

Assessment of Consumer Awareness and Attitudes Towards Food Additives: A Cross-Sectional Survey

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Abstract

Processed and packaged foods use a wide variety of food additives that enhance their safety, shelf life, flavour, colour, texture and quality. As the demand for processed foods continues to rise, the knowledge of food additives, their purpose, presence, and safety have become an important part of food safety. The present cross-sectional study aimed at measuring the awareness and attitudes of consumers regarding food additives, and to examine some factors related to their perception and food related behaviors. A structured questionnaire was used to gather data and statistical analysis of the data was done using appropriate statistical methods, such as correlation analysis. The study gives an overview of consumers' knowledge, attitudes, and awareness towards food additive and emphasizes the need for consumer's education and easy-to-understand information on the food label. The results could inform where increased awareness can be used to inform food choice and understanding of food safety information.

Keywords: Food Additives; Consumer Awareness; Attitudes; Food Safety; Processed Foods; Food Labels

1. Introduction

Food additives are substances intentionally added to foods during processing, preparation, packaging, or storage to serve specific technological functions such as preserving freshness, flavour enhancement, and improving the appearance and texture. The use of food additives has become a necessity with the increasing consumption of processed and packaged food around the world. Food additives contribute to food production and food safety. (1)

Before approval for use, food additives undergo scientific safety evaluations by international regulatory agencies. The Joint FAO/World Health Organization (WHO) Expert Committee on Food Additives (JECFA) establishes safety assessments and the acceptable daily intake (ADI) for approved additives. (2)

Despite the above regulations, consumers still believe in the adverse effects of additives such as artificial colours, preservatives, and sweeteners on health. Most consumers are often guided by their beliefs, the media, and trust in manufacturers in their perceptions of food additives. (3) Food labels are a vital source of information for consumers who buy foods, but most consumers do not read the labels and understand the ingredients. (4)

With the growing consumption of processed/packaged food, determining consumer awareness and attitude towards food additives is a necessity. Studies on consumer labelling awareness of food additives have indicated variances in food label awareness and consumer perceptions in different populations. (5) This highlights the need for better understanding and education on food safety. The present cross-sectional survey aimed to determine consumers' awareness and attitude towards food additives and highlight the relationships between selected socio-demographic factors and consumer purchasing behaviours.

2. Materials and Methods

2.1 Study Design

The current study utilized a cross-sectional questionnaire design to determine consumer awareness, attitude, and purchasing behaviour in relation to food additives at one point in time. This study design is commonly used for gathering population-based information regarding perceptions and behavioural patterns as it allows for determining the association between study variables within a certain time frame (6).

The study aimed to ascertain consumer perceptions in relation to the role, safety and labelling of food additives and determine whether consumer demographics such as age, gender, occupation and area of residence were associated with such perceptions. An online survey was chosen due to its ability to allow respondents of varying demographics to participate efficiently.

2.2 Study Population and Sampling Technique

A total of 294 respondents participated in the study. The respondents differed in age, occupation, gender, and place of residence and represented a diverse group for assessing consumer knowledge and attitude towards food additives.

The convenience sampling technique was used in the study, which involved recruiting participants through Google forms in social media and personal contacts. This technique was considered optimal because it facilitated fast recruitment of a wide range of consumers within a short period (6).

Inclusion Criteria

- Willingness to participate in the survey.
- Completion of the online questionnaire.
- Belonging to different age groups and occupations.

Exclusion Criteria

- Incomplete response to the questionnaire.
- Duplicate responses detected at the stage of screening.
- Inconsistent responses.

2.3 Development of the Survey Questionnaire

A well-structured questionnaire was designed using Google Forms to air of only closed-ended questions. The questionnaire was developed following the consumer food additives awareness, labelling, and safety research literature to ensure that it addressed all the relevant issues of interest to the participants with diverse levels of education (7).

The questionnaire had two sections.

The first section aimed to capture the respondent's socio-economic characteristics by inviting them to provide their age group, gender, occupation, and locality. Later, the collected data would be used to perform a chi-square test to establish the association between socio-economic factors and the attitude of consumers towards food additives.

