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Exploring the Dimensions of Millet Awareness among Generational Cohorts

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HIGHLIGHTS

- Millet awareness varies among different generational cohorts such as Generation X, Generation Y and Generation Z.
- Nine dimensions of awareness regarding millet and millet-based products were identified.
- Millet awareness consists of four core dimensions, i.e. health-related, product-specific, environmental, and socio-cultural.
- Understanding generational awareness patterns can inform targeted strategies for promoting millet consumption.

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Keywords: Consumer awareness, Millets, Organic products, Exploratory, Millet awareness, Qualitative.

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ABSTRACT

The rising disposable income and growing awareness of environmental sustainability have driven a shift towards healthier lifestyles across generational cohorts, with millets gaining popularity as a nutritious and sustainable food option. Although rural consumers adopt millet products in their regular diet, urban adoption seems limited. Therefore, the study explored millet awareness among urban consumers from Generations X (aged between 42-60 years), Y (28-42 years), and Z (18-28 years) using a qualitative approach, incorporating in-depth interviews and focus group discussions. The data was analysed through grounded theory methodology adopting the Gioia Technique. The findings revealed nine distinct types of millet awareness and highlighted variations across generational cohorts. Furthermore, the study identified four key dimensions of millet awareness, such as health-related awareness, product-specific awareness, environmental awareness, and socio-cultural awareness, thereby contributing to the existing body of knowledge. These insights provide valuable guidance for marketers, policymakers, and society to enhance awareness and adoption of millets, thereby promoting health, sustainability, and broader sustainable development goals.

INTRODUCTION

Millets are a group of small-seeded grasses cultivated as food crops around the globe. They are consumed primarily in many parts of the Asia and Africa continents (Chaudhary et al., 2023). These are known as nutri-cereals and can be consumed in various forms of food choices. In the dynamic consumer lifestyle, dietary patterns have also undergone a significant change over the years (Gherasim et al., 2020). The food production and marketing system plays a significant role in shaping consumer consumption patterns (Timmer, 2017). Recent studies emphasize the need for sufficient consumption of healthy diets, which not only have a positive impact on the human body as well are environment friendly, having a sustainable effect (Willet et al., 2019; Latka et al., 2021; Pavan Kumar et al., 2024). The increasing health challenge has led consumers to change their diet preferences by shifting away from staple cereals and making way for healthier foods such as nutri-cereals like millets and other diverse food groups (Singh & Vemireddy, 2023). Furthermore, the change in dietary habits nowadays has led to an upward growth in the focus on nutrition, safety and health function rather than the quantity in the domestic food consumption (Meng et al., 2021)

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The consumption of millet has been somewhat limited over the years, resulting in decreased farming of different kinds of millets (Meena et al., 2021). To revamp the millet consumption and create demand for millet and millet-based products, the Government of India proposed to the United Nations to declare 2023 as the "International Year of Millets," which was seconded by various countries, resulting in the declaration of the same (Thorikonda et al., 2024). To increase the domestic demand of millet, Government of India has taken up various initiatives, for example Indian Railway's "One station One product" initiative (Rao et al., 2021). Similarly, different state governments have taken initiatives for the upliftment of millet farming and consumption, like the Odisha Millet Mission by the Government of Odisha.

Millets are still not widely adopted by urban consumers in India, despite its acknowledged nutritional worth, environmental advantages, and cultural importance. Urban markets have a significant impact on product innovation, national food trends, and the need for sustainable agriculture (Sanders, 2006). Given that cohorts differ in their cultural attachments, environmental concerns, and health interests (Gray et al., 2019), it is especially important to comprehend how millet awareness varies with generation. Therefore, this study fills a crucial knowledge gap by examining the differences in awareness across Generations X, Y, and Z along nine important dimensions. The study focused on exploring the diverse dimensions of consumer awareness about millets and examining generational variations in the types of millet awareness. A qualitative research technique was used to conduct the research.

