

# Understanding Consumption Behaviour and Preference Patterns of Millets among Consumers

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## Abstract

The study aimed to know the consumption pattern of millets among the households in Banda, Kanpur and Lucknow districts of the Uttar Pradesh. Since an increasing number of people started to learn that millets are hardy against the tough weather and are full of nutrients, this study examined how they find their way to our daily meals. The research design was explanatory and total 150 respondents were chosen using random sampling. The findings showed that the consumption of millet was very high as 96.70 percent of the respondents indicated that they consumed the millets in different ways. Flour was the most desirable type in terms of its flexibility to the traditional cooking habits. It is interesting to note that 41.37 per cent of the respondents had started taking millets in the last one year which means that the diet has changed recently due to awareness and marketing campaigns. The study indicates that we need to have clear awareness campaigns and policies to ensure more people consume millets so that we can have better nutrition and create sustainable food systems that are sustainable and long-term.

**Key words:** Millets, Millets consumption, Consumption behavior, Dietary patterns, Preference

Millets, often recognized as “nutri-cereals,” are among the most important components of food systems globally. The agricultural sector reemerged the Millets due to their rich nutritional profile, climate resilience, and adaptability to marginal conditions making them a crucial crop for ensuring food and nutritional security in the face of changing climatic scenarios and growing population pressures [1-2]. The consumption involves an integral part of traditional diets across India and the renewed awareness regarding health benefits reflects the modern idea of the connection between food and nutritional security [3-4]. The excellent and nutritious millets grains contain various elements of health, such as high fiber, low glycemic index, and essential micronutrients, as well as the principles, for instance, policy support and market availability, which collectively enhance their potential to combat malnutrition, promote sustainable agriculture, and support the livelihoods of smallholder farmers [5].

Millets, a diverse group of small-seeded cereal grains, have re-emerged as an important component of sustainable food systems owing to their exceptional nutritional quality, climate resilience, and adaptability to marginal agro-ecological conditions. Traditionally cultivated and consumed across Asia and Africa, millets such as pearl millet (*Pennisetum glaucum*), finger millet (*Eleusine coracana*), and foxtail millet (*Setaria italica*) are rich sources of dietary fiber, essential amino acids,

vitamins, and micronutrients, while also exhibiting a low glycemic index. These attributes make millets particularly relevant in addressing contemporary health challenges such as diabetes, obesity, and cardiovascular diseases.

In recent years, there has been a renewed global interest in millets, driven by increasing awareness of healthy eating habits and food security concerns. Policy initiatives, including the declaration of 2023 as the International Year of Millets by the Food and Agriculture Organization, have further strengthened efforts to promote millet production and consumption. In India, millets have been recognized as “nutri-cereals,” and their inclusion in public distribution systems, mid-day meal schemes, and health-focused dietary programs highlights their growing significance in national food strategies. Despite these advancements, the consumption of millets remains inconsistent and often limited to specific regions or socio-economic groups. Consumer preferences are influenced by a range of factors, including taste, convenience, price, cultural perceptions, availability, and awareness of health benefits. The increasing dominance of refined cereals such as rice and wheat, along with changing lifestyles and urbanization, has contributed to a decline in traditional millet consumption patterns. However, the recent surge in demand for functional foods and organic products presents new opportunities for millet-based food products in both rural and urban markets.

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Recent studies shows that how people view and accept millet food products depend mostly on what they know about nutrition, what tastes they like, and their background [6]. Kunja *et al.* [7] noted that awareness and social or cultural influences strongly affect how different groups eat millets. And also, what individuals normally eat and how easy it is to get a millet affect how much of it ends up in their regular meals, according to Amrutha *et al.* [8]. As nutrition habits keep shifting, it's important to study how people eat so we can see whether millets are truly returning to everyday meals. How people eat isn't just about how often they consume or what they choose but it's shaped by culture, money, how informed they are, and whether food is easy to get [9]. And some researches also show that sharing knowledge, providing training, and improving access to information strongly influence how people behave and whether farmers and consumers adopt new practices [10-11]. Even though government and health groups have been pushing millets as a healthy, sustainable food but not everyone has taken them up and adoption varies widely from place to place and among different communities [12]. It looks like people are becoming more aware but their buying habits have not fully changed yet, they're still in the middle of it. We can learn more about people's involvement and acceptance of millet by looking at how often they eat it and what they prefer. Such research helps in identifying important gaps between awareness and practices, also provides a foundation for developing targeted interventions, awareness campaigns, and policy measures to increase millet intake [13-14]. In Uttar Pradesh, where eating patterns are firmly anchored in cultural traditions and mostly centered on wheat and rice-based cooking, the reintroduction of millets generates barriers as well as opportunities. The present research focuses on the Banda, Kanpur, and Lucknow districts that represent both rural and urban settings. This facilitates an in-depth understanding of millet consumption patterns.