The second section consisted of 15 statements intended to determine the respondents' level of

awareness, perception, and purchasing behavior towards food additives. The statements were grouped into several aspects of food additives, including knowledge, consumer safety, trust towards manufacturers, and interpretation of labelling information. Also, the statements captured the respondents' attitude towards buying products with additives, using social media to gather information, and willingness to pay a premium for products with no additives.

The Likert scale was used to capture the respondents' responses to the 15 statements. The scale was provided with five options of answers: Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree with an assigned value of 1 through 5, respectively (8). The Likert scale has been widely used to measure the attitude of participants in the context of consumer research.

2.4 Data Collection Procedure

The questionnaires were distributed via Google Forms during the research period. Beforehand, the participants were informed about the study's objectives, voluntary nature of their participation, and the confidentiality of the information provided. The respondents could participate voluntarily on an anonymous basis without giving any personal details in return. The informed consents were obtained in electronic form before proceeding to complete the questionnaires.

The collected data were exported to Microsoft Excel from Google Forms after the link was closed. This was done in order to organize the findings, apply codes and check statistical data.

2.5 Data Processing

The gathered responses were subjected to initial screening before analysis.

The following steps were undertaken:

- Checking for response completion,
- Removing any irrelevant or repeated responses,
- Coding of demographic information,
- Coding of Likert-scale responses,
- Preparing frequency tables for analysis.

The analysis was done using Microsoft Excel spreadsheet.

2.6 Statistical Analysis

Statistical analysis was conducted by means of descriptive and inferential statistics to examine the

level of awareness, attitudes, and purchasing behavior towards food additives.

▪ Descriptive Statistics

Descriptive statistics were applied to describe participant characteristics and the survey responses. The frequencies and percentages were computed for demographics and each item of the questionnaire to provide a general overview of participants' responses.

▪ Correlation Analysis

The relationships between selected awareness, attitude, and purchasing behavior variables were explored by means of the Pearson's correlation analysis. The correlation analysis was conducted using coded Likert-scale responses with the Statistics Kingdom Correlation Calculator. The association between the two variables was assessed with a correlation coefficient (r) and evaluated with a p -value. A positive correlation coefficient indicates that with an increase in one variable, there is an increase in another variable, whereas a negative coefficient suggests the opposite (9).

The analyzed variable pairs included beliefs about the safety of natural additives and purchasing decisions, social media influence and perceived harmfulness of food additives, preference for preservative-free labels and willingness to pay more, ingredient label-reading behavior and purchasing decisions, and trust in food manufacturers.

▪ Chi-square Test of Independence

The associations between selected demographics and consumers' attitudes were analyzed using the Chi-square Test of Independence conducted with the Standard Deviation Calculator Chi-square Calculator. The test explored whether age, gender, occupation, and the area of residence were predictive of selected consumer awareness and purchasing behavior variables (10).

The analyzed relationships included age and social media influence on food purchasing decisions, age and perceptions of natural additives, occupation and trust in food manufacturers, gender and perceptions of the role of food additives, and area of residence and ingredient label-reading behavior. Statistical significance was determined using a p -value less than 0.05.

2.7 Ethical Considerations

The study followed ethical principles applicable to voluntary questionnaire-based research. The

participants were provided with information about the study's objectives before engaging in the research, and informed consent was obtained using Google Forms before filling out the questionnaire. Participation was on a voluntary basis, responses were anonymous, and no personal information was collected.

The participants could withdraw from completing the survey at any moment before submitting their responses, and all the information provided would be used solely for academic and research purposes (6).

3. Results

3.1 Demographic Characteristics of Participants

A total of 294 respondents participated in the study. The largest proportion belonged to the 18–25 years age group (44.2%), followed by respondents below 18 years (21.8%). Female respondents constituted 52.4% of the sample, while students represented the largest occupational category. Most participants resided in urban areas (58.5%).