METHODOLOGY

The study explored the knowledge and awareness of urban consumers regarding millet-based products of three different generations (Gen X, Y and Z) through a qualitative research approach. The respondents were selected through a purposive sampling technique from tier 1 and tier 2 cities of Odisha, West Bengal, Andhra Pradesh, and Telangana. Customers who consumed millet and millet-based products 3-4 times a week were recruited to be the respondents for the study. The data was collected through in-depth interviews and focus group discussions. The data collection process continued till data saturation was achieved, resulting in a sample size of 34 (11 from Gen X, 13 from Gen Y, 10 from Gen Z) in in-depth interviews. To gain deeper insight into awareness regarding millet and millet-based products, 6 focus group discussions were conducted with 2 FGDs from each generation. Each focus group consisted of 6-8 members, resulting in 15 participants from Gen X, 15 participants from Gen Y, and 16 participants from Gen Z. The combination of interviews and focus groups also enabled triangulation of perspectives, capturing both individual narratives and group-level dynamics to strengthen the validity of the findings. The interviews and FGDs were recorded with the participants' consent, translated wherever required and transcribed for the data analysis process. After translation and transcription, member checking was done to ensure that the transcribed data captured the participant's emotion correctly.

The study adopted grounded theory methodology (Glaser & Strauss, 1975) for the data analysis process with the Gioia technique (Gioia et al., 2013) with a two-step iterative data analysis approach to identify the underlying themes of the data. The first-order analysis classified the data set into various first-order codes, which explained the inherent meaning of the sentence. The fraction of the sentences, such as "Millets are naturally free from gluten", was coded as "gluten-free", leading to 90 first-order codes. Furthermore, the second-order analysis was to further classify the first-order codes into various second-order themes. This process was iterative, where the codes were continually compared with the data set. The first order codes, such as "fibre content", "contains fibre", "rich in fibre", were classified under the second order theme "high-fibre content", resulting in 33 second order themes. Additionally, these second-order codes were categorised under different aggregate dimensions, resulting in the findings of the study. The second-order themes, such as "locally available", "not readily available", and "selectively available", were categorised under a single aggregate dimension named "limited availability" of the millets. The study identified 9 aggregate dimensions such as nutrition, disease prevention, healthier alternative, sustainable farming, social impact, limited availability, product variety, safe consumption, and culture.

