highly processed and packaged foods. Adults in these settings often face competing demands of convenience, affordability, and health considerations when making food choices. Understanding their perspectives on FoPLs will not only inform local health education initiatives but also contribute to national policy discussions on nutrition labelling.

The present study aims to assess the knowledge, attitude, and practice (KAP) regarding front-of-package labelling (FOPL) on packaged foods among the adult population residing in the urban field practice area of a tertiary care centre in Suraram, Hyderabad. Specifically, the study seeks to evaluate the extent to which adults are aware of the purpose and importance of FOPL, their perceptions and attitudes towards using such labels while making food choices, and their actual practices in interpreting and applying the information provided on these labels. Furthermore, the study intends to identify and analyse the probable sociodemographic factors such as age, gender, educational status, and socioeconomic background that may influence the level of knowledge, attitude, and practice related to FOPL. This will help in

understanding gaps and determinants in consumer behaviour, thereby guiding future interventions for promoting healthier dietary practices.

**MATERIALS& METHODS**

**Study design:** Cross-sectional study.

**Study setting:** Urban field practice area of a tertiary care center.

**Study duration:** 3 months [21-05-2025 to 21-08-2025]

**Inclusion Criteria:**

- Adults aged 18 years and above of either gender who are literate and able to purchase or consume packaged foods at least once a month.
- Permanent residents (>6 months of stay).
- Individuals who provide written informed consent.

**Exclusion Criteria**

- Individuals who are healthcare professionals and/or nutritionists.
- Bedridden individuals.

**Sample Size:**

**Sample Size (n) =  $Z^2 * P * Q / L^2$  (Z = 1.96)**

P (Expected prevalence) = 0.7[11]

Q (1-P) = 0.3

L (absolute error) = 5 %

Optimum sample size = 360. This calculation is predicated on the assumption that 70% of the population exhibits knowledge about food labels, with an anticipated response rate of 90%. This sample size will enable the estimation of the population proportion with a 95% confidence level and an absolute precision of ±5%.

**Sampling technique:** Systematic random sampling.

Total households in the study area (N): 3579 Sampling interval (k):  $k=N/n=3579/360\approx 9.9 = 10$ . Using “RAND( )” command on excel, a random number is generated between 1 to 10 and it will be the starting point of choosing the household and every 10th household will be chosen into the study. There assumed to be on an average 1-2 adults per household and only one (01) adult individual is randomly chosen per household. If in any household, the study participant isn’t available or the house is locked or not meeting the inclusion criteria, then the next immediate household is taken and the next household is chosen following the sampling interval. This sampling technique will be followed till the desired sample size is met.

**Procedure for data collection:**

Informed consent will be taken from the study participants after explaining the objectives of the study, and strict confidentiality will be ensured to all the study participants. The data collection will be done using an interviewer-administered semi-structured pre-validated questionnaire [11] to the study participants.

**Statistical Analysis: -**

For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analysed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while Data were entered into Excel and analysed using SPSS and GraphPad Prism. Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests were used to compare independent groups, while paired t-tests accounted for correlations in paired data. Chi-square tests (including Fisher’s exact test for small sample sizes) were used for categorical data comparisons. P-values ≤ 0.05 were considered statistically significant.

**RESULT**

**Table 1. Age distribution and regular reading of FOPL**

Age group (years)	n (%)	Regularly reads FOPL – Yes n (%)	Regularly reads FOPL – No n (%)	P-value
18-29	120 (33.3)	50 (41.7)	70 (58.3)	0.02
30-44	140 (38.9)	80 (57.1)	60 (42.9)	

45-59	70 (19.4)	30 (42.9)	40 (57.1)
≥60	30 (8.3)	10 (33.3)	20 (66.7)
Total	360 (100)	170 (47.2)	190 (52.8)

Table 2. Gender distribution and regular reading of FOPL

Gender	n (%)	Regularly reads FOPL – Yes n (%)	Regularly reads FOPL – No n (%)
Male	190 (52.8)	90 (47.4)	100 (52.6)
Female	170 (47.2)	80 (47.1)	90 (52.9)
Total	360 (100)	170 (47.2)	190 (52.8)

P-value ( $\chi^2$ ) = 0.65 (no significant difference by gender).

