Investigating Key Factors Influencing Consumer Food Practices and Choices for Ensuring Food Safety: A Case Study of Coimbatore Residents

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ABSTRACT

Aim: The primary objective of this study is to employ the Mann-Whitney U test as a robust statistical tool to assess and establish the significance of the association between the education levels of the respondents and their behaviour regarding checking for quality marks before initiating product purchases. By utilizing this non-parametric test, we intend to discern whether there exists a meaningful and statistically significant difference in the likelihood of individuals with varying educational backgrounds to prioritize the inspection of quality marks as part of their consumer decision-making process.
Study design: Since the study has its own predetermined objectives and methodology, it is descriptive in nature. The survey analyses the factors influencing the food safety practices of consumers during the period of June and July of 2023 (60 days) as a part of Masters research work.
Place and Duration of Study: The research was carried out in Coimbatore city. During the months of June and July of 2023, primary data was collected from a random sample of respondents.
Methodology: The study specifically targeted a sample size of 200 consumers (93 men, 107 Women).. A well-structured questionnaire was used to collect data from the sample respondents. The study employed the Mann-Whitney test to assess if a significant relationship exists between respondents' education levels and their tendency to inspect quality marks before purchasing products. This analysis seeks to uncover potential distinctions in this behaviour based on educational backgrounds.
Results: This study identifies the significance between the education and the food safety practices from purchase to home. The results indicate that there is significant difference between the education and Check for quality marks before buying the products. Results of Mann-Whitney U-Test showed that the difference between Graduate (1) and non-Graduate (0) with respect to the dependent variable Check for quality marks before buying the products was statistically significant, U=4158, p=.046, r= 0.15. Thus, the null hypothesis is rejected.
Conclusion: This study underscores a significant relationship between respondents' education levels and their practice of checking quality marks before product purchases. The test demonstrates a statistically significant distinction between Graduates and Non-Graduates (U=4158, p=.046, r=0.15), highlighting the influence of education on consumer behavior. Consequently, the null hypothesis is rejected, emphasizing the importance of education in shaping consumer decision-making processes.

Keywords: Consumer Behavior, Consumer Education, Food Safety, Attitudes, Quality mark

1. INTRODUCTION

Food safety is a critical global concern, impacting both health and economies. This multifaceted challenge involves diverse factors along the food chain, with foodborne diseases posing a significant threat. Vulnerable groups like children, pregnant women, and the elderly are especially at risk. Such diseases also bring about substantial costs, affecting

individuals, households, communities, and nations in terms of health expenses, productivity, trade, and social repercussions. Addressing food safety requires collaboration among governments, industries, civil society, media, and consumers. According to the World Health Organization (WHO), annually, around 600 million people fall ill, and 420,000 die due to unsafe food consumption. Children under five years contribute significantly to this burden. In India, an estimated 100 million people are affected by foodborne diseases, resulting in 38,000 deaths each year. Despite its vast and diverse food system, India encounters numerous obstacles in ensuring food safety, including inadequate infrastructure, weak regulations, low consumer awareness, hygiene issues, and prevalent food adulteration and fraud.

Consumers significantly shape safe food demand, influenced by factors like demographics, income, and education (Sanlier et al., 2019). Studies indicate limited awareness of food safety, covering causes, effects of foodborne diseases, sources, standards, and prevention methods (Jevsnik et al., 2008; Mederios et al., 2001). Preferences for safe foods stem from beliefs, values, motivations, and factors like taste, price, and culture (Angelillo et al., 2000).In North-West Romania, perception of organic food linked to health and environmental protection (Dacinia et al., 2015). Student preferences for fast food showed influence from "promotion decisions" and "product effect" but not "psychological and social environment" (Durmaz et al., 2016). An international survey revealed food safety knowledge gaps in developing countries (Olumide et al., 2018).In Izmir, higher income, education, and age correlated with better food safety knowledge; education campaigns could benefit low-income individuals (Bektas et al., 2011). Broad-based food safety education is vital, especially for future food handlers (Haapala and Probate, 2004). Demographics didn't affect practices, recommending national surveys and campaigns (Unusan N, 2007). Education, income, concern, and risk perception were vital, urging further research (Zanetta et al., 2022). Research on Polish and Thai consumers stressed education to enhance food safety awareness (Tomaszewska et al., 2022).

