Demographic Determinants of Consumer Buying Behavior for Millet Products in Haryana

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ABSTRACT

This study investigates the role of demographic factors age, gender, education, and marital status on consumer buying behavior toward millet products in Haryana. Millets, recognized for their nutritional and ecological benefits, are increasingly promoted as healthy alternatives to conventional cereals. Understanding consumer behavior in relation to demographic variables is essential for designing effective marketing strategies and policy interventions. The analysis reveals that younger consumers and educators show greater awareness and willingness to purchase millet products, while gender and marital status influence preferences and purchasing frequency. These findings highlight the importance of demographic profiling in shaping consumer demand for millet-based products.

Keywords: Consumer Buying Behavior, Millet Products, Demographic Determinants, Haryana State etc.

1. INTRODUCTION

Millets have emerged as an important component of sustainable diets due to their nutritional richness, resilience to climate change, and potential to address food security challenges. In India, particularly in states like Haryana, millet consumption is being actively promoted through government initiatives and awareness campaigns. Despite these efforts, consumer acceptance and buying behavior toward millet products remain influenced by several demographic factors, making it essential to understand how age, gender, education, and marital status shape demand patterns.

Consumer behavior is a complex phenomenon that reflects individual preferences, cultural influences, and socio-economic conditions. Demographic variables play a central role in determining food choices, as they influence awareness, perception, and willingness to adopt healthier alternatives. For instance, younger consumers may be more open to experimenting with millet-based products due to rising health consciousness, while education levels often correlate with awareness of nutritional benefits. Gender and marital status further affect household decision-making, shaping the frequency and type of millet products purchased.

In Haryana, where traditional cereal consumption dominates, the introduction of millet products requires careful analysis of consumer segments. Understanding demographic determinants provides insights into which groups are more likely to adopt millet consumption and which require targeted interventions. This knowledge is crucial for both marketers and policymakers, aiming to expand millet markets and integrate them into mainstream diets.

Therefore, studying the demographic factors influencing consumer buying behavior toward millet products in Haryana not only contributes to academic research but also offers practical guidance for designing effective marketing strategies, nutrition policies, and awareness campaigns. Theidentifying the role of age, gender, education, and marital status, this research seeks to bridge the gap between consumer preferences and sustainable food promotion.

2. REVIEW OF LITERATURE

Sudhagar et al. (2025) conducted a systematic literature review to examine current trends in millet purchase and consumption behaviour and to identify directions for future research. The study analyzed 20 peer-reviewed articles selected based on defined eligibility criteria, using content and thematic analysis. The findings revealed 15 key thematic areas, including general consumption behaviour, awareness and health impacts, preferred meal periods, social recommendations, geographic and demographic influences, nutritional benefits, frequency of consumption, perceptions, motivations and barriers, affordability, and knowledge-attitude-practice (KAP) dimensions. The authors emphasized that these insights could help researchers identify gaps in the existing literature and guide future investigations into millet-related consumer behaviour and market development.

Kaur et al. (2025) conducted a descriptive study to examine consumer perception and the factors influencing the consumption of millet and millet-based products in Ludhiana city. Using a structured, non-disguised questionnaire, they collected primary data from 200 respondents. The findings indicated that consumers preferred millet products due to their high quality, nutritional value, and health benefits. However, awareness of specific attributes such as low glycaemic index and gluten-free nature remained limited. Factor analysis revealed three principal components—Health and Nutritional Benefits, Cultural Significance and Accessibility, and Brand Influence, which explaining 58.35% of the variance in consumption behaviour. Key motivators included quality, health consciousness, and environmental friendliness, while cost, limited availability, and lack of awareness were identified as major barriers.

Hassanein et al. (2025) conducted a quantitative study to examine how sustainability-related factors influenced customer perceptions at farmers' markets in Maharashtra, India. Using a structured questionnaire, data were collected from a random sample of 235 customers. The study tested seven hypotheses involving variables such as convenience, variety, quality, price, health and hygiene, and service conditions. These constructions were modeled as reflective indicators within a structural equation framework. The results confirmed that all six latent variables positively and significantly affected customer satisfaction, which in turn significantly influenced customer loyalty. The model explained approximately 55% of the variation in customer satisfaction. The findings underscored the importance of sustainability-linked attributes in shaping consumer behavior and loyalty at farmers' markets, offering actionable insights for market organizers and policymakers aiming to promote sustainable agricultural practices.

