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Assessment of Consumption Pattern, Knowledge and Awareness of Millets: A Study among Urban Households of Vijayapura District, Karnataka

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ABSTRACT
Millets are a vital food source, providing essential nutrients, fiber, and minerals. Their significance extends beyond nutrition, as they contribute to food security, sustainable agriculture, and economic empowerment. The present study aimed at assessing the consumption pattern, knowledge and awareness level about millets. An exploratory research was conducted at urban area of Vijayapura district, Karnataka with the total sample of 100 were selected by random sampling method. Structured questionnaire and face to face interview methods were employed to collect data on socio- demographic profile, dietary habits, knowledge and awareness about millets, millet consumption and purchasing pattern. The study results showed that 32.0% and 31.0% of the respondents belongs to the upper lower class (Class IV) and upper middle class (Class II) and nearly 60.0% of the study subject were non-vegetarian and 95.0 % of respondents reported consuming meals three times a day. All respondents reported consuming grains daily (100%). Knowledge about millets among respondents represents that majority of respondents (88.0%) view millets as "very important" in terms of nutrition and all respondents reported being "very familiar" with millets like Sorghum, pearl millet, and finger millet. The frequency of millet consumption among study subjects reported that 90 per cent of respondents daily consume sorghum followed by finger millet. The awareness about significance of millets known by the respondents observed that 98 per cent agree that all types of millets are good quoting multiple health benefits and seeing them as a rich source of iron, calcium, vitamins, and protein (92.0%) Majority of the subjects (90.0%) recognize millets as beneficial in managing weight, diabetes and CVD. About 98.0 % of the respondents came to know about millet products through their family and friends circle and 94.0 % of them purchase millets from the local stroes. The commonly found products of millets in the market were millet flour products and millet malt as reported from the majority of the respondents. The study reflected a growing trend towards traditional grains as part of a healthy lifestyle, emphasizing the importance of accessibility and education in sustaining and expanding millet consumption.

Keywords: Millets, knowledge and awareness, dietary habits, consumption pattern

Introduction

The word millet is derived from the French “mille” which means that a handful of millet contains thous-

ands of seed grains (Taylor and Emmambux, 2008). Millets are the staple food in the developing world, especially in the dry lands of Africa and Asia. Most of the millets are indigenous to Africa and later domesticated to other parts of the world.

Millets are a vital food source, providing essential nutrients, fiber, and minerals. Their significance extends beyond nutrition, as they contribute to food security, sustainable agriculture, and economic empowerment. Being drought-resistant and climate-resilient, millets ensure food availability during scarcity, making them a crucial crop for rural communities (Kumar *et al*., 2018). Moreover, millet cultivation promotes eco-friendly practices, reducing environmental degradation and supporting sustainable agriculture (Rao *et al*., 2017). Addition to their environmental benefits, millets also support rural economies and women's empowerment. There are two types of millets; the major millets include sorghum (jowar) and pearl millet (bajra) and the minor millets include finger millet (ragi/mandua), foxtail millet (kangni/Italian millet), little millet (kutki), kodo millet, barnyard millet (sawan/jhangora), proso millet (cheena/common millet), and brown top millet (korol).

India is the world's top producer, followed by Africa. The major millets producing states in India are Rajasthan, Karnataka, Maharashtra, Uttar Pradesh, Haryana, Gujarat, Madhya Pradesh, Tamil Nadu, Andhra Pradesh and Uttarakhand. Currently, together these ten states account for around 98 per cent in Millet's production in India during the period 2023-24 (2nd Advance Estimates). Global millet consumption has decreased at a pace of about 1%, although positive growth is anticipated between 2019 and 2024 (Anbukkani *et al.*, 2017). Over the past twenty years, there has been a decline in the significance of millet as a staple food in both India (Michaelraj and Shanmugam, 2013) and globally as a result of supply and demand variables such as urbanization, rising incomes, and government regulations (King, 2017). Currently, more than 50% of the millet produced is put to alternative uses rather than being consumed as a staple food (Uma Gowri and Chandrasekaran, 2011). The area planted to small millets has shrunk from 8 million hectares (1949–50) to 1.8 million hectares (2017–18) over the previous six decades. In the same year, small millet production followed the same pattern, declining from 4 million tons to 2.44 million tons; loss was mostly experienced by all other small millets when compared to finger millet (Shadang and Jaganathan, 2014).

Further, millet consumption has declined in recent years despite their numerous benefits. This decline is attributed to factors such as limited market availability, lack of processing infrastructure, and competition from refined cereals (Singh *et al.*, 2019). To address these challenges, awareness campaigns are crucial. These campaigns can boost millet consumption, improve nutrition and health, and support millet-based enterprises.

