Research Article

Indian Journal of Extension Education
Vol. 60, No. 3 (July–September), 2024, (23-27)

ISSN 0537-1996 (Print)
ISSN 2454-552X (Online)

Finger Millet Consumption: A study on Knowledge, Attitude and Practices in North Coastal Region of Andhra Pradesh

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HIGHLIGHTS

- Increasing awareness of Finger Millet's nutritional benefits, especially in Andhra Pradesh's North Coastal Region.
- While culturally familiar, gaps exist in knowledge on modern Finger Millet cultivation, processing, and recipes, highlighting education opportunities.
- Finger Millet's has potential as sustainable, nutritious food, resilient to climate change, and capable of addressing regional malnutrition.

ARTICLE INFO

Keywords: Finger millet, Consumer, Knowledge, Attitude, Practice

https://doi.org/10.48165/IJEE.2024.60305

Conflict of Interest: None

Research ethics statement(s):
Informed consent of the participants

ABSTRACT

Finger millet (*Eleusine coracana* L.), commonly known as *Ragi* or *Mandia*, holds significant importance in global agriculture due to its nutritional richness, adaptability, and its potential to address food security challenges. It serves as a vital crop contributing to sustainable food systems and nutrition security worldwide. The study was conducted from 2023 to 2024, gathering data from 120 consumers across three districts in the North Coastal Region of Andhra Pradesh, namely Srikakulam, Vizianagaram, and Visakhapatnam through personal interview method and revealed that the majority of consumers were aged 36-50 years, mostly male, and educated up to graduation level. Business activities were predominant in Srikakulam (40%) and Vizianagaram (50%), while Visakhapatnam had a higher proportion of government employees (30%). Household incomes varied, with Srikakulam and Vizanagaram ranging from 50,000 to 1,00,000 rupees, and Visakhapatnam from 1,00,000 to 2,00,000 rupees. Finger millet malt was favored across dishes in all districts, but consumption frequency differed. In Srikakulam (41.40%) and Vizianagaram (35%), consumption was less frequent, while in Visakhapatnam, 29% consumed it weekly or monthly. Reasons for consumption also varied, with health benefits cited in Srikakulam (41.40%), weight management in Vizianagaram (29%) and Visakhapatnam (36%).

INTRODUCTION

Millet is in one of the multi-functionality groups of dual-purpose crops within the agricultural sector (Babele et al., 2022). The term "Millet" is used to refer to a variety of various small-grained cereal grasses (Hrideek & Nampoothiri, 2017). Due to high nutritive value Millet are acknowledged as a Nutri-cereals (Yadav et al., 2024). Millet, small-seeded grasses, domesticated for millennia, serve as primary food worldwide, belonging to the Gramineae and Poaceae families (Dayal & Kushwaha, 2023). Pre-Green Revolution, Millet comprised 40 per cent of grains grown. Post-revolution, Wheat tripled, Rice doubled, leading to decreased Millet production (Reddy, 2019). Millet is known for their nutritive qualities and they have substantially high amount of protein, fiber and minerals in comparison to rice and wheat (Sah et al., 2021). Millet's nutritional value and resilience make it vital in semi-arid tropics, thriving in limited resources with high productivity and minimal inputs (Singh et al., 2018). There are numerous millet crop producers throughout

Received 30-04-2024; Accepted 19-05-2024

the World, among them India is the largest successful nation in the World, accounting for 20 per cent of all production across 131 nations (Dayal & Kushwaha, 2023). Majority of millet crops are indigenous to India and are referred to be "Nutri-cereals" since they contain the majority of the nutrients needed. Between all the grains and millet, Finger Millet has the uppermost nutrients and health benefits. Finger Millet, scientifically known as *Eleusine coracana* L., it is known for its small, Finger-like grains (Gupta et al., 2017). These grains, mostly from Africa and Asia, have been farmed for thousands of years (Sul et al., 2019). Finger Millet comes under the category of Major Millet, due to its ease of cultivation and versatility as a food (Das, 2023). Finger millet grain has a dark brown seed coat which is rich in polyphenols compared to many other cereals such as Barley, Rice, Maize and Wheat (Gull et al., 2014). Consuming Finger Millet has been linked to a variety of health benefits. It helps in reduces the cardiovascular disease by reducing plasma triglycerides in the hyper lipidemic rats (Sirisha, 2108 & Lee et al., 2010). Finger Millet promotes digestion, bone health, and prevents anemia with its high fiber, Calcium, and Iron content. Antioxidants lower diabetes, heart disease risk. Among all the grains and Millet, Finger Millet has the highest concentrations of Calcium (344 mg/100g), Potassium (408 mg/100g), Magnesium (137 mg/100 g), Sodium (11 mg/100 g), and phenolic compounds (0.3–3%) (Paschapur et al., 2021 & Shobana et al., 2013). It has a number of health advantages, some of which are attributable to the polyphenol and dietary fiber (Devi et al., 2014). Finger Millet is rich in essential amino acids (Isoleucine, Leucine, Methionine, Phenylalanine), vitamins (Niacin, B6, Folic acid), minerals (Calcium, Iron, Potassium, Magnesium, Zinc), and Vitamin B. (Dida & Kebero, 2023). Particularly, Finger Millet is the highest source of Calcium, with three times as much as milk and ten times as much as Wheat, Maize, and Rice (Jagati et al., 2021). The main aim of the study was to assess the Knowledge, Attitudes, and Practices (KAP) of consumers regarding Finger millet in the districts of Srikakulam, Vizianagaram, and Visakhapatnam in North coastal Andhra Pradesh.