Table 3.1.1. Demographic characteristics of participants ($n = 294$)

Variable	Category	Frequency (n)	Percentage (%)
Age	Below 18	64	21.8
	18-25	130	44.2
	26-35	63	21.4
	36-45	22	7.5
	Above 45	15	5.1
Gender	Female	154	52.4
	Male	140	47.6
Residence	Urban	172	58.5
	Semi-Urban	108	36.7
	Rural	14	4.8
Occupation	Student	172	58.5
	Government Employee	35	11.9
	Private Sector	20	6.8
	Self-Employed	28	9.5
	Homemaker	18	6.1
	Unemployed	14	4.8
	Retired	5	1.7
	Other	2	0.7

RESPONDENTS AGE GROUP

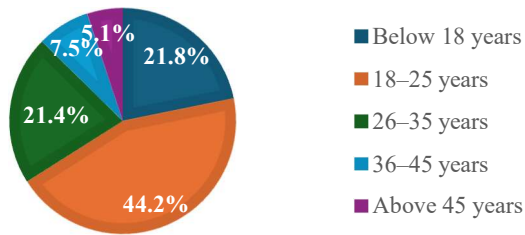


Figure 3.1.1. Distribution of respondents according to age group.

RESPONDENTS GENDER PROPORTION

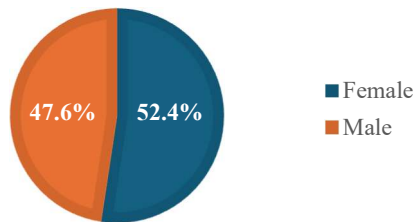


Figure 3.1.2. Distribution of respondents by gender.

OCCUPATION

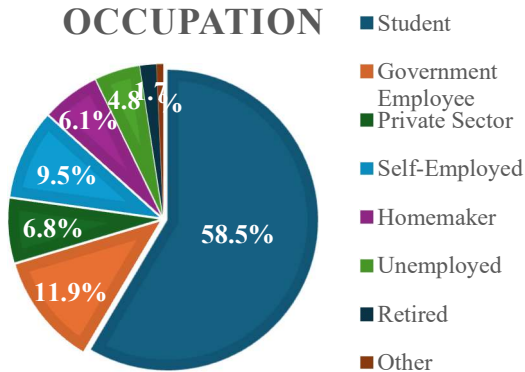


Figure 3.1.3. Distribution of respondents by occupation.

RESIDENCE

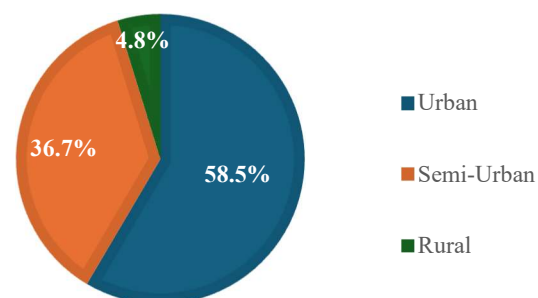


Figure 3.1.4. Distribution of respondents by area of residence.

3.2 Distribution of Consumer Responses

The respondents displayed different levels of awareness and attitudes towards food additives. Most of the respondents selected Neutral, Agree, or Strongly Agree, options for statements relating food additives awareness. This shows that the respondents have mixed perceptions about the safety and use of food additives.

Table 3.2.1. Distribution of responses to food additive awareness and attitude statements (n = 294).

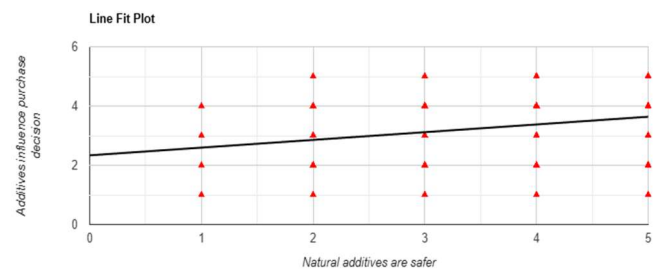
Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Q1. Food additives play an essential role in food production	19	47	125	54	49
Q2. Foods containing food additives are harmful to human health	18	56	116	62	42
Q3. Natural food additives are safer than artificial food additives	11	45	107	66	64
Q4. Foods containing additives are of low quality	14	48	116	72	44
Q5. GMO-derived food additives are safe for use in convenience foods	16	53	135	61	29
Q6. There is no way to avoid food additives	12	64	126	52	40
Q7. I trust manufacturers do not add excessive permitted additives	39	52	124	57	22
Q8. I believe "additive-free" food labels are true	18	45	128	76	26
Q9. "Suitable for Vegetarians"	17	67	107	65	38

means all ingredients and additives are vegetarian					
Q10. I read the ingredient list before purchasing packaged food	17	56	95	79	47
Q11. Food additives influence my purchasing decisions	22	48	107	75	42
Q12. I prefer foods labelled "No Artificial Preservatives"	12	46	110	76	50
Q13. I don't mind paying more for additive-free food products	10	43	123	68	50
Q14. I purchase foods with additives because they taste better	12	58	124	63	37
Q15. Social media influences my food purchasing decisions	15	53	114	70	42