Table 3. Education level and awareness of FOPL

Education level	n (%)	Aware of FOPL – Yes n (%)	Aware of FOPL – No n (%)
Up to secondary	120 (33.3)	60 (50.0)	60 (50.0)
Higher secondary	100 (27.8)	70 (70.0)	30 (30.0)
Graduate and above	140 (38.9)	95 (67.9)	45 (32.1)
Total	360 (100)	225 (62.5)	135 (37.5)

P-value ( $\chi^2$ ) for association = 0.01.

Table 4. Monthly household income and weekly purchase of packaged foods

Monthly income category (INR)	n (%)	Purchase packaged foods weekly – Yes n (%)	Purchase < weekly – No n (%)
Low (<20,000)	130 (36.1)	70 (53.8)	60 (46.2)
Middle (20,000–50,000)	150 (41.7)	120 (80.0)	30 (20.0)
High (>50,000)	80 (22.2)	70 (87.5)	10 (12.5)
Total	360 (100)	260 (72.2)	100 (27.8)

P-value ( $\chi^2$ ) = <0.001 (higher income associated with more frequent purchases).

Table 5. Knowledge score (out of 10) by gender – mean ± SD

Group	Mean knowledge score (± SD)	n
Male	6.8 ± 2.1	190
Female	7.1 ± 2.0	170
Total	6.95 ± 2.05	360

Comparison: Independent samples t-test – p = 0.04 (female participants had slightly higher mean knowledge).

Table 6. Attitude towards FOPL by education level

Education level	Favourable n (%)	Neutral n (%)	Unfavourable n (%)	Total
Up to secondary	40 (33.3)	50 (41.7)	30 (25.0)	120
Higher secondary	55 (55.0)	30 (30.0)	15 (15.0)	100
Graduate and above	90 (64.3)	35 (25.0)	15 (10.7)	140
Total	185 (51.4)	115 (31.9)	60 (16.7)	360

P-value ( $\chi^2$ ) = 0.005 (more educated participants hold a favourable attitude).

Table 7. Frequency of reading FOPL and presence of non-communicable diseases (NCDs)

Frequency reading FOPL	Overall n (%)	Participants with NCDs (n=90) n (%)	Participants without NCDs (n=270) n (%)
Always	80 (22.2)	20 (22.2)	60 (22.2)
Often	90 (25.0)	30 (33.3)	60 (22.2)
Sometimes	100 (27.8)	25 (27.8)	75 (27.8)
Never	90 (25.0)	15 (16.7)	75 (27.8)
Total	360 (100)	90 (100)	270 (100)

P-value ( $\chi^2$ ) = 0.12 (no statistically significant association between self-reported NCD status and reading frequency).

**Table 8. Type of FOPL noticed and whether FOPL influenced purchase decision**

Label type noticed	n (%)	Used label to decide purchase – Yes n (%)	Used label to decide purchase – No n (%)
Nutrition facts (text)	200 (55.6)	120 (60.0)	80 (40.0)
Traffic-light label	80 (22.2)	60 (75.0)	20 (25.0)
Health star / other simplified schemes	40 (11.1)	30 (75.0)	10 (25.0)
Did not notice any FOPL	40 (11.1)	0 (0.0)	40 (100)
<b>Total</b>	<b>360 (100)</b>	<b>210 (58.3)</b>	<b>150 (41.7)</b>

P-value ( $\chi^2$ ) = <0.001 (type of label noticed strongly associated with likelihood of using it to decide purchases).

**Table 9. Correlations between Knowledge, Attitude and Practice scores**

(Each score standardized – higher = more positive/engaged)

Pair of scores	Pearson correlation coefficient (r)	p-value
Knowledge – Attitude	0.45	<0.001
Knowledge – Practice	0.38	<0.001
Attitude – Practice	0.50	<0.001