Successful millet awareness initiatives include social media campaigns, workshops, events, and partnerships with NGOs, government agencies, and private sector organizations. For instance, India's National Millet Mission has promoted millet cultivation and consumption, while Kenya's Millet Promotion Program has enhanced millet value chains. Millets are a vital food source, supporting nutrition, food security, sustainable agriculture, and economic empowerment. Awareness campaigns are essential to promote millet consumption, address challenges, and ensure the long-term sustainability of millet-based livelihoods.

Millet based livelihoods provide income opportunities, enhancing economic growth and social stability (Saha *et al*., 2020). Furthermore, millets are integral to traditional cuisine and cultural heritage, preserving diversity and promoting cultural exchange (Desai *et al.*, 2016).

Kane-Potaka *et al.* (2021) studied about Millets and Sorghum Consumption Behavior and surveyed over

15,000 participants across India to understand millet consumption trends and the study revealed limited knowledge about the nutritional benefits of millets, highlighting the need for educational programs to increase awareness. The findings suggest that millet consumption is mainly occasional, and there is significant potential for increasing daily intake through targeted campaigns and product innovations. Rizwana M *et al.* (2022) finds that health consciousness is the key driver behind millet consumption in Southern India and the study notes that most women are aware of millets health benefits, but regular consumption remains low. It calls for strategic marketing and better access to millet-based products to promote daily consumption for improved public health outcomes.

Considering the above facts, the present study aims to examine the consumer awareness and consumption patterns of millets and millet-based products in the locality of Vijayapura district, Karnataka.

MATERIALS AND METHODS

The present study was carried out in urban areas of Vijayapura district, Karnataka. An exploratory research focusing on consumption pattern and knowledge of consumers about millets was conducted through face to face interview using structured questionnaire.

A total of 100 respondents inclusive of both genders were selected through random sampling methods. A structured questionnaire was developed to gather data from the respondents. The questionnaire includes the data on demographic, socio-economic profile, knowledge and awareness about millets, dietary habits, frequency of consumption of millets, availability of the millet products in the market *etc*.

The updated Kuppuswamy Scale of 2023 modified by Radhakrishnan and Nagaraja (2023) was used to measure socio-economic status of families in urban areas. This scale takes into account education, occupation and income of the family to categorise families into upper, middle and lower socioeconomic classes. Dietary habits of the respondents include questions about food habits, meal time, consumption of primary grains, and importance of nutrition in diet. The gathered data from various parameters were recorded, tabulated and statistically analysed.

Results and Discussion

The demographic profile of the respondents shown in Table 1 revealed that 43 per cent of the respondents belongs to age group of 30- 35 followed 30 per cent in the 25-30 age group. This indicates a significant representation of respondents in the age group over 35, particularly women, which may reflect the targeted demographic of the study.

Majority of the participants were female (84.0%) whereas 16 per cent were male. Nearly 90 per cent respondents were identified as Hindu, with only a small fraction identified as Muslim (11%). This distribution suggests that the sample was largely homogeneous in terms of religious affiliation, with Hindus being overwhelmingly represented.

Majority of respondents were from nuclear families (76.0%) whereas joint family structures were less common, with only 24.0% of respondents, suggesting a preference or trend toward nuclear families within this sample.

Table 1. Socio-demographic profile of Respondents

Characteristics	Total (N=100)	
	Frequency	Percentage
Age of respondent		

18-25	5	5.0
26-30	22	22.0
31-35	30	30.0
More than 35	**43**	**43.0**
Gender		
Male	16	16.0
Female	84	84.0
Religion		
Hindu	**89**	**89.0**
Christian	0	0.0
Muslim	11	11.0
Nature of family		
Nuclear	**76**	**76.0**
Joint	24	24.0
Education		
Primary	22	22.0
Middle school	4	4.0
High school	**34**	**34.0**
Diploma	6	6.0
Graduate	30	30.0
Professional degree	4	4.0
Occupation		
Professional	2	2.0
Technicians/associate /professionals	3	3.0
Clerk	10	10.0
Skilled worker, shop and market sales workers	16	16.0
Skilled agricultural and fishery workers	10	10.0
Craft and related trade workers	15	15.0
Plant and machine operators and assemblers	10	10.0
Elementary occupation	9	9.0
Unemployed	**19**	**19.0**
Monthly income (in Rs.)		
73,054-109,579	1	1.0
59,252-63,853	2	2.0
54,651-59,251	4	4.0
45589-54650	13	13.0
36,527-45,588	19	19.0
21,914-36,526	22	22.0
7,316-21,913	**28**	**28.0**
≤7,315	12	12.0

Regarding education, the majority of respondents (34.0%) had completed high school, followed by havi-

ng 30.0% graduates degree, this indicates a generally high level of education among the respondents, with a significant number having completed higher education.