METHODOLOGY

The study was carried out in three districts of North costal region of Andhra Pradesh i.e., Srikakulam, Vizianagaram and Visakhapatnam districts. A sample of 120 consumers (i.e., 40 from the each district) was selected randomly from the three-district headquarters. Data was gathered *via* in-person interviews using a series of scheduled questions. Three components make up the Millet KAP Questionnaire: Knowledge, Attitude, and Practice. The procedure of KAP scale developed by Prasanthi & Sireesha (2022) was followed with slight modification in the set of questions about Knowledge, Attitude and Practices and added few question on frequency of millet consumption and Food products preferred based on millets. The first segment concentrates on gauging respondents' familiarity with finger millet, while the subsequent sections delve into their attitudes and practices regarding finger millet.

The first part of the questionnaire contained 7 closed-ended questions about knowledge, with responses of 'Yes', 'No', and 'Don't know'. 'Yes' represented that the individual had noble eating habits, 'No' showed that the person had less practice on Finger Millet, and 'Don't know' indicated that the person did not have knowledge on Finger millet. Each 'Yes' answer in this segment received a score of 3; 'No' received a score of 2, and 'Don't know' had a score of 1. Therefore, the individuals could score an extreme of 21 and a minimum of 7 in this division.

The opinions and questions in this segment on attitude towards Finger Millet were specifically tailored to address these issues. To find out how respondents felt about Finger Millet consumption, this portion included 8 questions in total that dealt with attitudes. A general nutritional perspective of Finger Millet was expressed in these remarks. For every response the respondent provided in the Attitude section, a numerical value was allocated. 3 points were awarded for 'Yes', 2 points for 'No', and 1 point for 'Don't know'. There was a maximum score of 24 and a minimum score of 8 for responses in the attitude part.

The practice section's questions were created to evaluate the population's diet in relation to Finger Millet. There were eight closed-ended questions with 'Yes' and 'No' responses. Indeed, it did not necessarily imply that the individual had healthier eating habits or fewer Finger Millet practices. In this area, all 'Yes' responses were given a score of 1; however, zero score for 'No' responses. As a result, the respondent's score in this part could be as high as 16 or as low as 1. This section included questions about Finger millet use, diet, cooking methods, and behaviors. Table 1 showed the scoring and nutritional classification of KAP.

RESULTS

The majority of respondents, encompassing 72.5, 85 and 70 per cent from the three districts i.e., Srikakulam, Vizianagaram, and Visakhapatnam, reported consuming Finger millet. 28, 32 & 36 per cent from the three districts, reported consuming Finger Millet in the form of *Malt* followed by a smaller percentage of individuals, specifically 7 & 11 per cent from Srikakulam and Visakhapatnam districts, indicated consuming Finger Millet in the form of *Kheer/ Sevai*. In Vizianagaram district, only 6 per cent of respondents reported consuming Finger Millet in the form of *Dosa/Idly.* The frequency of Finger Millet consumption varied among respondents across the three districts. In Srikakulam and Vizianagaram districts, the majority (41.4 & 35%) of respondents reported consuming Finger Millet less often. In Visakhapatnam district, 29 per cent of respondents consumed Finger Millet once in a week and once a

Table 1. Reasons for consuming Finger Millets among three districts

Activities/Questions/ Reasons	Reasons for consuming Millets		
	Srikakulam District	Vizianagaram District	Visakhapatnam District
a. Good for health	35.4	15	14
b. Reduces body weight	28.5	29	36
c. Body becomes strong	11.8	11	14
d. Gives good nutrients	3.4	12	4
e. Makes stronger bones	6.9	6	7
f. Only a, b & c	3.4	9	11
g. Only a, c & d are correct	8.2	9	7
h. All the above	5.4	9	7
Total	100	100	100

month, followed by only 6.9 per cent of respondents from Srikakulam district who reported consuming Finger Millet once a week, while 9 per cent and 7 per cent from Vizianagaram and Visakhapatnam districts respectively reported consuming it daily.