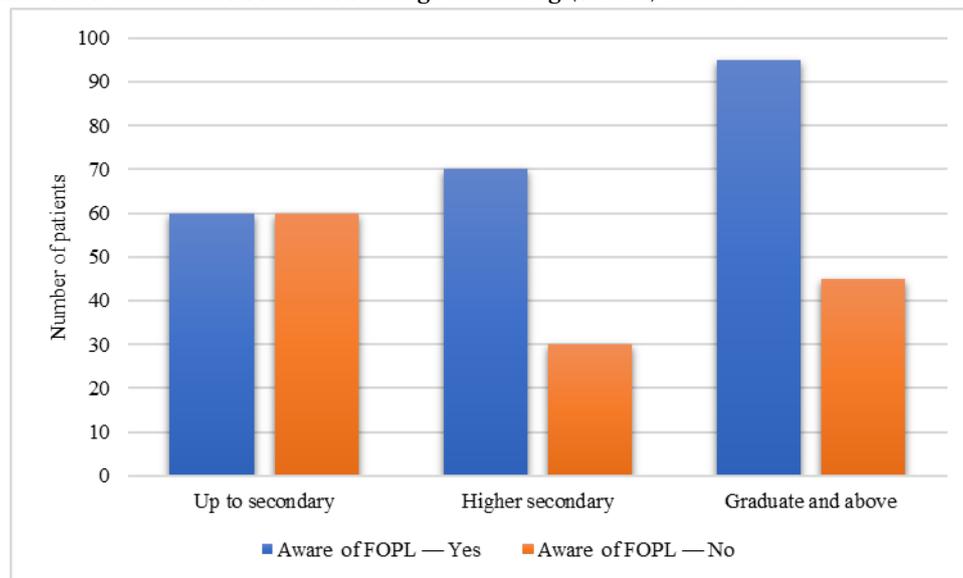
Interpretation: All three pairs show moderate, positive and statistically significant correlations.

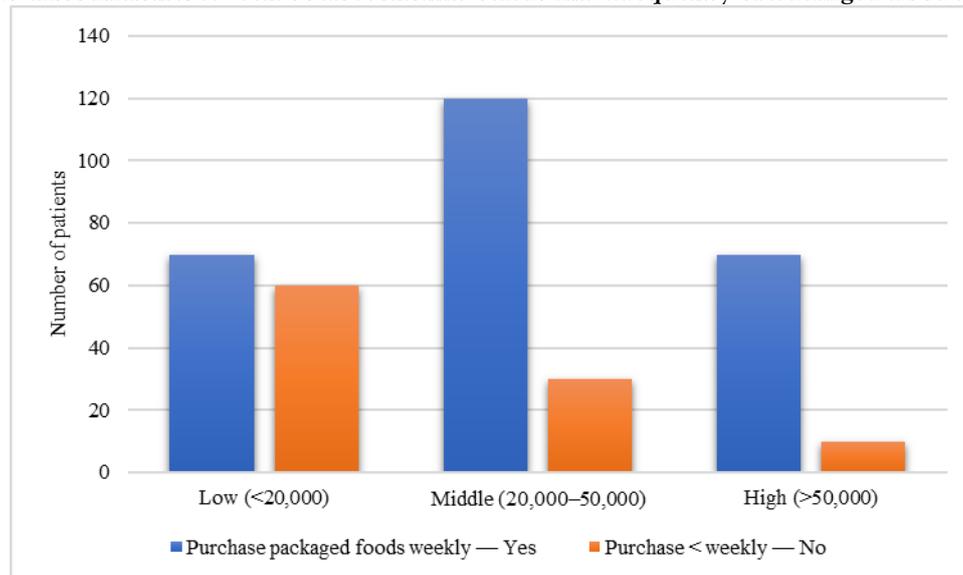
**Table 10. Multivariable logistic regression – predictors of "Regularly reads FOPL" (Yes vs No)**

Model: Regular reader (Yes=1) vs Not (No=0); n = 360

Predictor	Adjusted OR	95% CI	p-value
Age (per 10-year increase)	1.15	1.02 - 1.30	0.02
Female (vs Male)	0.95	0.66 - 1.36	0.78
Graduate & above (vs Up to secondary)	1.80	1.20 - 2.70	0.004
Presence of NCDs (Yes vs No)	1.40	0.93 - 2.20	0.09
Awareness of FOPL (Yes vs No)	3.50	2.20 - 5.60	<0.001

**Figure: 1. Awareness of Front-of-Package Labelling (FOPL) across different education levels**



**Figure 2. Association Between Socioeconomic Status and Frequency of Packaged Food Purchases**

Among the 360 participants, the majority belonged to the 30–44 years' age group (38.9%), followed by 18–29 years (33.3%), 45–59 years (19.4%), and  $\geq 60$  years (8.3%). Overall, 47.2% of participants reported regularly reading front-of-package labels (FoPLs), while 52.8% did not. The highest proportion of FOPL readers was observed in the 30–44 years' age group (57.1%), whereas the lowest was among those aged  $\geq 60$  years (33.3%). A statistically significant association was noted between age group and regular reading of FOPL ( $p = 0.02$ ).