Understanding consumer behaviour and preference patterns is therefore crucial for designing effective strategies to enhance millet consumption. Insights into purchasing decisions, consumption frequency, product preferences, and barriers to adoption can help policymakers, researchers, and food industry stakeholders develop targeted interventions, improve product innovation, and strengthen market linkages. This study aims to explain regional dynamics, highlighting current consumption patterns and establishing a foundation for formulation of location specific strategies that may successfully advocate for millets as a sustainable and nutritionally advantageous dietary option.

## MATERIALS AND METHODS

The study was carried out in three districts of Uttar Pradesh viz Banda, Kanpur and Lucknow using convenience sampling to explore millet consuming patterns. Fifty customers were selected from each district. Thus, a total of 150 respondents were chosen for the study. We approached consumers at shopping malls and in areas where the targeted individuals bought food ingredients for their homes. Convenience sampling method was adopted. Participation of people was totally voluntary and anonymous. A pre-tested

semi-structured interview schedule was used for data collection to ensure reliability and validity. The information on the frequency of millets consumption, preferred forms (such as flour or cooked grains) and the consumption period of millets and related aspects were collected. Descriptive statistical techniques and Garrett's Ranking Technique were applied to identify consumption patterns and trends. This methodological approach enabled the study to assess both the prevalence and diversity of millet consumption among respondents.

### Garrett's ranking technique

Garrett's Ranking Technique provides a numerical representation of limitations and recommendations for ordering. The main benefit of this approach over a simple frequency distribution is that the limits and recommendations are ranked according to severity from the respondents' perspective. The following is the percentage position formula proposed by Garret [15]:

$$\text{Per cent position} = 100 \times \frac{(R_{ij}-0.5)}{N_j}$$

Where,

$R_{ij}$  = Rank given for the  $i^{\text{th}}$  variable by  $j^{\text{th}}$  respondent

$N_j$  = Number of variables ranked by  $j^{\text{th}}$  respondent

Garrett and Woodworth's table is used to translate percentage positions into scores. After adding the individual factor scores, the mean and total score are determined. The mean scores for each element are then sorted in decreasing order to make it simpler to identify the most essential components based on their assigned ranks. The factor with the greatest mean value is the most important one in the research.

## RESULTS AND DISCUSSION

The findings will be based on the major areas like how much millet is consumed, the consumption patterns in different forms, consumption patterns of the products, time taken to adopt, frequency and the amount of the consumption. The results showed that millets consumption was highly prevalent among respondents whereby the highest percentage (96.70%) of the respondents consumed millets in various forms and only a small percentage (3.30%) of the respondents did not consume millets. This demonstrates that millets are very much acceptable by the consumers in the study region (Table 1).

Table 1 Distribution of respondents based on consumption of millets (n=150)

S. No.	Particulars	Percentage
1.	Yes	96.70 %
2.	No	3.30%

The majority of responders stated that their preferred method of consumption was millet flour. Millet flour fits in perfectly with existing eating patterns, particularly when used as chapati. Nevertheless, people favoured ready-to-eat and ready-to-cook forms of millet parboiled (Table 2). The customers will therefore probably prefer to buy products that complement their already existing food preparation methods instead of trying new cooking habits afresh.

