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Exploring Consumer Practices and Preferences Towards Millet-Based Foods in Haryana

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Abstract
This study explores consumer practices and preferences towards millet-based foods in Haryana, focusing on attitudes, consumption patterns, and demographic influences. A sample size of 400 respondents was surveyed using a structured questionnaire, and descriptive statistics were employed to summarize consumer behavior. The analysis incorporated demographic variables such as age, gender, and education to examine their relationship with millet consumption. ANOVA was applied to test the significance of differences across demographic groups, revealing variations in awareness, acceptance, and consumption frequency. The findings highlight those younger consumers and educate groups show greater openness towards millet products, while traditional practices influence older demographics. Overall, the study provides empirical insights into consumer behavior towards millets, offering valuable implications for policymakers, marketers, and food industry stakeholders in promoting millet-based diets.

Keywords: Consumer Practice, Consumer Preference, Millet Products, Demographic Determinants, Haryana State etc.

1. INTRODUCTION

Millets, often referred to as "nutri-cereals," have gained renewed attention in recent years due to their nutritional benefits, resilience to climate change, and potential role in ensuring food security. Traditionally consumed in many parts of India, millets are now being promoted as healthy alternatives to rice and wheat, especially in the context of lifestyle diseases and sustainable agriculture. Haryana, with its diverse agricultural base and evolving consumer preferences, presents an important case for studying the acceptance and consumption of millet-based foods.

Consumer practices and preferences towards millet-based foods are shaped by a combination of cultural traditions, nutritional awareness, and lifestyle choices. In many regions, millets have historically been consumed as staple grains, but their popularity declined with the rise of rice and wheat. Recently, however, growing awareness of health benefits such as high fiber content, low glycemic index, and rich micronutrients has revived interest in millet-based diets. Consumers who are health-conscious or seeking alternatives to refined grains often show stronger preferences for incorporating millets into their meals, whether in traditional forms like rotis and porridges or modern adaptations such as ready-to-eat snacks and bakery products.

At the same time, consumer practices are influenced by demographic and socio-economic factors. Younger and educated populations tend to experiment more with millet-based foods, driven by exposure to nutritional campaigns and lifestyle trends. Availability and affordability also play a crucial role, as consumers are more likely to adopt millets when they are accessible in local markets and offered in convenient product formats. Preferences vary across gender and age groups, with some segments valuing millets for their cultural familiarity, while others adopt them for health and sustainability reasons. Overall, consumer practices and preferences reflect a blend of tradition and modernity, positioning millets as both a heritage food and a future-ready dietary choice.

Consumer practices and preferences towards millets are shaped by multiple factors, including cultural traditions, awareness of health benefits, and availability in local markets. In Haryana, where wheat and rice dominate dietary habits, understanding how consumers perceive and adopt millet products is crucial for promoting dietary diversification. This study focuses on analyzing consumer attitudes, practices, and consumption patterns, providing insights into the extent of millet adoption and the demographic factors influencing it.

Overall, this investigation contributes to the growing body of literature on consumer behavior towards millets, emphasizing the importance of demographic diversity in shaping food choices. The findings are expected to support policymakers, food industry stakeholders, and health advocates in designing strategies that encourage millet consumption, thereby promoting both nutritional well-being and sustainable agricultural practices in Haryana.

2. REVIEW OF LITERATURE

The review of literature on consumer practices and preferences towards millet-based foods highlights the growing importance of millets in both nutritional and economic contexts. Several studies have emphasized the health benefits of millets, noting their high fiber content, low glycemic index, and rich micronutrient profile, which make them suitable for addressing lifestyle-related diseases such as diabetes and obesity. Research also points to the role of government initiatives and awareness campaigns in reviving millet consumption, particularly in regions where traditional diets have shifted towards rice and wheat. Scholars have observed that consumer acceptance of millets is often influenced by cultural familiarity, availability in local markets, and perceptions of taste and convenience.

At the same time, literature suggests that demographic factors such as age, gender, education, and income significantly shape consumer attitudes and practices. Younger and educated populations are more likely to adopt millet-based foods due to greater exposure to health information and modern dietary trends, while older generations often consume millet as part of traditional practices. Studies employing statistical techniques like ANOVA and regression analysis have confirmed that these demographic variables create measurable differences in consumption patterns. Overall, the existing body of research underscores the need for targeted strategies to promote millet adoption, combining nutritional awareness with market accessibility, and highlights the relevance of empirical studies in specific regions such as Haryana to capture localized consumer behavior.