Majority of respondents from Srikakulam and Vizianagaram districts, comprising 17.2 & 24 per cent respectively, for consuming finger millet improve their health benefits such as improves overall health, Reduces body weight, Body becomes strong, Gives good nutrients, and Makes stronger bones. Similarly, in Visakhapatnam district, most individuals reported consuming Finger millet to Reduce their body weight.

The majority of respondents reported that 37.9, 35 and 36 per cent were from Srikakulam, Vizianagaram, and Visakhapatnam districts, respectively, consuming finger millet. A smaller percentage of individuals, specifically 6.9 per cent, from Srikakulam district reported consuming foxtail millet, while 9 & 14 per cent from Vizianagaram and Visakhapatnam districts were reported consuming Pearl millet. The scoring range employed aligns with the format depicted in Figure 1. In period of usage of Finger Millet, 31 per cent of consumers were consuming since their childhood in Srikakulam district & 35 per cent of people were consuming it for more than six years in Vizianagaram district & 43 per cent from Visakhapatnam district were consuming between 0-2 years. The scoring range utilized corresponds to the presentation provided in Figure 2.

Table 2 represents the respondents' knowledge level on Finger Millet, out of the three districts, Vizianagaram district was more knowledge (16%) than Visakhapatnam (10%) and Srikakulam (7%) districts followed by medium in Srikakulam (19%), Visakhapatnam (16%) and Vizianagaram (8%).

Table 3 depicts that Vizianagaram (10%) respondents showed a notably more positive attitude towards Finger Millet compared to those from Visakhapatnam (8%) & Srikakulam (6%) districts. Followed by 18 per cent were found medium in Visakhapatnam 16 & 15 per cent in Srikakulam and Vizianagaram districts respectively. Table. 4 reported that the consumers of Visakhapatnam district had a greater (16%) inclination towards Finger Millet practices compared to their counterparts in Srikakulam (15%) and Vizianagaram (10%) districts respectively.

Figure 3 represented that majority of the consumers were from Vizianagaram (65%) districts and Srikakulam (52%) consuming Finger Millet because it is a Healthy food diet and from Visakhapatnam district, majority (54%) of respondents were consuming Finger Millet to Lose the weight.

Table 2. Item-wise analysis of Knowledge level of consumers towards Finger millet

Activities / Questions / Reasons	Srikakulam District			Vizianagaram District			Visakhapatnam District		
	Yes	No	Don't Know	Yes	No	Don't Know	Yes	No	Don't Know
	%	%	%	%	%	%	%	%	%
Millet is good for health	58	25	18	75	13	13	75	15	10
Millet containing highest nutrients	58	15	28	70	13	18	60	20	20
Millet contains high fiber	48	20	33	63	13	25	60	12.5	27.5
Millet are easily digestible foods	45	30	25	73	13	15	75	5	20
Millet helps to maintain body weight	48	28	25	63	15	23	70	10	20
Daily millet consumption helps in controls blood sugar/B. P levels normal	55	23	23	58	25	18	75	10	15
Millet helps to reduces the risk of colon and breast cancer	28	28	45	58	8	35	50	12.5	37.5

*(Multiple responses)

Table 3. Item-wise analysis of Attitude of consumers towards Finger millet

Activities / Question / Reasons	Srikakulam District			Vizianagaram District			Visakhapatnam District		
	Yes	No	Don't Know	Yes	No	Don't Know	Yes	No	Don't Know
	%	%	%	%	%	%	%	%	%
All type of millet is good	53	25	23	72.5	7.5	20	78	15	8
With the help of millet, you can prepare different foods	48	20	33	67.5	12.5	20	73	20	8
You can take only one millet at time	20	75	5	20	62.5	17.5	18	65	18
Millet is expensive compared to rice	28	50	23	18	70	13	50	40	10
Millet value added foods enhance the nutritive value of the product	55	20	25	40	10	50	38	40	23
Millet value added foods Millet are gluten free foods	40	18	43	30	2.5	67.5	48	5	48
Millet has lower glycemic index	48	18	35	30	7.5	62.5	40	5	55
Millet contains high Phenolic acids, tannins and phytates	38	13	50	30	5	65	30	5	65