Meenakumari et al. (2025) conducted a study to analyze consumer behavior toward millet-based products in Tamil Nadu, India. The research aimed to identify the factors influencing consumer purchase decisions and acceptance of millets in daily diets. Using a structured questionnaire, the authors collected data on consumer preferences, nutritional awareness, and perceived value. The findings revealed that health benefits, affordability, and cultural familiarity significantly influenced buying behavior. The Friedman test indicated maize as the most preferred cereal, and notable differences were observed in consumer perceptions of nutrient density across millet varieties. The study emphasized the need for targeted marketing strategies and product diversification, recommending that food manufacturers introduce a wider range of millet-based snacks to enhance consumer engagement and promote healthier eating habits.

Karuppanan et al. (2025) investigated consumer awareness and purchasing behavior toward finger millet (Eleusine coracana) products in Coimbatore, Tamil Nadu. A structured questionnaire was administered to 150 respondents selected through simple random sampling. The study revealed that younger consumers (aged 21–30) and female respondents exhibited higher levels of awareness regarding the nutritional benefits of finger millet. Factor analysis identified nutritional value, convenience, and product familiarity as key determinants influencing purchase decisions, explaining 45.19% of the variance. Preferred product forms included finger millet flour (23%), noodles (20%), and porridge (18%). Garrett's ranking method positioned finger millet as the most favored millet (score 69.5), followed by proso millet and little millet. The findings emphasized the need for targeted marketing strategies, especially toward health-conscious youth and women, and recommended diversification of millet flour-based products to enhance consumer engagement and market penetration.

Cheung et al. (2025) conducted two pilot studies to evaluate the sensory properties and consumer acceptability of fermented pearl millet, a climate-resilient and nutrient-rich grain, among U.S. consumers. In the first study, pearl millet was fermented under five conditions (0, 48, and 96 hours in distilled water or 5% NaCl solution at 28 °C). The 96-hour water fermentation reduced phytic acid by approximately 72%, enhancing mineral bioavailability. However, flatbreads made with fermented millet were rated as more bitter and sour than those made with unfermented millet. In the second study, whole wheat bread was substituted with 0–50% fermented or unfermented pearl millet flour. Substitution up to 20% did not affect liking or purchase intent, but higher levels—especially with fermented millet—reduced consumer acceptance. The findings suggested that while fermentation improves nutritional quality, sensory attributes must be optimized to support broader consumer adoption in Western markets.

Zhang et al. (2024) indicated that mechanized harvesting was essential in the agricultural production of foxtail millet (Setaria italica), as its peduncles were prone to bending and breaking during harvesting, resulting in yield losses and a decline in grain quality. This study comprehensively assessed the biomechanical properties of the peduncles and associated morphological characteristics of 116 foxtail millet accessions to evaluate their suitability for mechanical harvesting, thereby establishing a system for indicator screening and comprehensive evaluation. Through partial correlation analysis and R-type cluster analysis, four biomechanical and seven associated morphological indices of the peduncle were selected among 22 potential indicators, exhibiting a coefficient of variation between 6% and 80%. The entropy technique was employed to allocate weights to the chosen indices, with biomechanical considerations accounting for 47.4%, peduncle morphology 20.2%, spike morphology 27.6%, and plant height 4.8%. The Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) and Rank-Sum Ratio (RSR) methods were utilized to rank and categorize 116 foxtail millet varieties into four performance groups: Excellent (8 varieties), Good (50 varieties), Moderate (51 varieties), and Poor (7 varieties).

Golden Odey et al. (2024) presented that agricultural water production was essential for sustainability considering the increasing demand for food. Cereals were essential for delivering nutritious food at economical pricing. This research utilized Ghanaian data from 1992 to 2021 to assess water consumption in the cultivation of primary cereals. It also analysed the virtual water losses or gains in cereal commerce together with the relevant factors. The analysis included secondary data that included virtual water content, production volume, export and import volumes, distance, GDP per capita, population, and land per capita for Ghana and its 75 trading partners. Over the past five years, crop water use (CWU) averaged 7.08 billion m³/year for maize, 3.48 billion m³/year for rice, 1.08 billion m³/year for sorghum, and 0.63 billion m³/year for millet cultivation. Niger, Burkina Faso, South Africa, and Togo were Ghana's principal partners for exporting virtual water (EVW). The principal partners for imported virtual water (IVW) included Argentina, South Africa, Ukraine, Togo, Russia, Burkina Faso, Canada, Senegal, Nigeria, Portugal, the United Kingdom, Niger, and the United States. The Panel Least Squares Method of Regression was employed to implement the Gravity Model principle in evaluating influential elements. The results demonstrated that Ghana was a net importer of virtual water in grain trade, significantly influenced by geographical distance, GDP per capita, population, land per capita, and cereal water use.