3.3 Pearson Correlation Analysis

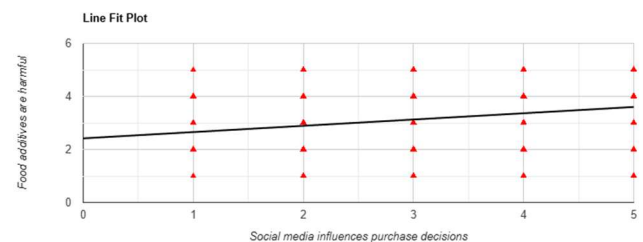
The Pearson correlation test was performed to examine relationships between selected consumer awareness, attitude, and purchasing behavior variables measured on the five-point Likert scale. Correlation coefficients (r) and p -values were obtained using the Statistics Kingdom Correlation Calculator. (9)

Parameter	Value
Pearson correlation coefficient (r)	0.2585
Correlation strength	Small
r^2	0.06683
P-value	0.000007114
Covariance	0.3184
Sample size (n)	294
Statistic	4.5729



Results of the Pearson correlation indicated that there is a significant small positive relationship between Natural additives are safer and Additive influences purchase decision, (r (292) = 0.259, $p < 0.001$). Fig.3.3.1. Correlation between Natural additives are safer and Additive influences purchase decision.

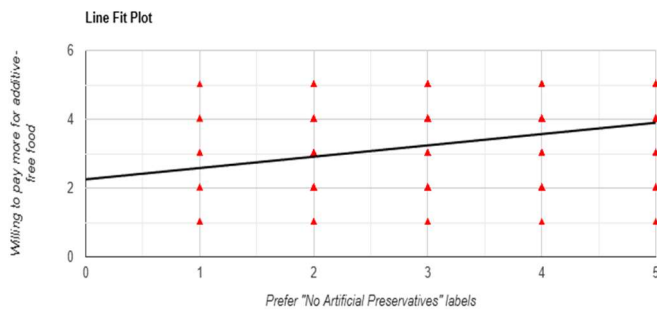
Parameter	Value
Pearson correlation coefficient (r)	0.2316
Correlation strength	Small
r^2	0.05365
P-value	0.00006091
Covariance	0.2695
Sample size (n)	294
Statistic	4.0686



Results of the Pearson correlation indicated that there is a significant small positive relationship between Social media influences purchase decisions and Food additives are harmful, (r (292) = 0.232, $p < 0.001$)

Fig. 3.3.2 Social Media Influence and Perceived Harmfulness of Food Additives.

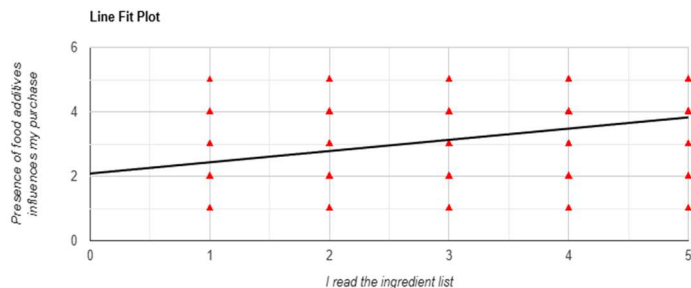
Parameter	Value
Pearson correlation coefficient (r)	0.3384
Correlation strength	Medium
r^2	0.1145
P-value	2.609e-9
Covariance	0.3725
Sample size (n)	294
Statistic	6.1454



Results of the Pearson correlation indicated that there is a significant medium positive relationship between Prefer "No Artificial Preservatives" labels and Willing to pay more for additive-free food, ($r(292) = 0.338, p < 0.001$).