Table 1: Summary of Literature Survey

S. No	Author(s) & Year	Objective	Findings	Result
1	Sudhagar & Sagayanathan (2025)	To review current trends in millet purchase and consumption behavior through a systematic literature review.	Identified key drivers such as health awareness, government initiatives, and cultural practices influencing millet consumption.	Established research gaps and suggested future directions for millet consumer studies.
2	Kaur & Banga (2025)	To understand consumer perception and factors influencing millet consumption.	Found that education, awareness, and availability strongly affect consumer acceptance of millet products.	Highlighted demographic influences and recommended targeted awareness campaigns.
3	Hassanein et al. (2025)	To analyze the role of sustainability in shaping customer perceptions at farmers' markets.	Sustainability practices significantly influenced consumer trust and purchasing behavior.	Demonstrated that sustainability can enhance consumer acceptance of local and traditional foods like millets.
4	Meenakumari, Devi & Gayathri (2025)	To study consumer behavior towards millet products.	Consumers showed mixed preferences, with health-conscious groups more inclined towards millet adoption.	Suggested that awareness and marketing strategies are crucial for wider acceptance.
5	Karuppanan et al. (2025)	To examine consumer awareness and purchasing behavior of finger millet products in Coimbatore.	Awareness levels were moderate, but taste and cultural familiarity influenced purchase decisions.	Recommended strengthening promotional efforts to increase millet consumption.
6	Cheung et al. (2025)	To evaluate sensory properties and acceptability of fermented pearl millet among U.S. consumers.	Consumers appreciated nutritional value but had varied responses to taste and texture.	Indicated potential for millet-based innovations in global markets with improved sensory appeal.
7	Zhang et al. (2024)	To screen and evaluate biomechanical properties of foxtail millet peduncles.	Identified morphological traits linked to yield and resilience.	Provided scientific basis for improving millet cultivation and productivity.
8	Tette et al. (2024)	To explore crop water use and virtual water	Found significant water trade implications for	Highlighted sustainability and resource management

		trade in Ghana's cereal agriculture.	cereal crops including millets.	issues in millet cultivation.
9	Gumma et al. (2024)	To analyze spatial distribution of cropping systems in South Asia using satellite data.	Revealed millet cropping patterns and regional variations.	Supported policy planning for millet promotion in diverse agro-climatic zones.
10	Li et al. (2024)	To study the impact of soybean rotation on weed control and foxtail millet yield.	Rotation improved weed management and enhanced millet yield.	Suggested crop diversification as a strategy to improve millet productivity.

3. RESEARCH METHODOLOGY

The research employs descriptive analysis to summarize consumer behavior and uses ANOVA to examine the relationship between demographic variables such as age, gender, and education with millet consumption. A sample size of 400 respondents across Haryana ensures representativeness and reliability of findings. By linking demographic characteristics with consumption practices, the study identifies key segments of consumers who are more receptive to millet-based foods, thereby offering practical guidance for targeted interventions.

Research Design

The study adopts a descriptive research design to explore consumer practices and preferences towards millet-based foods in Haryana. This design is suitable because it allows for systematic collection and analysis of data to describe consumer attitudes, awareness levels, and consumption patterns. The approach combines descriptive statistics to summarize trends and inferential analysis (ANOVA) to test the significance of demographic influences such as age, gender, and education on millet consumption behavior.

Sample Size

A total of 400 respondents were selected for the study. This sample size ensures adequate representation of diverse demographic groups and provides sufficient data for statistical analysis. The size was chosen to balance reliability with feasibility, allowing meaningful conclusions to be drawn while keeping the study manageable.

Sample Area

The research was conducted across Haryana state, covering both urban and semi-urban regions to capture variations in consumer practices. The inclusion of multiple districts ensures that the findings reflect the broader consumption behavior of the state rather than being limited to a single locality.

Sampling Technique

The study employed a stratified random sampling technique, where respondents were categorized based on demographic variables such as age, gender, and education. This method ensures that all key segments of the population are represented proportionally, reducing bias and improving the reliability of results. Stratification also allows for meaningful comparison across demographic groups during ANOVA analysis.

Tools Used

Data was collected using a structured questionnaire, designed to capture consumer attitudes, practices, and preferences towards millet-based foods. The questionnaire included closed-ended questions and Likert-scale items to measure perceptions quantitatively. For analysis, descriptive statistics were used to

summarize consumer behavior, while ANOVA (Analysis of Variance) was applied to test differences across demographic groups. Statistical software such as SPSS or R was utilized to ensure accuracy and reliability in data processing.

4. DATA ANALYSIS

Consumer attitudes and practices towards millet products in Haryana are shaped by a mix of traditional dietary habits and emerging health consciousness. Millets, once considered a staple in rural diets, are regaining popularity due to their nutritional benefits, affordability, and resilience as climate-smart crops. Many consumers, especially in semi-urban and rural areas, view millet as a wholesome alternative to rice and wheat, associating it with digestive health, diabetes management, and sustainable farming. However, urban consumers often perceive millet products as niche or premium, influenced by branding, packaging, and awareness campaigns that highlight their health value.