RESULTS

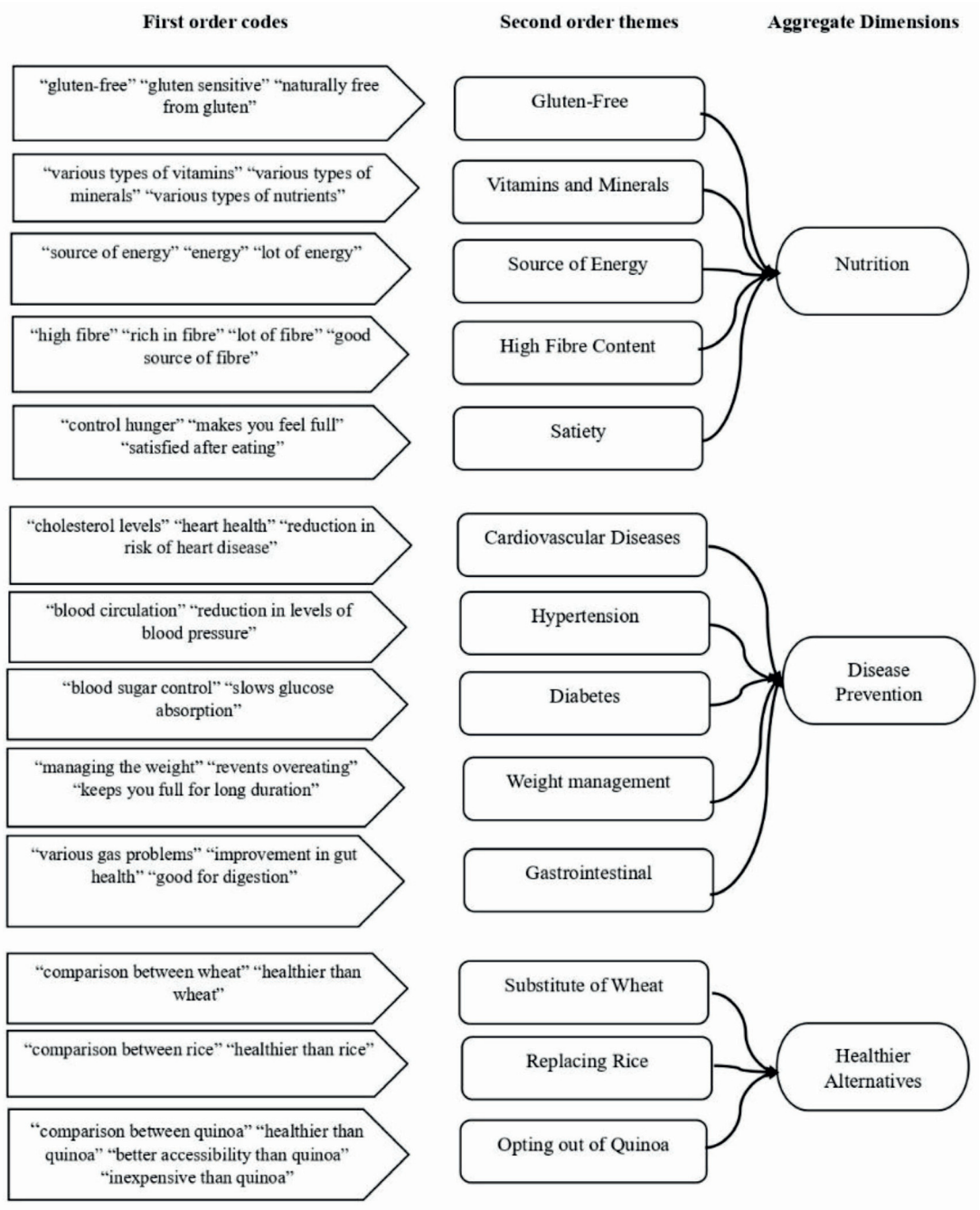
The study conducted in-depth interviews with 34 individuals and 6 focus group discussions inclusive of all the generations ageing between 18-60 yrs. Among them all of the respondents were familiar with Finger millet whereas 87 per cent consumed Pearl millet, 26 per cent & 75 per cent consumed foxtail and sorghum respectively. However lesser consumers consumed little millet (14%), proso millet (17%) and kodo millet (20%). The study adopted grounded theory methodology for the analysis of the collected data. The data analysis discovered 9 aggregate dimensions from 33 second order codes which explained the customers' knowledge regarding different types of awareness regarding millet and millet-based products. The findings identified nutrition awareness among the urban consumers which explores the customers' awareness of different qualities of millets such as gluten free, vitamin rich, source of energy, high fibre and satiety factors. The customers seemed to be aware of the different diseases such as cardiovascular diseases, hypertension, diabetes, weight management and gastrointestinal issues which can be prevented or kept in control by regular consumption of millets. With the changing lifestyle, the customers are aware of the different millets being an alternative to the traditional food grains such as rice and wheat. Furthermore, the customers also discussed about the positive impact of millet farming on the agrodiversity, organic foods, water efficiency and low carbon emission factors making millet a sustainable farming option. Along with this, millet farming and marketing also results in economic empowerment, cultural preservation, food security and social empowerment highlighting the awareness of urban consumers awareness regarding the social impact of millet farming and consumption. The consumers also discussed about the limited availability which becomes a challenge for them to include in their regular diet. Additionally, the customers also shared regarding the safe consumption knowledge, which is essential for the consumer to retain the benefits of millets without occurring any harm to them. Lastly, various customers discussed about millet being a part of their culture and traditions. The transcripts provided in Table 1 will provide clarity regarding the results. The data structure is provided in Figure 1.