Fig.3.3.3 Preference for "No Artificial Preservatives"

Parameter	Value
Pearson correlation coefficient (r)	0.3503
Correlation strength	Medium
r^2	0.1227
P-value	6.507e-10
Covariance	0.4372
Sample size (n)	294
Statistic	6.3909

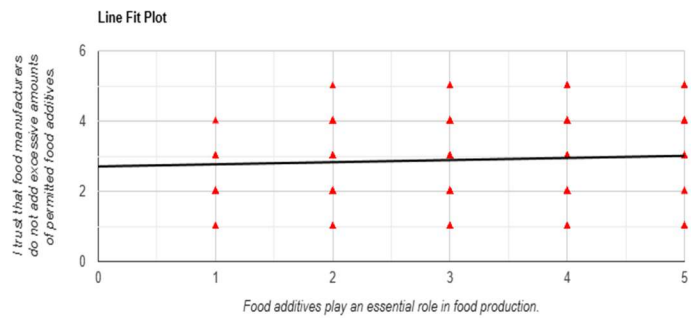


Results of the Pearson correlation indicated that there is a significant medium positive relationship between I read the ingredient list and Presence of food additives influences my purchase, ($r(292) = 0.35, p < 0.001$).

Fig.3.3.4. Ingredient Label Reading and Purchasing Decisions.

Parameter	Value
Pearson correlation coefficient (r)	0.06106
Correlation strength	Very small
r^2	0.003728
P-value	0.2968
Covariance	0.07375

Sample size (n)	294
Statistic	1.0453



Results of the Pearson correlation indicated that there is a non-significant very small positive relationship between Food additives play an essential role in food production and I trust that food manufacturers do not add excessive amounts of permitted food additives., ($r(292) = 0.0611, p = 0.297$).

Fig.3.3.5. Perceived Essential Role of Food Additives and Trust in Food Manufacturers.

3.4 Chi square analysis

The Chi-square test of independence (Chi-square Calculator) was used to assess whether there is an association between selected demographics and consumer awareness, attitudes, and purchasing behavior toward food additives. The test was used to evaluate whether the observed difference between the groups is statistically significant. This test's results were based on the p-value, where a p-value of less than 0.05 is statistically significant. The analysis was conducted using the Standard Deviation Calculator Chi-square Calculator.

Table 3.4.1. Age $\times$ Information about food additives on social media influences my decision to purchase foods containing or avoiding food additives.

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Total
Below 18 years	6	12	22	20	4	64
18-25 years	5	21	46	34	24	130
26-35 years	2	13	33	8	7	63
36-45 years	1	3	12	3	3	22
Above 45 years	1	4	1	5	4	15
Total	15	53	114	70	42	294

Result: The results showed that there was a significant association between age groups and the effect of social media information on the participants buying behavior.

Step by step solution:

Expected frequencies:

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Below 18 years	3.265	11.537	24.816	15.238	9.143
18-25 years	6.633	23.435	50.408	30.952	18.571
26-35 years	3.214	11.357	24.429	15	9
36-45 years	1.122	3.966	8.531	5.238	3.143
Above 45 years	0.765	2.704	5.816	3.571	2.143

Chi square points:

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Below 18 years	3.265	11.537	24.816	15.238	9.143
18-25 years	6.633	23.435	50.408	30.952	18.571
26-35 years	3.214	11.357	24.429	15	9
36-45 years	1.122	3.966	8.531	5.238	3.143
Above 45 years	0.765	2.704	5.816	3.571	2.143

Chi - square = 26.8365

The p-value is 0.0433. Significant at $p < 0.05$.

Table 3.4.2. Age $\times$ Natural food additives are safer than artificial food additives.

Result: The results suggest that there is a link between age group and the idea that natural food additives are safer than artificial food additives.