1.1 Theoretical Framework

The Mann-Whitney U test, also known as the Wilcoxon rank-sum test, is a non-parametric statistical test used to determine if there is a significant difference between the distributions of two independent groups.

The formula for calculating the Mann-Whitney U statistic is as follows:

$$U = R - (n1 * (n1 + 1))/2$$

Where:

- U represents the Mann-Whitney U statistic,
- R denotes the sum of ranks for one of the groups,
- n1 indicates the sample size of the first group.

2. METHODOLOGY

The research was carried out in Coimbatore city. The study employs a descriptive research design to provide an in-depth understanding of the factors influencing consumer food practices and choices for ensuring food safety among residents of Coimbatore. The reason for choosing Coimbatore as the study area was because of its significance as a major urban centre in Tamil Nadu, India. With a significant population and diverse food consumption patterns, Coimbatore City provided an ideal setting to examine consumer behaviours and perceptions related to safe food practices. The study specifically targeted a sample size of 200 consumers. A well-structured questionnaire was used to collect data from the sample respondents. The study's reference year is 2023. During the months of July and August of 2023, primary data was collected from a random sample of respondents.

A simple percentage analysis was worked out to study the general characteristics of the sample consumers like age, educational status, occupation, Income etc. Mann Whitney test was used to test whether there was a significant difference between the Education of the respondents and Check for quality marks before buying the products

3. RESULTS AND DISCUSSION

Gender

From table 1, it could be inferred that male respondents accounted for 46.5 per cent and female respondents accounted for 53.5 per cent.

Table 1 Gender of the sample respondents

S.No	Gender	Number of respondents	Percentage (in per cent)
1	Male	93	46.5

2	Female	107	53.5
	Total	200	100

Age

It could be observed from the above Table 2, that 9 per cent of the respondents belonged to the age category 18-25 years, followed by 21.5 per cent of the respondents in the age group of 26-35 years, 26 per cent of the respondents in the age group of 36-45 years, 24 per cent of the respondents in the age group of 46-55 years and 19.5 per cent of the respondent in the age group of 56 and above.

Table 2. Age of the sample respondents

S.No	Age (in Years)	Number of respondents	Percentage (in per cent)
1	18-25	18	9
2	26-35	43	21.5
3	36-45	52	26
4	46-55	48	24
5	56 and above	39	19.5
Total		150	200

Marital status

It could be observed from the table 3, majority of the respondents were married (86.5%) followed by unmarried (13.5%)

Table 3 Marital status of the sample respondents

S.No	Marital status	Number of respondents	Percentage (in per cent)
1	Married	173	86.5
2	Unmarried	27	13.5
	Total	200	100

Annual Income

It could be observed from table 4, that 59 per cent of sample respondents' annual income was upto 20,0000 followed by 43.50 per cent of sample respondents with an annual income of 2,00,000-4,00,000, 27 per cent of sample respondents with an annual income of Rs. 4,00,000 – 6,00,000, 18 per cent of sample respondents with the annual income of Rs. 6,00,000-8,00,000 and 9 per cent of sample respondents with the annual income of above Rs. 8,00,000 respectively.

Table 4 Annual income of the sample respondents

S.No	Annual income (in Rs)	Number of respondents	Percentage (in per cent)
1	Up to 200000	59	29.5
2	200000-400000	87	43.5
3	400000-600000	27	13.5
4	600000-800000	18	9
5	Above 800000	9	4.5
	Total	200	100

Education

It could be observed from the above table 5, that 46.5 per cent of sample respondents were Non-Graduate, followed by Graduate (53.5).

Table 5 Educational Status of the sample respondents

S.No	Educational Level	Number of respondents	Percentage (in per cent)

1	Non-Graduate	93	46.5
2	Graduate	107	53.5
	Total	200	100

Occupation

From the above table 6, it could be inferred that (51.5 per cent) of the respondents were Employed, followed by homemaker (37 per cent), Unemployed (11.5 per cent).