Table 1. Aggregate dimensions with transcript reference

Aggregate Dimensions	Transcripts
Nutrition	• *"Millets are naturally free from gluten. Finger millet (ragi), pearl millet (bajra), sorghum (jowar), and foxtail millet are all gluten-free." (P33, 57 yrs)* • *"Millets are full of important vitamins and minerals. Finger millet (ragi) has a lot of calcium Pearl millet (bajra) has magnesium. Foxtail millet provides vitamins and Sorghum (jowar) is rich in iron, magnesium, and B vitamins. Millets are good for any diet and help with overall health." (P17, 24 yrs)* • *"Millets give me long-lasting energy and satiety without the urge to snack frequently. Millets are good at offering energy for a long duration, which helps to keep hunger in control and is easily digestible." (P16, 50 yrs)* • *"Millets are rich in fibre, helping with digestion and overall health." (P12, 34 yrs)* • *"Millets have high fibre content; specifically, Pearl millet and Finger Millet have High fibre content. However, Foxtail millet has Moderate fibre content." (P7, 20 yrs)*
Disease Prevention	• *"My blood pressure has been under control since I started consuming millets. I feel that this is mainly due to its ability to balance sodium, leading to enhanced circulation." (P27, 47 yrs)* • *"Millet has been crucial in enhancing the overall health of my family members, particularly, I notice that since we have started to consume millets frequently, we are able to manage diabetes better." (P9, 46 yrs)* • *"After eating millet cuisines, I feel full, and I am able to avoid overeating, as a result I am able to manage my weight effectively." (P21, 24 yrs)* • *"I know millets are gluten-free and light on the digestive system, making them one of the best options for those with gluten intolerance or vulnerable to gastrointestinal problems like bloating or indigestion. I feel my gut health has been improved after consuming millet regularly." (P5, 30 yrs)* • *"Eating millet can be good for my heart health. The high magnesium and fibre content of millet helps in reducing the risk of heart disease." (P25, 44 yrs)*
Healthier alternative	• *"Millets have high nutritional value in addition to fiber content. Which makes it a complete food unlike wheat which is rich in Carbs." (P4, 32 yrs)* • *"Millets are better than rice as they have less calories and don't lead to gas. So, I think they are better than rice. I feel I intake less when I eat millet. It makes me feel full; thus, I eat less when I consume millet." (P26, 22 yrs)* • *"Millets are easier to find and budget friendly compared to quinoa. Because of this, it's a convenient option for our family. They're also rich in fibre and provide steady energy, which is great for keeping me full and satisfied." (P1, 49 yrs)*
Sustainable Farming	• *"Millets include a wide range of species such as finger millet, pearl millet, foxtail millet, sorghum, and more. This diversity helps maintain genetic variation in agricultural systems." (P31, 54 yrs)* • *"Growing millet can reduce environmental pollution, as these grains can sustain without artificial fertilizers and pesticides, even in poor soil conditions." (P23, 35 yrs)* • *"Millet is highly sustainable, unlike water-intensive crops like wheat and rice. These grains can also grow on barren land and survive drought. Moreover, they also prevent erosion and maintain soil health." (P18, 55 yrs)* • *"Millet cultivation can be done efficiently on less fertile soil, even without artificial additives. Moreover, they also need less input from machines. This leads to lower carbon emission." (P10, 26 yrs)*
Social Impacts	• *"In areas that lack access to resources, millet cultivation is highly profitable, unlike other crops." (P19, 33 yrs)* • *"The tribal culture is interlinked with millets; therefore, millet cultivation is vital to preserve the tribal culture and their traditional practices." (P25, 44 yrs)* • *"As millets can thrive in harsh climates and survive poor quality soil, they are highly effective in solving the food security problems of marginal farmers and tribals." (P20, 30 yrs)* • *"Cultivation of millets is essential to preserve the culture of tribal communities; by doing so, the social status of trials is enhanced, as people start to know their culture via consuming millets, and hence respect it." (P32, 52 yrs)*
Limited Availability	• *"Millet is not easily available in retail stores. Also, it is costly." (P3, 35 yrs)* • *"In most traditional and local markets, raw millet grains and products made from millet are readily available." (P8, 48 yrs)* • *"Millet-based products and grains can be purchased through local markets and health food stores or specialized outlets like millet Shakti, as well as e-commerce sites and online platforms that allow us to buy a variety of millet products." (P24, 21 yrs)*
Product Variety	• *"There are millet-based breakfast cereals like flakes or granola, which are healthy and nutritious for us, also snack options such as millet cookies, energy bars, and puffs, which are tasty as well as healthy." (P15, 32 yrs)* • *"Ready-to-use ragi and bajra millet flours for making rotis and dosas to instant millet khichdi, millet upma, millet-based instant noodles, snack bars, a range of ready-to-cook range of millet-based products are available in the market."(P11, 37 yrs)* • *"I have often come across Bajra, which is high in fibre and minerals and Ragi, is also because it is rich in calcium content. This is why people like to eat both Ragi and bajra. I know only about these and have tried these, but there could be more varieties, too." (P14, 19 yrs)*

Table 1 contd....