Dubey et al. (2024) presented that a cropping system practice involved the successive cultivation of several crops across distinct seasons within a year. Cropping system methods influenced land productivity and agricultural sustainability in many places; thus, data on cropping systems, presented as maps and statistics, are essential for effective crop planning and efficient resource utilization. While satellite-based crop mapping was commonly utilized, the generation of cropping systems maps via satellites was less frequently documented. It created moderate-resolution maps of the principal cropping systems in South Asia for the year 2014–2015 by employing multi-temporal satellite data and a spectral matching technique (SMT), which was developed using a comprehensive array of field observation data and expert-identified crops in high-resolution satellite imagery. It delineated and catalogued 27 principal cropping systems in South Asia at a spatial resolution of 250 meters. The rice-wheat cropping system was predominant, succeeded by millet-wheat and soybean-wheat systems. The map depicting the cropping system practices of various regions presented numerous applications for agricultural performance in certain areas. Comparing maps from various time periods provides insighted into sensitive locations, and analysing these maps alongside resource maps, such as those depicting climate and soil, facilitated the optimization of resources in relation to improving land productivity.

Liu et al. (2024) indicated that Foxtail millet was a significant grain crop in northern China. Nonetheless, weeds significantly compete with foxtail millet and have historically been a biological impediment to its cultivation. Crop rotation necessitated the identification of species and sequencing of crops, and an effective rotation offers numerous

advantages for agriculture, including mitigating weed damage. To elucidate the synergistic effects of foxtail millet–soybean rotation and herbicide application on weed management and crop yield, fixed-location studies were conducted across three growing seasons. Foxtail millet and soybean were cultivated in the following sequential order over successive years: FFF (foxtail millet–wheat–foxtail millet–wheat–foxtail millet), SFF (soybean–wheat–foxtail millet–wheat–foxtail millet), SSF (soybean–wheat–soybean–wheat–foxtail millet), and SSS (soybean–wheat–soybean–wheat–soybean). The study assessed and analysed weed density, biodiversity, weed seedbank, and crop yield. The findings indicated that the mean weed density of SFF and SSF decreased by 61.7% and 66.3%, respectively, in comparison to FFF for three years, and by 16.5% and 26.6% when compared to SSS, respectively. The rotation of foxtail millet and soybean (SFF and SSF) enhanced species richness and the Marg alef species richness index of the weed community while diminishing the Simpson index in comparison to continuous foxtail millet and continuous soybean cropping (FFF and SSS). The weed seedbank of SFF and SSF was 45.7% and 55.8% lower than that of FFF, while it rose by 92.7% and 56.7% compared to SSS, respectively. The weed density in the FFF treatment exhibited a significant association with the 0–5 cm grass seedbank size, however no significant correlation was observed in the other three treatments. The yield of foxtail millet in SFF and SSF rose by 54.05% and 221.81%, respectively, due to reduced weed damage intensity compared to FFF. The research findings indicated that both SFF and SSF could significantly mitigate weed damage and enhance biodiversity.

3. RESEARCH METHODOLOGY

The primary objective of this study is to examine the influence of demographic factors specifically age, gender, education, and marital status on consumer buying behavior toward millet products in Haryana. The research seeks to identify how these variables shape consumer preferences, awareness, and purchasing decisions, with a particular focus on jawar (sorghum) millet. By analyzing demographic determinants, the study aims to provide insights that can guide marketers, policymakers, and agricultural stakeholders in promoting millet consumption more effectively.

Research Design – Descriptive

A descriptive research design has been adopted for this study, as it is best suited to systematically describe the characteristics of consumer behavior in relation to demographic factors. This design enables the collection of quantitative data that highlights patterns, relationships, and variations across different consumer segments. It does not manipulate variables but instead observes and records existing conditions, making it appropriate for understanding how demographic profiles influence millet product consumption in Haryana.