Table 6 Occupational status of the sample respondents

S. No	Occupational Status	Number of respondents	Percentage (in per cent)
1	Employed	103	51.5
2	Unemployed	23	11.5
3	Homemaker	74	37
	Total	200	100

FOOD SAFETY PRACTICES FROM PURCHASE TO HOME

The Mann-Whitney U test, also known as the Mann-Whitney-Wilcoxon test, is a non-parametric statistical test used to compare two independent groups and determine if there is a significant difference between their distributions. In this study Man Whitney U test in used to find the significance between the Education of the respondents and their food safety practices

Man Whitney U Test

Education vs Check for quality marks before buying the products

In Figure 1, the box plot illustrates the distribution of responses from two groups regarding checking the quality marks of products. It describes two groups' behaviours in relation to checking for quality marks before purchasing products. In Graduates, consisting of 93 participants, the mean value for this behaviour is 3.09, with a median of 3 and a standard deviation of 1.36. Conversely, in Non-Graduates, consisting of 107 participants, the mean value is 2.75, the median is 3, and the standard deviation is 1.08.

Fig 1 Box plot of the distribution of responses from two groups regarding checking the quality marks of products.

Results of Man-Whitney U test - Education vs Check for quality marks before buying the products

Table 9 shows that the Mann-Whitney U statistic for this comparison is 4158. The associated z-score is -2.06. The asymptotic *P=.039,* which indicates a statistically significant difference between the groups. The exact *P= .046*, further supports the significance of the observed difference. This suggests that there is a meaningful distinction between the groups in terms of their tendency to check for quality marks before making purchases.

Table 7. Result of Mann- Whitney U-Test

	U	z	asymptotic P	exact P
Check for quality marks before buying the products	4158	-2.06	.039	.046

P<0.05

Education vs Checking Expiry dates of the product

In Figure 2, the box plot illustrates the distribution of responses from two groups regarding checking expiry dates of products. The box plot illustrates the distribution of responses from two groups regarding checking the expiry dates of products. Graduates, with a mean of 2.68 and a median of 3, tends to have lower values for checking expiry dates, showing some variability in their responses with a standard deviation of 1.24. On the other hand, Non-Graduates, with a mean of 3.09 and the same median of 3, tends to have higher values and relatively consistent responses, with a standard deviation of 1.17.

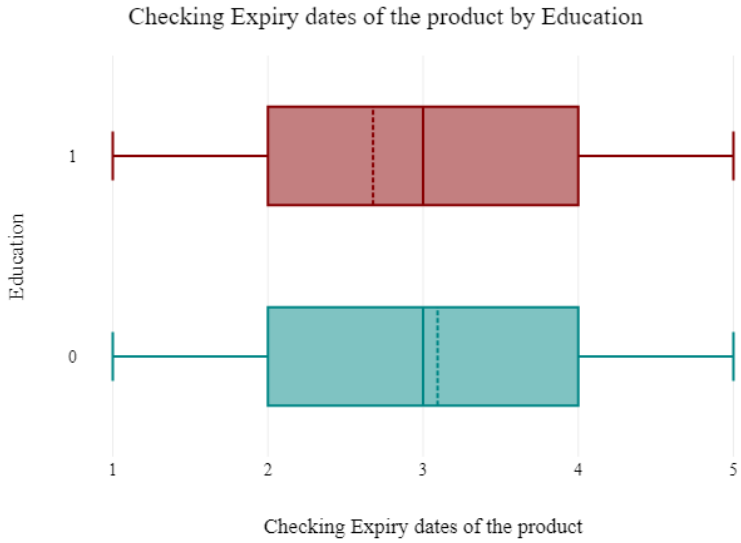

Fig 2 Box plot of the distribution of responses from two groups regarding checking the expiry dates of products.

Results of Man-Whitney U test - Education vs Checking Expiry dates of the product

Table 8 shows that the Mann-Whitney U statistic for this comparison is 4039. The associated z-score is -2.36. The asymptotic *P=.018,* which indicates a statistically significant difference between the groups. The exact *P= .022*, further supports the significance of the observed difference. This suggests that there is a meaningful distinction between the groups in terms of their tendency to check expiry dates before making purchases.

Table 8. Result of Mann- Whitney U-Test

	U	z	asymptotic p	exact p
Checking the Expiry dates of the product	4039.5	-2.36	.018	.022

P<0.05

Education vs Washing fruits and vegetables before consumption

Fig 3 illustrates the distribution of responses from two groups regarding washing fruits and vegetables before consumption. Graduates, consisting of 93 data points, have a mean of 2.84 and a median of 3, with a standard deviation of 1.35. On the other hand, Non-Graduates, comprising 107 data points, have a higher mean of 3.23 and the same median of 3, with a slightly larger standard deviation of 1.44.