Aggregate Dimensions	Transcripts
Safe Consumption	• *"Look closely for any extraneous items, such as stones or insects, among the millet grains. Rinse well: In order to get rid of any residue or debris, wash the millet grains under cold running water." (P33, 57 yrs)* • *"First, we should let millet cool down at room temperature before storing, and we should put it in air-tight containers, which allows them to maintain its quality." (P7, 20 yrs)* • *"Like any other product, we can check the packaging to see if it is airtight and within the expiry date. If I can smell, I will smell those products and try to get to know if it smells ok or smelling awful." (P13, 33 yrs)*
Culture	• *"They play a very important role in religious rites, traditional cuisine, and Ayurvedic medicine." (P27, 47 yrs)* • *"People use millet during different religious and cultural ceremonies, such as Pongal, Onam, Makar Sankranti, and Navratri." (P2,27 yrs)* • *"During festivals like Nuakhai, the festival of Odisha, folk songs sung as Nuakhai Bhet Ghat'Folk songs associated with millets are Rajasthan's Bajra Ni Roti and Karnataka's Ragi Muddeya Rasa." (P6, 22 yrs)*



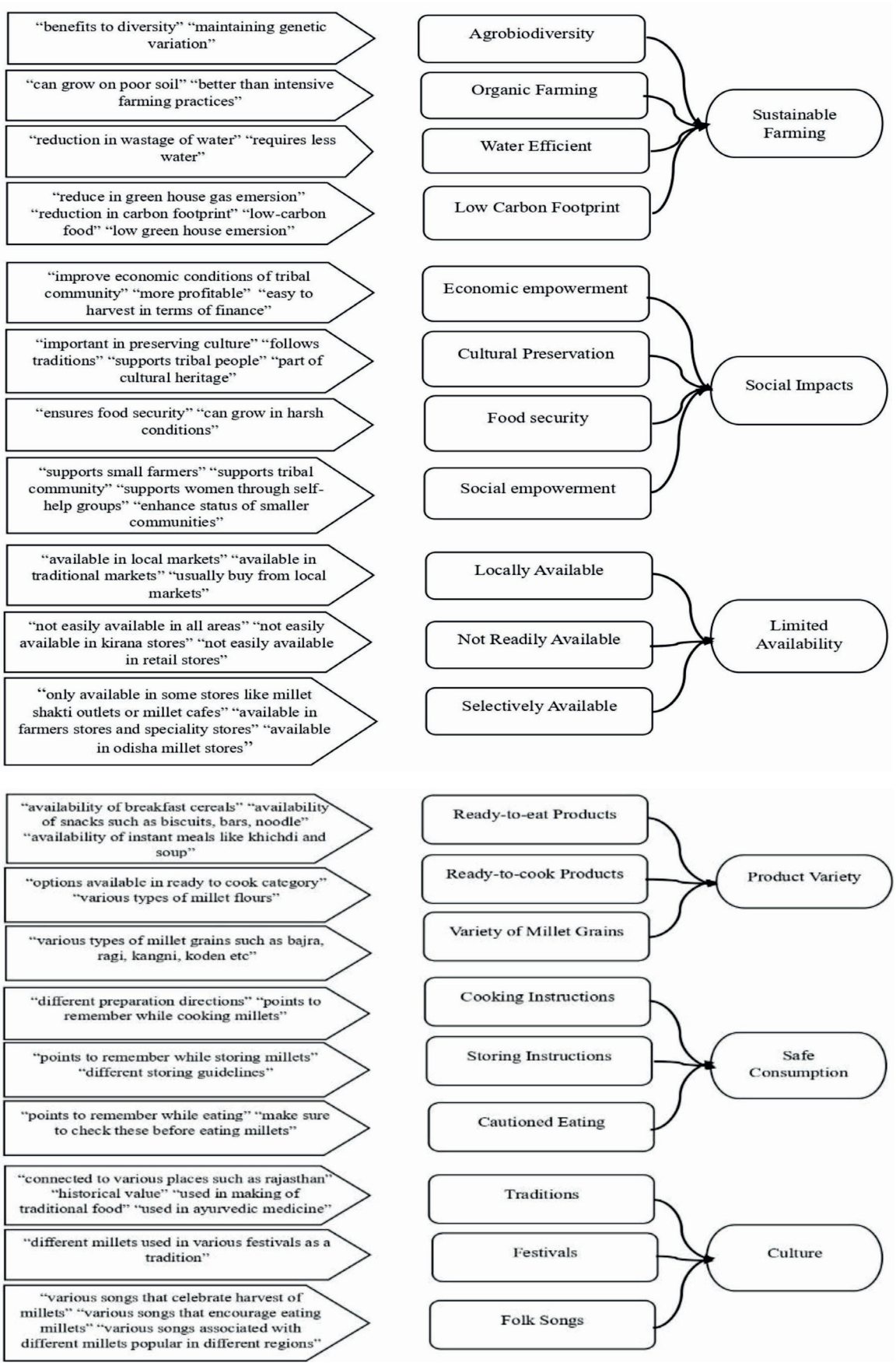


Figure 1. Data structure: first-order codes, second-order themes, and aggregate dimension.