Step by step solutions :

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
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Below 18 years	3	12	26	15	8
18-25 years	4	18	26	37	45
26-35 years	3	12	32	11	5
36-45 years	1	4	16	0	1
Above 45 years	0	0	7	3	5

Expected frequencies:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Below 18 years	2.395	10.014	23.293	14.367	13.932
18-25 years	4.864	20.34	47.313	29.184	28.299
26-35 years	2.357	9.857	22.929	14.143	13.714
36-45 years	0.823	3.442	8.007	4.939	4.789
Above 45 years	0.561	2.347	5.459	3.367	3.265

Chi square points:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Below 18 years	0.153	0.394	0.315	0.028	2.526
18-25 years	0.153	0.269	9.601	2.093	9.856
26-35 years	0.175	0.466	3.589	0.698	5.537
36-45 years	0.038	0.09	7.98	4.939	2.998
Above 45 years	0.561	2.347	0.435	0.04	0.922

Chi - square = 56.2033

The p-value is 2.2524E-6. Significant at $p < 0.1$.

Table 3.4.3. Occupation $\times$ I trust that food manufacturers do not add excessive amounts of permitted food additives to their products.

Result: The results suggest a strong relationship between occupation and the belief that food

manufacturers do not use an excessive amount of permitted food additives in their products.

Step by step solutions:

Category	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Student	31	35	59	35	12
Government Employee	1	3	20	9	2
Private Sector Employee	2	2	10	3	3
Self-Employed / Business	0	7	17	3	1
Homemaker	3	2	7	4	2
Unemployed	0	2	10	2	0
Retired	2	1	0	1	1
Other	0	0	1	0	1
Total	39	52	124	57	22

Expected frequencies:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Student	22.816	30.422	72.544	33.347	12.871
Government Employee	4.643	6.19	14.762	6.786	2.619
Private Sector Employee	2.653	3.537	8.435	3.878	1.497
Self-Employed / Business	3.714	4.952	11.81	5.429	2.095
Homemaker	2.388	3.184	7.592	3.49	1.347
Unemployed	1.857	2.476	5.905	2.714	1.048
Retired	0.663	0.884	2.109	0.969	0.374
Other	0.265	0.354	0.844	0.388	0.15

Chi square points:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Student	2.935	0.689	2.529	0.082	0.059
Government Employee	2.858	1.644	1.859	0.723	0.146

Private Sector Employee	0.161	0.668	0.29	0.199	1.51
Self-Employed / Business	3.714	0.847	2.281	1.086	0.573
Homemaker	0.157	0.44	0.046	0.075	0.317
Unemployed	1.857	0.092	2.84	0.188	1.048
Retired	2.694	0.015	2.109	0.001	1.047
Other	0.265	0.354	0.029	0.388	4.831

Chi - square = 43.6451

The p-value is 0.0301. Significant at $p < 0.05$.

Table 3.4.4. Gender $\times$ Food additives play an essential role in food production.

Result: The results suggest that there is a link between gender and the idea that food additives are important in the production of food.

Step by step solutions:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Female	3	23	65	33	30	154
Male	16	24	60	21	19	140
Total	19	47	125	54	49	294

Expected frequencies:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Female	9.952	24.619	65.476	28.286	25.667
Male	9.048	22.381	59.524	25.714	23.333

Chi square points:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Female	4.857	0.106	0.003	0.786	0.732
Male	5.342	0.117	0.004	0.864	0.805

Chi - square = 13.6164

The p-value is 0.0086. Significant at $p < 0.05$.

Table 3.4.5. Area of Residence × I read the ingredient list before purchasing packaged food.

Result: The results suggest a strong relationship between the area of the respondent and the likelihood of reading the ingredient list before purchasing a pack of food.

Step by step solutions:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Urban	7	27	65	42	31	172
Semi-Urban	10	28	24	33	13	108
Rural	0	1	6	4	3	14
Total	17	56	95	79	47	294

Expected frequencies:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Urban	9.946	32.762	55.578	46.218	27.497
Semi-Urban	6.245	20.571	34.898	29.02	17.265
Rural	0.81	2.667	4.524	3.762	2.238

Chi square points:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Urban	0.872	1.013	1.597	0.385	0.446
Semi-Urban	2.258	2.683	3.403	0.546	1.054
Rural	0.81	1.042	0.482	0.015	0.259

Chi - square = 16.8648

The p-value is 0.0315. Significant at $p < 0.05$.