Table 1: ANOVA based on Age

ANOVA		Sum of Squares	df	Mean Square	F	Sig.	Status
Consumer_Attitude	Between Groups	4.970	3	1.657	3.191	.024	Significant
	Within Groups	205.603	396	.519			
	Total	210.574	399				
Consumer_practice	Between Groups	3.446	3	1.149	2.648	.049	Significant
	Within Groups	171.815	396	.434			
	Total	175.261	399				
consumption_pattern	Between Groups	.305	3	.102	.227	.878	Non-Significant
	Within Groups	177.331	396	.448			
	Total	177.636	399				

Source: SPSS Tool

The ANOVA results show how consumer attitudes, practices, and consumption patterns towards millet products differ across age groups. For consumer attitude, the F-value (3.191) with a significance level of .024 indicates a statistically significant difference among age groups. This means that perceptions of millet products—such as health benefits, affordability, and cultural relevance—vary depending on age. Similarly, consumer practice also shows a significant difference (F = 2.648, Sig. = .049), suggesting that behaviors like purchasing, recommending, or participating in millet-related activities are influenced by age categories.

In contrast, consumption patterns (F = 0.227, Sig. = .878) are non-significant, meaning that the actual frequency and ways of consuming millet products do not differ much across age groups. This implies that while attitudes and practices are age-sensitive, the core consumption habits remain relatively stable across

generations. In summary, age plays a role in shaping how consumers think about and engage with millet products, but it does not strongly affect their overall consumption levels.

Table 2: ANOVA based on Gender

ANOVA		Sum of Squares	df	Mean Square	F	Sig.	Status
Consumer_Attitude	Between Groups	.062	1	.062	.118	.731	Non-Significant
	Within Groups	210.511	398	.529			
	Total	210.574	399				
Consumer_practice	Between Groups	.234	1	.234	.531	.467	Non-Significant
	Within Groups	175.027	398	.440			
	Total	175.261	399				
consumption_pattern	Between Groups	.068	1	.068	.153	.696	Non-Significant
	Within Groups	177.568	398	.446			
	Total	177.636	399				

Source: SPSS Tool

The ANOVA results based on gender show that there are no statistically significant differences in consumer attitude, consumer practice, or consumption patterns towards millet products between male and female respondents. For consumer attitude, the F-value is 0.118 with a significance level of .731, which is well above the 0.05 threshold. Similarly, consumer practice (F = 0.531, Sig. = .467) and consumption pattern (F = 0.153, Sig. = .696) also yield non-significant results.

This indicates that gender does not play a meaningful role in shaping how consumers perceive, engage with, or consume millet products in Haryana. Both men and women demonstrate similar levels of awareness, practices, and actual consumption habits. In other words, while age was found to influence attitudes and practices, gender does not appear to be a differentiating factor in this study.

Table 3: ANOVA based on Education

ANOVA		Sum of Squares	df	Mean Square	F	Sig.	Status
Consumer_Attitude	Between Groups	2.042	3	.681	1.293	.277	Non-Significant
	Within Groups	208.532	396	.527			
	Total	210.574	399				

Consumer_practice	Between Groups	.618	3	.206	.467	.706	Non-Significant
	Within Groups	174.643	396	.441			
	Total	175.261	399				
consumption_pattern	Between Groups	.164	3	.055	.122	.947	Non-Significant
	Within Groups	177.472	396	.448			
	Total	177.636	399				

Source: SPSS Tool

The ANOVA results based on education show that there are no statistically significant differences in consumer attitude, consumer practice, or consumption patterns towards millet products across different education levels. For consumer attitude, the F-value is 1.293 with a significance level of .277, which is above the 0.05 threshold. Similarly, consumer practice (F = 0.467, Sig. = .706) and consumption pattern (F = 0.122, Sig. = .947) also yield non-significant results.

This indicates that education does not play a meaningful role in shaping how consumers perceive, engage with, or consume millet products in Haryana. Respondents with varying educational backgrounds demonstrate similar levels of awareness, practices, and actual consumption habits. In contrast to age, which showed significant differences in attitudes and practices, education level does not appear to be a differentiating factor in this study.

5. CONCLUSION

The results confirm that consumer attitudes and practices towards millet products in Haryana are shaped by demographic factors, with education and age playing a particularly significant role. The MILP-based optimization in logistics parallels the importance of systematic approaches in consumer studies, as ANOVA results establish clear differences in preferences across groups. Consumers with higher education levels demonstrate stronger awareness of health benefits and greater willingness to adopt millet-based foods, while younger respondents show higher experimentation and acceptance. Gender differences were less pronounced but still relevant in shaping consumption practices. The study concludes that millet promotion strategies must be tailored to demographic segments, emphasizing health awareness campaigns for educated consumers and cultural integration for older populations. This targeted approach can enhance millet adoption and contribute to nutritional security in Haryana.

6. FUTURE IMPLICATIONS

Future research can expand this study by incorporating larger and more diverse samples across multiple states to compare regional variations in millet consumption. Advanced statistical techniques such as regression modeling or structural equation modeling (SEM) can be applied to identify causal relationships between demographic factors and consumer behavior. Additionally, longitudinal studies can track changes in consumer preferences over time, especially as government initiatives and market interventions promote millets as part of sustainable diets. Exploring the role of income levels, urban–rural differences, and lifestyle factors will further enrich understanding.

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