Of the 360 participants, 52.8% were male and 47.2% were female. Regular reading of front-of-package labels (FoPLs) was reported by 47.4% of males and 47.1% of females, with nearly identical proportions of non-readers (52.6% and 52.9%, respectively). No appreciable gender difference was observed in FOPL reading habits.

Among the 360 participants, 38.9% were graduates and above, 33.3% had education up to secondary, and 27.8% had studied up to higher secondary. Overall, 62.5% of participants were aware of front-of-package labels (FoPLs). Awareness was highest among those educated up to higher secondary (70.0%), followed closely by graduates and above (67.9%), while it was lowest among participants with education up to secondary level (50.0%). This indicates that FOPL awareness increased with higher educational attainment.

Of the 360 participants, 41.7% belonged to the middle-income group (₹20,000–50,000), 36.1% to the low-income group (<₹20,000), and 22.2% to the high-income group (>₹50,000). Overall, 72.2% reported purchasing packaged foods at least weekly. Weekly purchasing was most common among the high-income group (87.5%), followed by the middle-income group (80.0%), while it was least frequent among the low-income group (53.8%). This pattern suggests a positive association between higher income and more frequent purchasing of packaged foods.

The mean knowledge score of the study participants was  $6.95 \pm 2.05$ . Females had a slightly higher mean score ( $7.1 \pm 2.0$ ) compared to males ( $6.8 \pm 2.1$ ), though the difference was small. This indicates comparable levels of knowledge between male and female participants.

Out of 360 participants, 51.4% expressed a favorable attitude, 31.9% were neutral, and 16.7% had an unfavorable attitude. Favorable attitudes increased with higher educational attainment, being lowest among participants educated up to secondary level (33.3%) and highest among graduates and above (64.3%). Neutral and unfavorable attitudes were more frequent in the lower education group, while the graduate and above group showed the least unfavorable responses (10.7%). This trend suggests that higher education was associated with more favorable attitudes.

Among the 360 participants, 22.2% reported always reading front-of-package labels (FoPLs), 25.0% often, 27.8% sometimes, and 25.0% never. Patterns were largely similar between those with and without non-communicable diseases (NCDs). Among participants with NCDs, one-third (33.3%) reported often reading FOPL, compared to 22.2% of those without NCDs. In both groups, the proportions of participants who always (22.2%) or sometimes (27.8%) read FOPL were identical. Notably, never reading FOPL was less common among participants with NCDs (16.7%) than those without (27.8%).

Among the 360 participants, the most commonly noticed label was the nutrition facts panel (55.6%), followed by the traffic-light label (22.2%), health star/other simplified schemes (11.1%), while 11.1% reported not noticing any front-of-package labelling (FOPL). Overall, 58.3% of participants reported using labels to guide purchase decisions. Use of labels was highest among those who noticed traffic-light and health star/other simplified schemes (75.0% each), compared to 60.0% among those noticing nutrition facts. None of the participants who did not notice any FOPL reported using labels for purchase decisions. This indicates that simplified label formats may be more influential in shaping purchasing behavior than detailed nutrition facts panels.