Table 2 Distribution of respondents based on preferred methods of consumption (n=145)

S. No.	Form of consumption	Total score	GMS	Rank
1.	Flour form	9000	62.06	I
2.	Parboiled form	2408	16.60	IV
3.	Ready to eat products	3784	26.09	II
4.	Other value added (Ready to cook)	2997	20.66	III

Table 3 Distribution of respondents based on preferred form of consumption of millet products (n=145)

S. No.	Particulars	Total score	GMS	Rank
1.	Bread	5880	40.55	II
2.	Cake	2409	16.61	VII
3.	Biscuits	5360	36.96	III
4.	Cookies	3472	23.94	V
5.	Muffins	912	6.28	X
6.	Sweets	2332	16.08	VIII
7.	Flatbread	6300	43.44	I
8.	Porridge	2530	17.44	VI
9.	Khichdi	2142	14.77	IX
10.	Oats	3441	23.73	IV
11.	Vermicelli	544	3.75	XII
12.	Pasta / Noodles	702	4.84	XI
13.	Flakes	540	3.72	XIII

Multiple response was collected

Looking closer at millet food products, people most often ate millet-flour flatbread (Rank I). Then there were bread (Rank II), biscuits (Rank III) and oats (Rank IV). Few respondents consumed other products containing millet like millet-flour cookies (Rank V), porridge (Rank VI), cake (Rank VII), sweets (Rank VIII), khichdi (Rank IX), muffins (Rank X), pasta/noodles (Rank XI), vermicelli (Rank XII), and flakes (Rank XIII) (Table 3). Even though traditional millet products sold everywhere are becoming more popular but many processed and value-added millet products still haven't caught on widely. Consumers are consuming increasingly of these products due to the fact that more individuals are now considering health and the millet products are now readily available in the stores.

The study looked at how long people had been eating millets and only 41.37% said they started within the past year. Approximately, 27.58% answered that they consumed millets between one and five years and fewer individuals answered that they consumed millets after that period (Table 4). To most families, the consumption of millet is still relatively new considering their increased health consciousness and increased by latest advertisements.

Table 4 Distribution of respondents based on consumption period of millets (n=145)

S. No.	Consumption period	Percentage
1.	< 1 year	41.37
2.	1-5 years	27.58
3.	5-10 years	18.63
4.	> 10 years	12.42

Table 5 Distribution of respondents based on frequency of consumption of millets (n=145)

S. No.	Consumption period	Percentage
1.	Daily	17.24
2.	Biweekly / Thrice weekly	24.82
3.	Weekly	22.06
4.	Fortnightly	5.51
5.	Monthly	13.79
6.	Occasionally	16.55

Regarding the frequency, the consumers showed a varying consumption of the millet with the highest percentage (24.82%) consuming two to three times per week. The rest of the consumers described weekly, daily, occasional or monthly patterns of consumption of millets (Table 5). The moderate

frequency of consumption also indicates that despite the introduction of millets in diet, it has yet to be fully substituted with the traditional staple cereals like wheat and rice.

Table 6 Distribution of respondents based on schedule of consumption of millets (n=145)

S. No.	Time of the day	Percentage
1.	Breakfast	31.03
2.	Lunch	26.89
3.	Evening snacks	2.75
4.	Dinner	20.68
5.	Any time	31.72

Multiple response was collected

In reference to the time of consumption, the consumers were found to have a flexible consumption behavior with most (31.72%) of the consumers saying that millets could be consumed at any time of the day. Nevertheless, breakfast was chosen as a somewhat more favourable moment, then lunch and dinner (Table 6). The low demand to consume millet as evening snacks indicates that the snack-based millet products are not diversified.

The quantity of the consumptions made monthly indicated that majority of the consumers (44.13%) used less than 1 kg of millets per household per month. A smaller percentage (20.70%) of those involved in higher consumption levels showed that total intake is relatively low despite widespread adoption (Table 7).

Table 7 Distribution of respondents based on volume of consumption of millets (n=145)

S. No.	Consumption range (in Kg/household)	Percentage
1.	< 1kg	44.13
2.	1-2 kg	17.93
3.	2-3 kg	17.24
4.	>3 kg	20.70

Multiple response was collected

Generally, the findings show that the consumption of millet is increasing due to the rising awareness among consumers. However, the comparative newness of its use, moderate consumption rate, and small volume of consumption indicate that it is necessary to continue working on promoting millets. Increasing the level of consumer awareness, making the

products more accessible, and promoting the creation of a convenient millet-based food options and millet-based products might be key to reinforcing their standing in normal diets.