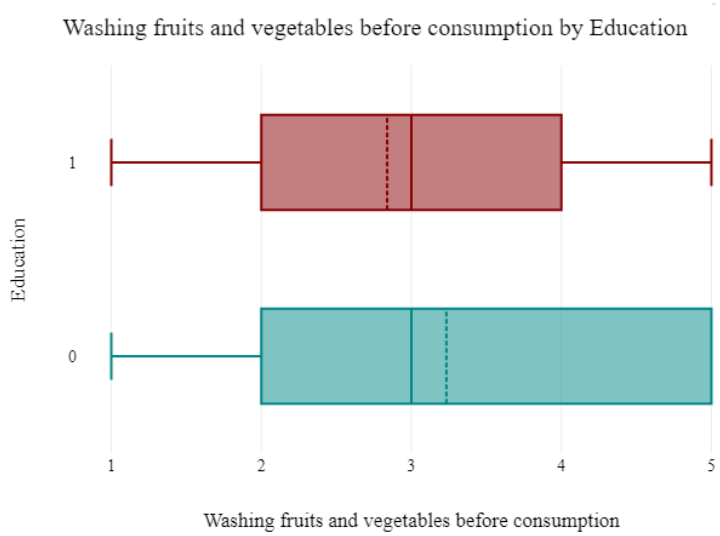

Fig 3 Box plot of responses from two groups regarding washing fruits and vegetables before consumption

Results of Man-Whitney U test - Education vs Washing Fruits and vegetables before consumption

Table 9 shows that the Mann-Whitney U statistic for this comparison is 4218.5. The associated z-score is -1.9. The asymptotic *P=.057,* which indicates a statistically significant difference between the groups. The exact *P= .064*, These results suggest that there is no statistically significant difference between the two groups in terms of their tendency to wash fruits and vegetables before consumption. The p-values are slightly above the conventional threshold of 0.05, indicating that the observed difference may not be significant.

Table 9. Result of Mann- Whitney U-Test

	U	z	asymptotic p	exact p
Washing fruits and vegetables before consumption	4218.5	-1.9	.057	.064

P<0.05

4. CONCLUSION

In the analysis comparing education levels and the behaviour of checking for quality marks before buying products, the results indicate a statistically significant difference. The Mann-Whitney u statistic for this comparison is 4158, with an associated z-score of -2.06. The asymptotic p-value is .039, and the exact p-value is .046, both of which are less than the conventional threshold of 0.05. This suggests a meaningful distinction between individuals with different education levels

in terms of their tendency to prioritize the inspection of quality marks before making purchases. Therefore, the null hypothesis is rejected, affirming that education has a significant influence on consumer behaviour.

For the analysis of education levels and checking the expiry dates of products before purchasing, the results also show a statistically significant difference. The Mann-Whitney u statistic for this comparison is 4039, with an associated z-score of -2.36. The asymptotic p-value is .018, and the exact p-value is .022, both indicating a significant difference between groups. This underscores the influence of education on the practice of checking expiry dates before making purchases, as individuals with different education levels exhibit distinct tendencies in this regard.

In the examination of education levels and the practice of washing fruits and vegetables before consumption, the results are less conclusive. The Mann-Whitney u statistic for this comparison is 4218.5, with an associated z-score of -1.9. The asymptotic p-value is .057, and the exact p-value is .064. These p-values are slightly above the conventional threshold of 0.05, suggesting that the observed difference in this behaviour between education groups may not be statistically significant. Therefore, the analysis does not provide strong evidence of a meaningful distinction in the tendency to wash fruits and vegetables before consumption based on education levels.

In summary, the conducted analyses reveal that education levels significantly influence the behaviours of checking for quality marks before purchasing products and checking expiry dates before purchasing. However, the evidence is less clear regarding the influence of education on the practice of washing fruits and vegetables before consumption. These findings emphasize the role of education in shaping consumer behaviours related to food safety practices and underscore the importance of targeted educational efforts to promote safe food practices among consumers**.**

COMPETING INTEREST

Author have declared that no competing interests exist.

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