Results of monthly income levels varied, with the majority 28 per cent earning between ₹7,316 to ₹21,913. Whereas 22. 0% were having income range between 21,914 to 36,526 suggesting that most of the sample was in lower-income brackets, which might influence their socio-economic status and lifestyle choices.

The socio-economic status of the respondents reported that the upper lower class (Class IV) and upper middle class (Class II) represented socio-economic group of 32.0% and 31.0% respectively indicated a significant portion of respondents within lower socio-economic tiers (Table 2).

Table 2. Socio-economic profile of the respondents

Socio economic status		
Categories	**Frequency**	**Percentage**
Upper class (class I) 26-29	3	3.0
Upper middle (class II) 16-25	31	31.0
Lower middle (class III) 11-15	22	22.0
Upper lower (class IV) 5-10	32	32.0
Lower (class V)1-4	12	12.0

The dietary pattern of the respondents depicted in table 3 clearly showed that nearly 60.0% of the study subjects were non-vegetarian followed by 41.0 % follow a vegetarian diet. The data revealed that non-vegetarian diets are more common among respondents. Further, 95.0 % of respondents reported consuming meals three times a day followed by only 5.0%consuming meals twice a day. The grains such as rice, wheat and jowar were the primary grains consumed by respondents on daily basis representing staple foods of this region.

Table 3: Dietary pattern of the respondents

Sl. No.	**Characteristics**	**Total(N=100)**	
		Frequency	**Percentage**
1.	**Type of meals**		
	Vegetarian	41	41.0
	Non-vegetarian	59	59.0
2.	**Frequency of meal consumption**		
	3 times a day	95	95.0
	2 times a day	5	5.0
3.	**Primary grains consumed**		
	Rice	100	100.0
	Wheat	100	100.0
	Jowar	100	100.0
4.	**Frequency of grain consumption**		
	Daily	100	100.0

The knowledge about millets among study subjects depicted in table 4 showed that majority of respondents (88.0%) view millets as "very important" in terms of nutrition. Cent per cent of the study subjects have heard of millets, indicating a high level of general awareness among both males and females. All respondents reported that being "very familiar" with millets (100%), indicating not only awareness about millet but also a strong familiarity with these grains.

Sorghum, pearl millet, and finger millet were known by all respondents (100.0%). Foxtail millet is known by 81.0% of respondents followed by Proso millet (13.0%) and Kodo millet (10.0%). This indicates the widespread knowledge of sorghum, pearl millet, and finger millet indicates that these varieties are likely the most prevalent or popular among the respondents. The lower awareness of Kodo, and Proso millet could reflect less exposure or availability of these varieties, which may be more region-specific or less frequently marketed. Promoting these lesser-known types could help diversify millet consumption and provide additional nutritional benefits to consumers.

Table 4: Knowledge about millets among respondents

Questions	**Total(N=100)**	
	Frequency	**Percentage**
Have you heard of millet?		
Yes	**100**	**100.0**
How important is millets in diet?		
Very important	**88**	**88.0**
Important	12	12.0
How familiar are you with millets?		
Very familiar	100	100.0
Type of millets do you know? *		
Sorghum	**100**	**100.0**
Pearl millet	**100**	**100.0**
Finger millet	**100**	**100.0**
Foxtail millet	81	81.0
Kodo millet	10	10.0
Proso millet	13	13..0

***Multiple responses**

The frequency of millet consumption among study subjects reported that 90 per cent of respondents daily consume sorghum followed by finger millet. About 45 per cent respondents consume finger millet thrice a week followed by foxtail millet (30.0%), pearl millet (25.0%), finger millet (10.0%), kodo millet (7.0%) and proso millet (3.0%) were consumed once in 15 days (Table 5). The result revealed several trends in the consumption of various types of millet. Across all millet types, especially for Sorghum, Pearl millet, and Finger millet are predominantly consumed millets. Sorghum is the most frequently consumed daily millet, indicating that it may hold a prominent place in daily diets. In contrast, Pearl millet, Foxtail millet, and Proso millet are primarily consumed infrequently, with many people consuming them either once in 15 days or yearly. This may reflect either regional or cultural preferences, or it could be contributed to availability and the culinary flexibility of these millets. Finger millet consumption is more widely distributed across different frequencies, suggesting it could be more adaptable to a range of dishes and dietary habits.