4. Discussion

A cross-sectional survey of 294 consumers evaluated awareness, attitudes, and purchasing behaviour towards food additives. Results showed that while respondents were moderately aware of food additives, purchasing behaviour was influenced by perception about natural additives, label-reading behaviour, social media exposure, and selected socio-demographic factors. Awareness of

food additives was not associated with full trust of consumers in food additives or manufacturers.

One of the key findings of this study was the positive link between belief in natural food additives being safer compared to artificial and purchasing decisions, which is compatible with previous evidence indicating that consumers perceive natural food additives as safer and of higher quality, therefore, willing to pay more for products with natural or additive free claims (11). Similar to previous findings, this study showed that those preferring 'No Artificial Preservatives' labels were also more willing to pay extra for additive free items, reflecting the growing consumer preference for additive-free products and perceived trust in them (12).

Another key finding was that respondents more influenced by social media were more likely to consider additives as harmful, which is in line with previous research showing that the manner in which information on food additives is communicated substantially impacts consumer perceptions, intentions to purchase as well as their willingness to pay, even if the actual scientific evidence on the topic stays constant (13). Consumers rely heavily on digital platforms for health information as they are a rich source of it, which makes such platforms powerful tools for both increasing consumer awareness on the importance of food additives as well as creating misconceptions regarding additives currently approved for use in the food supply (13).

A third key finding was the positive association between reading ingredient labels and considering additives in the context of purchasing decision-making (14,15). Those reading ingredient lists were more conscious of additives in foods they purchased, which underlines the importance of providing accessible information on food packages. Interpretive front-of-pack labels have proven to be effective tools in improving consumer understanding of food labels and encouraging healthier choices (14,15).

The study's results also identified significant associations between age, occupation, gender, and area of residence with selected consumer attitudes and behaviours towards food additives. These findings imply that consumer perception around food additives varies across population groups and can be affected by a range of social factors, such as lifestyle and education. Large-scale studies performed in India also showed that awareness and

understanding of food labels vary between different demographic groups, underlining the need to develop effective communication methods for all consumer groups (16).

While this study did not find a significant association between recognition of the essential role food additives play in the food production process and trust in manufacturers using additives in appropriate manner, previous research shows that consumer trust in manufacturers is affected not only by technical knowledge but also by the manner in which information about the product is communicated through food labels (17). This finding implies that effective communication might play an important role in building consumer trust in manufacturers and their products.

The strengths of this study include the broad representativeness of the sample, which covers a wide range of ages, occupations and residential background, enabling analysis of the association between a variety of socio-demographic factors and consumer attitudes and purchasing behaviours towards food additives. Combined with the use of Likert scale responses and analysis using Pearson's correlation and Chi-square tests, this allowed for an in-depth investigation of the relationship between the selected factors.

However, certain limitations associated with this study should be noted while interpreting the results. Since the convenience sampling method was used, results might not be fully generalizable across the larger population. Additionally, the cross-sectional study design limits the extent to which conclusions on causal relationships can be drawn. Furthermore, consumer attitudes and purchasing behaviour were self-reported, which might reflect personal views rather than actual purchasing patterns.

In summary, the study's findings underline the importance of increasing consumer awareness by utilising accessible information on food labels and building consumer trust via effective communication on the role of food additives across various platforms. Previous studies show that interpretive front-of-pack labels help increase consumer understanding of information provided on food packages, which in turn promotes healthier purchasing behaviours and better nutritional outcomes for consumers (18,19).

5. Conclusion

The current cross-sectional study assessed consumer awareness, attitudes, and purchasing behaviour towards food additives among 294 respondents. The results suggest that the participants had a moderately high level of awareness about food additives, while their perceptions and buying behaviour were influenced by beliefs about natural additives, reading of ingredients, exposure to social media, and specific aspects of demography. The analysis using Pearson's correlation and Chi-square tests showed that consumer attitudes towards food additives differed significantly among the studied groups depending on purchasing behaviour.

Therefore, the current research concludes that proper labelling of food products and the provision of information to the public about food safety are significant to increase consumers' awareness about additives. While the current study had limitations due to convenience sampling and its cross-sectional nature, it provides important conclusions for future improvements in consumer education and research. Enhancing the safety of food additives usage requires a better-informed public, which can be achieved through evidence-based consumer education and improved label communication (20).

7. Reference

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