DISCUSSION

The findings revealed that there are nine types of millet awareness among consumers. These nine types of millet awareness were categorized under four dimensions, namely, health-related awareness, product-specific awareness, environment-related awareness and socio-cultural awareness (Figure 2).

The health-related awareness dimension consists of nutrition, disease prevention and healthier alternative types of millet awareness. This indicates the customers knowledge regarding millet being gluten-free, fibre-rich grain with essential nutrients which help in preventing various chronic illnesses. The product-specific awareness dimension highlights the customer's knowledge regarding different millet grains and millet based ready to eat products as well as preparatory cautions and availability of the products. Furthermore, the environment related awareness discusses about sustainable farming techniques and the influence of millet farming supporting the agrodiversity and impacting on ecological balance. Additionally, the socio-cultural awareness highlights the consumer awareness of millet being part of different cultures along with the

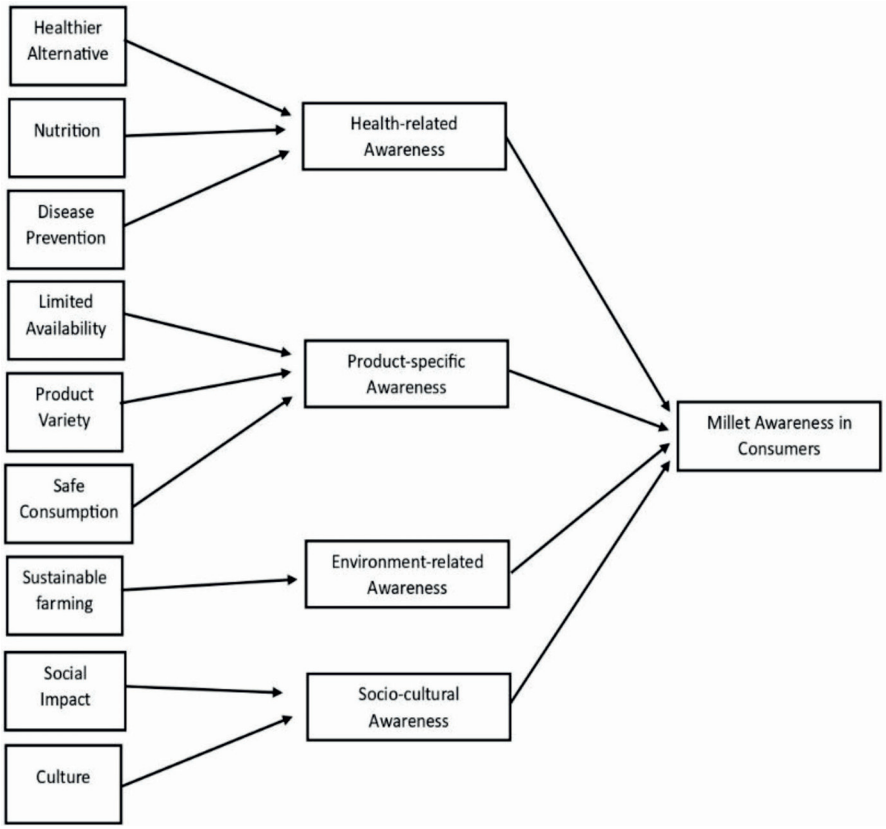


Figure 2. Classification of Types of millet awareness

Table 2. Generational differences in different millet awareness dimensions

Awareness Dimensions	Generation X	Generation Y	Generation Z
Health-related awareness	Source of energy Satiety Chronic Disease	Vitamins Minerals Chronic Disease Disease Prevention Alternative to Rice & Wheat	Gluten free Vitamins Minerals Disease Prevention Alternative to Rice & Wheat
Product-specific awareness	Safe consumption Raw millets Limited Availability	Ready to cook Limited Availability	Ready to eat Ready to cook Limited availability
Environment-related awareness	Millet cultivation techniques Agro-biodiversity	Sustainable farming practices Impact on environment Agro-biodiversity	Low carbon footprint
Socio-cultural awareness	Traditional Customs and festivals Songs of millets Women empowerment Social upliftment	Economic empowerments Self-Help Groups	Food security Upliftment of farmers