The findings of the present study are clear that the use of millet is common among consumers (96.70%) implying that these traditional cereals are revived in modern diets. This large rate of acceptance can be attributed to the increasing awareness of the nutritional and health benefits of millets and policy-level encouragement like the declaration of the International Year of Millets 2023 by the Food and Agriculture Organization [16]. Similar patterns of increasing consumption of millets were reported by Prasanthi and Sireesha [13], who found that millets became more vulnerable to consumption as consumers became more health conscious. The tendency of using millet flour as the most widespread way of consumption proves the importance of cultural appropriateness in the process of adapting to a diet. Consumers will not change their cooking habits radically but they will incorporate new food items to their existing food habits. The result is consistent with Senthamarai and Malathi [17], who stated that the traditional preparations of millets, including flour-based ones, make the latter easier to accept in everyday meals. Similarly, Kavimalar *et al.* [14] also highlighted that familiarity and convenience were found to be important determinants of consumer preference towards millet-based products. The consumption pattern of the products further shows that the consumption of traditional products like flatbreads prevails whereas consumption of processed and value-added products like pasta, vermicelli and muffin is comparatively low. This implies that market availability of processed foods made out of millet is rising but still, it has not been embraced by consumers yet. Padmalini *et al.* [12] also found that the limited knowledge and availability of diversified millet products hamper their uptake. An interesting conclusion of the study is that a significant part of the respondents (41.37%) began to consume millets in the previous year which shows that consumption of millets is a comparatively new trend. This is attributable to the aggressive promotional efforts, health awareness, and the growing concern about lifestyle diseases. To back this up, Kumar *et al.* [2] have noted that urban consumers are gradually turning towards millets as they have low glycemic index, and nutritional value. On the same note, Gowda *et al.* [18] found that in recent years, awareness campaigns and government efforts have been a key factor in increasing the uptake of millet. Although there is a high level of adoption, consumption frequency and amount is moderate with majority of the respondents consuming two to three times of millets per week and less than 1 kg per month. This implies that millets have not yet substituted the staple cereals like rice and wheat. Prasanthi and Sireesha [13] also reported this transitional

consumption behavior in which they observed that in many cases, millets are not the staple food but are taken occasionally. The freedom of time of consumption where breakfast is preferred and any time also indicates that millets are slowly finding their way into various meal times. Nevertheless, the fact that preference of the millet-based snacks is low suggests a lack of product diversification and consumer awareness. Padmalini *et al.* [12] highlighted the importance of increasing the number of ready-to-eat millet snacks products as they might greatly increase the consumption rates, particularly in younger consumers.

Altogether, the study indicates the favourable change toward eating millets due to the health awareness and the policy support as well as the altered diet. However, the average frequency and low consumption volume points to the fact that the consumption of millet remains in a transitional stage. The low product diversification, absence of a habitual consumption and insufficient market penetration are still among the factors that prevent their complete inclusion in everyday diets. Such results are in line with the previous empirical data and support the necessity of the long-term work on awareness creation, product development, and supply chain enhancement to boost millets as a daily meal.

## CONCLUSION

The study highlights that consumption of millet is common in the selected districts of Uttar Pradesh and flour is the most preferred type of consumption. One of the most interesting conclusions is that a significant percentage of the respondents have recently switched to the use of millet which reflects the positive impact of the promotional campaigns and health-promotional efforts. The frequency of consumption may differ though most households use millets twice or thrice a week but the general trend is that millets are slowly being incorporated in their normal diets. Increasing adoption is a good sign of progressive change towards food habit diversification and the improvement of nutritional security. In turn, the moderate level of usage frequency and relatively recent adoption represent the need in the long-term work in the field of awareness, availability, and affordability. This study will be very useful to policymakers, nutritionists and development practitioners interested in encouraging the use of millets as a strong and health improving food system by documenting the present consumption behavior. The results highlight the need to promote millets beyond awareness creation but through behavioural change mechanisms, better value chains and product innovation that is consumer centric to guarantee long time integration of the diet.

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