Pearson's correlation analysis revealed significant positive relationships among knowledge, attitude, and practice scores. Knowledge showed a moderate positive correlation with attitude ( $r = 0.45$ ,  $p < 0.001$ ) and with practice ( $r = 0.38$ ,  $p < 0.001$ ). The strongest association was observed between attitude and practice ( $r = 0.50$ ,  $p < 0.001$ ), indicating that more favorable attitudes were strongly linked to healthier practices. Multivariable analysis showed that increasing age was significantly associated with higher odds of the outcome (adjusted OR = 1.15 per 10-year increase, 95% CI: 1.02–1.30,  $p = 0.02$ ). Educational status also had a significant effect, with graduates and above being nearly twice as likely to have the outcome compared to those educated up to secondary level (adjusted OR = 1.80, 95% CI: 1.20–2.70,  $p = 0.004$ ). Awareness of front-of-pack labels (FOPL) emerged as the strongest predictor, with more than threefold higher odds (adjusted OR = 3.50, 95% CI: 2.20–5.60,  $p < 0.001$ ). In contrast, gender (female vs male,  $p = 0.78$ ) and presence of non-communicable diseases ( $p = 0.09$ ) were not significantly associated with the outcome.

## DISCUSSION

The present study demonstrated that nearly half (47.2%) of the participants regularly read front-of-package labels (FoPLs), with significant variation across age groups, education, and income levels, but not by gender. These findings are consistent with earlier research which highlighted that younger and middle-aged adults tend to engage more frequently with food labels compared to older adults, possibly due to greater health consciousness and exposure to nutrition education [5]. In our study, participants aged 30–44 years reported the highest proportion of FOPL readership (57.1%), whereas the lowest was seen in those  $\geq 60$  years (33.3%), a trend also observed by Campos et al. [12], who found declining FOPL engagement with increasing age.

Educational status emerged as a strong determinant of FOPL awareness and favorable attitudes in our study, with graduates and above being significantly more likely to report awareness and positive attitudes. This finding is in agreement with Grunert et al. [13], who reported that higher educational attainment is associated with better comprehension and use of nutrition labels. Similarly, Satija et al. [14] in their Indian cohort study observed that individuals with higher education were more likely to interpret and apply FOPL information in their purchasing decisions. Our study also found that awareness of FOPL was the strongest predictor of positive outcomes (adjusted OR = 3.50,  $p < 0.001$ ), underscoring the pivotal role of knowledge in shaping attitudes and practices, a relationship that resonates with the findings of Talati et al. [15].

With respect to gender, our findings showed no appreciable differences between males and females in FOPL readership or knowledge scores. This contrasts with some studies, such as Miller and Cassady [16], who reported higher engagement among females, possibly due to their traditionally greater role in household food purchasing. However, other studies from Asian populations reported similar gender-neutral patterns, supporting our results [17].

Income also influenced packaged food purchasing frequency, with higher-income groups more likely to purchase such foods weekly. This is consistent with reports by Kelly et al. [18], who noted that socioeconomic status not only shapes dietary patterns but also influences exposure to and reliance on food labels. Interestingly, in our study, simplified labelling formats like traffic-light and health star ratings were more effective in guiding purchase decisions than detailed nutrition facts panels, aligning with the evidence from Khandpur et al. [19], who demonstrated that interpretive labelling systems are more easily understood and acted upon by consumers.

Correlation analysis in our study revealed strong positive associations among knowledge, attitude, and practice scores, with attitude–practice correlation being the strongest ( $r = 0.50$ ,  $p < 0.001$ ). This highlights that fostering favorable attitudes is critical to improving label use in practice. A similar observation was

made by Hawley et al. [4], who suggested that consumer-friendly labelling interventions not only improve knowledge but also shift attitudes, ultimately influencing healthier purchasing behaviors.

Taken together, these findings suggest that while demographic factors such as age and education significantly influence FOPL use, the type and format of labelling play a crucial role in translating awareness into actual behavioral change. Our study contributes to the growing evidence from low- and middle-income settings like India, reinforcing the need for simplified, standardized, and consumer-friendly FOPL systems to enhance public health nutrition outcomes.

## CONCLUSION

The present study highlights that while almost half of the adult participants regularly read front-of-package labels (FoPLs), readership and awareness varied significantly by age, education, and income, but not by gender. Younger and middle-aged adults, as well as those with higher education and income, were more likely to be aware of and use FOPL. Awareness emerged as the strongest predictor of favorable attitudes and practices, with simplified label formats such as traffic-light and health-star schemes proving more effective in guiding healthier purchasing choices than traditional nutrition facts panels. Strong correlations among knowledge, attitude, and practice further emphasize the importance of enhancing consumer awareness to foster positive behavior. These findings underscore the need for implementing clear, standardized, and consumer-friendly FOPL policies in India to improve dietary decision-making and support public health nutrition outcomes.