societal benefits of millet cultivation and promotion. According to Table 2, Generation Y and Z focused more on the role of millets in providing vitamins and minerals and their potential in disease prevention and overall health improvement. Generation X discussed more about satiety, energy levels of millets, and chronic diseases. Generation X demonstrated a greater understanding of the safe consumption of millets. Discussions on product variety were more prominent among Generation Y and Z, with Generation Z showing a preference for ready-to-eat millet products and Generation Y favoring ready-to-cook options. In contrast, Generation X focused more on raw millets. Despite these differences, all generations were equally aware of the limited availability of millets. Therefore, millet cultivation supports sustainable farming. In addition to this, Generation X was more aware of sustainable millet cultivation techniques and agro-biodiversity, while Generation Y was more concerned about sustainable farming practices and their impact on the environment. Generation Z showed more interest in the carbon footprint associated with millet production. Generation Z emphasized issues such as food security and the upliftment of small farmers and women, whereas Generation Y focused more on economic empowerment. Generation X displayed a deeper understanding of the role of millets in traditional customs and festivals, including knowledge of songs associated with millets. This finding extends the studies conducted by Shah et al., (2021) and Singh & Vemireddy (2023) by differentiating between different generations.

The current study provided novel insights into knowledge and awareness regarding millet and millet-based products among urban consumers. The findings extended the study conducted by Shirahatti et al., (2022), which conducted this study from a quantitative perspective. The findings identified unique dimensions of millet awareness among different generations and studied the impact of generational cohorts as well. Furthermore, the study also extends the study conducted by Beera et al., (2024), by considering not only finger millet but also considering other kinds of millets and extending the study by focusing on gen z customers as well. However, in contrast to the study by Dudekula et al., (2023) who studied with the different stakeholders of millet supply chain, this study was undertaken from the perspective of consumers only.

The study organizes these nine types of millet awareness into four key dimensions: health-related awareness, product-specific awareness, environment-related awareness, and socio-cultural awareness. While existing studies have explored consumer awareness of millets (Reddy & Patel, 2023; Shirahatti et al., 2023), systematically categorizing these types into such comprehensive dimensions was overlooked. Therefore, this study provides conceptual framework that enriches academic discourse by providing a structured approach to understanding millet awareness.

The practical implications can be adopted by different spheres of marketing personnel involved in food business such as restaurants, processed food organizations and food corners. Although the millet-based food category has variety of products under its umbrella, the product managers can develop new recipes substituting the traditional food options. Considering the fast-moving lifestyle of the youth, ready to eat and cook product segment can be enhanced having more options to choose from. The operation managers should oversee the supply chain of millet procurement till to the table of the consumers. The managers should try to bridge the gap in between the demand and supply of millet and millet-based food products.

Converting the Awareness into Action (based on AIDA) should be the primary focus of marketing managers. The marketing managers should promote the nutritional benefits to target the Gen Z customers for increased consumption of millet and millet-based products. Similarly, the managers should focus on disease prevention awareness among the consumers to target the Gen Y and Gen X customers. Furthermore, the limited supply of millets signals an opportunity for small farmers to expand production in terms of both quantity and variety. This can encourage sustainable farming practices, contributing to environmental conservation and mitigating pollution. Collectively, these efforts can improve the quality of life in rural areas while fostering a healthier environment for all.

CONCLUSION

The study highlighted generational variations across various cohorts. Notably, Generation Z exhibited the highest awareness of health-related aspects, while Generation Y demonstrated greater awareness of environmental issues, and Generation X displayed a deeper understanding of sociocultural aspects. Interestingly, product-specific awareness was found to be relatively uniform across all generations, suggesting a shared understanding of millet-related product characteristics regardless of age group. Future research could explore millet awareness in other geographical contexts. Comparative studies could further enrich understanding in this domain. Furthermore, the qualitative approach employed in this study to identify dimensions of millet awareness provides a foundation for future research. Future studies could develop and validate a quantitative scale for millet awareness. Consequently, quantitative and experimental methodologies could also be utilized to provide deeper insights and broader applicability. These directions would contribute to a more comprehensive understanding of millet awareness across diverse contexts.

DECLARATIONS

Ethics approval and informed consent: Informed consent was sought from the respondents of the study and their organizations during the course of the research.

Conflict of interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Declaration of Generative AI and AI-assisted technologies in the writing process: During the preparation of this work, the author(s) used ChatGPT in order to improve language and readability. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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