Sample Design

The sample design is purposive in nature, focusing on consumers from Haryana who are potential or actual buyers of millet products. A total of 400 respondents were selected to ensure adequate representation and statistical reliability. To capture regional diversity, five districts Hisar, Bhiwani, Sirsa, Mahendragarh, and Rewari were purposively chosen, as these areas reflect varying socio-economic and demographic characteristics relevant to millet consumption. The focus on jawar millet ensures that the study remains specific to one widely consumed variety, allowing for deeper insights into consumer behavior patterns.

By combining a descriptive design with purposive sampling, the study ensures that the data collected is both contextually relevant and statistically meaningful. The selection of districts provides geographical diversity, while the focus on demographic variables allows for a nuanced understanding of consumer preferences. This methodological framework is designed to generate actionable insights that can inform marketing strategies, nutritional awareness campaigns, and policy interventions aimed at increasing millet consumption in Haryana.

4. DATA ANALYSIS

Data analysis is the systematic process of examining, cleaning, transforming, and interpreting data to extract meaningful insights. It helps researchers identify trends, patterns, and relationships within the collected information, turning raw data into useful knowledge.

AGE

Table 1: Descriptive Statistics based on Age

Age	Frequency	Percent
21-30 Y	103	25.8
31-40 Y	127	31.8
41-50Y	99	24.8
Above 50 Y	71	17.8
Total	400	100.0

(Source: Primary Data)

Table 1 highlights the age distribution of the 400 respondents included in the study. The majority of participants fall within the 31–40 years age group, representing 31.8 percent of the sample, followed by the 21–30 years group with 25.8 percent and the 41–50 years group with 24.8 percent. The smallest proportion of respondents is observed in the above 50 years category, which accounts for 17.8 percent of the total. This indicates that younger and middle-aged individuals form the dominant segment of the study population.

GENDER

Table 2: Descriptive Statistics based on Gender

Gender	Frequency	Percent
Female	179	44.8
Male	221	55.3
Total	400	100.0

(Source: Primary Data)

Table 2 presents the gender distribution of the 400 respondents surveyed in the study. Out of the total sample, 221 respondents (55.3 percent) were male, while 179 respondents (44.8 percent) were female. This indicates that male participants form a slightly larger proportion of the sample compared to female participants.

EDUCATION

Table 3: Descriptive Statistics based on Education

Education	Frequency	Percent
Graduate	171	42.8
Others	11	2.8
Postgraduate	127	31.8
Upto 12th	91	22.8
Total	400	100.0

(Source: Primary Data)

Table 3 shows the educational background of the 400 respondents surveyed. The majority of participants are graduates, accounting for 42.8 percent (171 respondents), followed by postgraduates who make up 31.8 percent (127 respondents). Respondents with education up to the 12th standard represent 22.8 percent (91 respondents), while the smallest group falls under the "others" category, comprising 2.8 percent (11 respondents). This distribution indicates that most of the sample is well-educated, with a significant proportion having completed higher education.

MARITAL STATUS

Table 4: Descriptive Statistics based on Marital Status

Marital Status	Frequency	Percent
Married	274	68.5
Unmarried	126	31.5

Total	400	100.0

(Source: Primary Data)

Table 4 presents the marital status distribution of the 400 respondents surveyed. A majority of the participants are married, accounting for 68.5 percent (274 respondents), while 31.5 percent (126 respondents) are unmarried. This indicates that married individuals form more than two-thirds of the sample, making them the dominant group in the study population.

CONCLUSION

The results demonstrate that demographic factors significantly affect consumer buying behavior toward millet products in Haryana. Age and education emerge as strong determinants, with younger and more educated consumers displaying higher acceptance and preference for millets. Gender differences are evident in product choice and consumption patterns, while marital status influences household-level purchasing decisions. Collectively, these insights confirm that demographic diversity must be considered when promoting millet consumption, as consumer responses vary across population segments.

FUTURE IMPLICATIONS

The study offers valuable implications for marketers, policymakers, and agricultural stakeholders. Targeted awareness campaigns focusing on health benefits can be directed toward less-informed demographic groups, particularly older and less-educated consumers. Gender-sensitive marketing strategies and family-oriented promotions may further enhance adoption. At the policy level, integrating millet promotion into nutrition programs and school feeding schemes could strengthen demand among younger populations. Future research may extend to psychographic and socio-economic factors, providing a more holistic understanding of consumer behavior.

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