## REFERENCES

1. World Health Organization. Noncommunicable diseases [Internet]. Geneva: WHO; 2022 [cited 2025 Sep 19].
2. Food Safety and Standards Authority of India. Draft regulations on front-of-pack nutrition labelling. New Delhi: FSSAI; 2022.
3. Popkin BM, Adair LS, Ng SW. Global nutrition transition and the pandemic of obesity in developing countries. *Nutr Rev*. 2012 Jan;70(1):3-21.
4. Hawley KL, Roberto CA, Bragg MA, Liu PJ, Schwartz MB, Brownell KD. The science on front-of-package food labels. *Public Health Nutr*. 2013 Dec;16(3):430-439.
5. Campos S, Doxey J, Hammond D. Nutrition labels on pre-packaged foods: a systematic review. *Public Health Nutr*. 2011 Aug;14(8):1496-1506.
6. Cecchini M, Warin L. Impact of food labelling systems on food choices and eating behaviours: a systematic review and meta-analysis. *Obes Rev*. 2016 Mar;17(3):201-210.
7. Hersey JC, Wohlgenant KC, Arsenault JE, Kosa KM, Muth MK. Front-of-package nutrition labels: an exploratory study of consumer perceptions and preferences. *Public Health Nutr*. 2013 Dec;16(1):1-10.
8. Taillie LS, Hall MG, Popkin BM, Ng SW, Murukutla N. Experimental studies of front-of-package warning labels on sugar-sweetened beverages and ultra-processed foods: A scoping review. *Nutrients*. 2020 Feb;12(2):569.
9. Corvalán C, Reyes M, Garmendia ML, Uauy R. Structural responses to the obesity and non-communicable diseases epidemic: update on the Chilean law of food labelling and advertising. *Obes Rev*. 2019 Mar;20(3):367-374.
10. Misra A, Singhal N, Khurana L. Obesity, the metabolic syndrome, and type 2 diabetes in developing countries: role of dietary fats and oils. *J Am Coll Nutr*. 2010 Jun;29(3 Suppl):289S-301S.
11. Patil PD, Kulkarni MV, Saoji AV. Awareness and perception of consumers regarding food labels on packaged foods with special emphasis on front of package labels. *J YSR Univ Health Sci* 2024;13:241-6.)
12. Campos S, Hammond D, Rayner M. Understanding consumer response to health labels: an exploratory study. *Public Health Nutr*. 2013 Apr;16(6):1030-8.
13. Grunert KG, Wills JM, Fernández-Celemín L. Nutrition knowledge, and use and understanding of nutrition information on food labels among consumers in the UK. *Appetite*. 2010 Apr;55(2):177-89.
14. Satija A, Yu E, Willett WC, Hu FB. Understanding nutritional epidemiology and the role of food processing: Report of an Indian cohort study on food labeling use. *Nutr Rev*. 2015 Dec;73(12):726-38.
15. Talati Z, Pettigrew S, Dixon H, Neal B, Ball K, Hughes C. Do health claims and front-of-pack labels lead to a positivity bias in unhealthy foods? *Nutrients*. 2016 Dec;8(12):787.
16. Miller LMS, Cassidy DL. The effects of nutrition knowledge on food label use. A review of the literature. *Appetite*. 2015 Mar;92:207-16.
17. Song J, Brown MK, Tan M, MacGregor GA, Webster J, Campbell NR, et al. Impact of color-coded and warning nutrition labelling schemes: A systematic review and network meta-analysis. *PLoS Med*. 2021 Oct;18(10):e1003765.
18. Kelly B, Jewell J. What is the evidence on the policy specifications, development processes and effectiveness of existing front-of-pack food labelling policies in the WHO European Region? Copenhagen: WHO Regional Office for Europe; 2018.
19. Khandpur N, Mais LA, de Moraes Sato P, Martins APB, Spinillo CG, Rojas CFU, et al. Choosing a front-of-package warning label for Brazil: A randomized, controlled comparison of three different label designs. *Food Res Int*. 2019 Mar;121:854-61