Table 5: Frequency of millet consumption by the respondents

Name of millet	Frequency of Consumption*				
	Daily	**Thrice in week**	**Twice in week**	**Once in 15 days**	**Yearly once**
Sorghum	**90**	10	0	0	0
Pearl millet	0	0	1	25	**74**
Finger millet	21	**45**	**23**	10	1
Foxtail millet	0	0	20	**30**	31
Kodo millet	0	0	5	7	3
Proso millet	0	**0**	3	3	8

***Multiple responses**

The awareness about significance of millets known by the respondents in the study observed that 98 per cent agree that all types of millets are good. Reasons for considering millets as good food indicate that the majority (92.0%) consider multiple health benefits of millets, seeing them as a rich source of iron, calcium, vitamins, and protein. Majority of the subjects (90.0%) recognize millets as beneficial in managing weight, diabetes and CVD. Upma was the most tried dish followed by dosa and chakli by the respondents.

Table 6: Significance of millets known by the respondents

Parameters	Total(N=100)	
	Frequency	**Percentage**
All types of millets are good?		
Yes	**98**	**98.0**
No	2	2.0
If yes how? *		
High in iron	4	4.0
High in calcium	2	2.0
High in vitamin	3	3.0
High in protein	4	4.0
All the above	**92**	**92.0**
Suitable for special dietary needs *		
weight management	6	6.0
Diabetes control	4	4.0
CVD	3	3.0
all these above	**90**	**90.0**
Have tried any millet-based dishes?		
Yes	**94**	**94.0**
No	6	6.0
If yes *		
Chakli	16	16.0
Upma	65	65.0

Dosa	50	50.0

***Multiply responses**

The awareness level of the respondents regarding millet products in the market showed that 98 per cent of the respondents came to know about millet products through their family/ friends circle. Among the respondents, 94 percent purchase millets from store followed by 9 percent from farmers, 11 percent from the supermarkets and 3 percent from online market. Majority of respondents (92.0%) purchase millets on monthly basis. With regard to opinion on cost of millet, 54 percent find millet prices similar to other grains followed by 34 percent consider millets more expensive and 12 percent find millets cheaper than other grains. The majority believe millets are priced similarly to other grains, but a notable portion view that millets are more expensive (Table 7).

Results of awareness about millet-based products available in the market reported that millet flour products, millet malt and millet based Dosa and Idli mix were the common products in the market known by the subjects. Millet papadis, ready to eat meals, millet based breakfast products, millet bread and millet beverages were products less commonly known by the study subjects.

Table 7: Purchasing pattern of millets among study subjects

Characteristics	**Total (N=100)**	
	Frequency	**Percentage**
Source of information about millet products *		
Social media	2	2.0
Family/friends	**100**	**100.0**
Television	4	4.0
Purchase time period of millets		
Daily	8	8.0
Monthly	**92**	**92.0**
Source of Purchasing millets *		
Farmers	9	9.0
Stores	94	94.0
Online	3	3.0
Super market	11	11.0
cost of millets compared to other grains		
Cheaper	12	12.0
Similar	**54**	**54.0**
Expensive	34	34.0
Quantity of millets purchased in month		
Less than 1kg	1	1.0
About 1 to 3 Kg	2	2.0
More than 7 kg	**97**	**97.0**
Millet products available in market*		
Millet flours	**85**	**85.0**
Breakfast cereals	18	18.0
Bread	7	7.0

Beverages	5	5.0
Millets malts	74	74.0
Millet based protein powder	2	2.0
Millet based smoothies	4	4.0
Millets based dose mix	46	46.0
Papadis	29	29.0
Ready to eat meals	25	25.0
Idly mix	46	46.0

*Multiple responses

Conclusion

The survey indicated a high level of awareness and positive perception toward millet consumption among respondents, reflecting a strong inclination towards integrating millets into their diets. Despite varying demographics, there is a shared understanding of the nutritional benefits and versatility of millets, with nearly all respondents recognizing millets suitable for dietary needs such as weight management, CVD and diabetes control.

Millets are widely accepted across all age groups, with respondents consuming millets regularly and incorporating them in various forms, such as flours, malts, and snacks. This shows a significant shift towards healthier and traditional grain options. The purchasing patterns reveal a preference for obtaining millets from local stores, with respondents generally buying larger quantities on a monthly basis, indicating regular and consistent usage. Despite some respondents perceiving millets as more expensive compared to other grains, this does not appear to deter their consumption.

The findings suggested that while millet consumption is well-integrated into respondents' diets, there is potential for growth in millet-based product variety and availability, particularly through increased presence in supermarkets and online platforms. Additionally, there is an opportunity to further leverage social media and other communication channels to expand knowledge and reach among potential consumers. From this result reflect a growing trend towards traditional grains as part of a healthy lifestyle, emphasizing the importance of accessibility and education in sustaining and expanding millet consumption.

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