*(Multiple responses)

Table 4. Item-wise analysis of practice of consumers towards finger millet

Activities / Question / Reasons	Srikakulam		Vizianagaram		Visakhapatnam	
	Yes %	No %	Yes %	No %	Yes %	No %
Cooked millet is highly nutritious	60	40	62.5	37.5	80	20
Daily you are consuming millet-based foods	30	70	30	70	18	83
Using millet, you are preparing supplementary foods	72.5	27.5	82.5	17.5	78	23
Preparing different millet recipes	70	30	67.5	32.5	75	25
It is easy to process the millet	35	65	70	30	70	30
Millet consumption improve health status	72.5	27.5	85	15	83	18
Millet can blend very easily with common foods without any pronounced of flavor	60	40	65	35	70	30
Millet act as probiotics and improve flavor, texture and acceptability of products	77.5	22.5	77.5	22.5	53	48

*(Multiple responses)

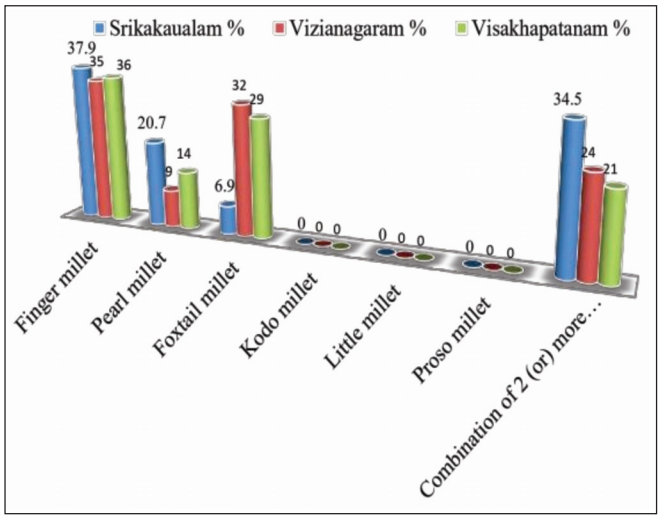


Figure 1. Millet consumption by the respondents in study area

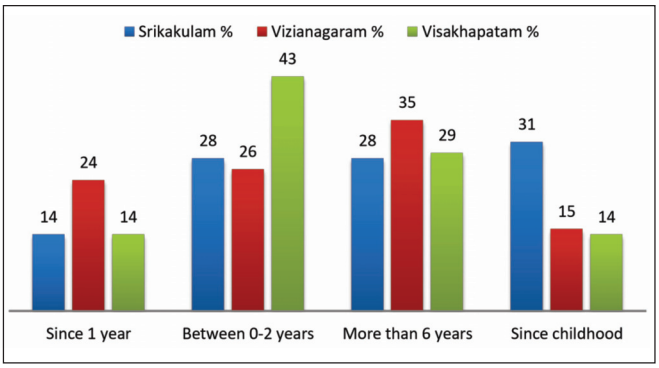
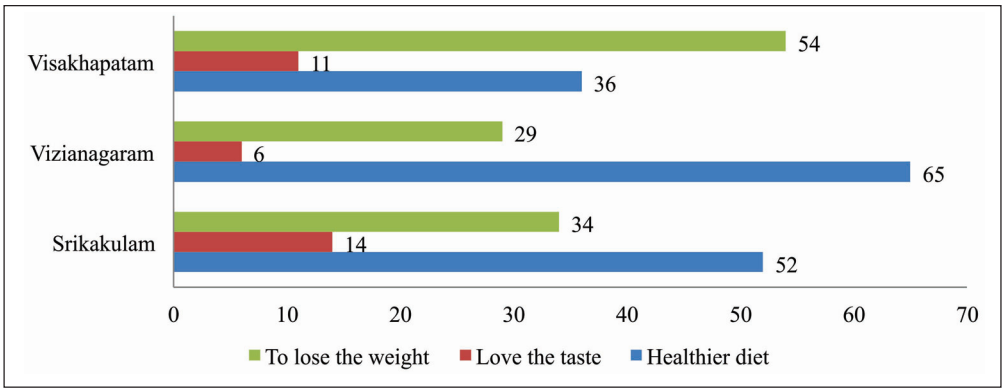


Figure 2. Period of usage of Finger millet in study area

DISCUSSION

Vizianagaram district leads in Finger Millet consumption due to scientist-led farmer education, emphasizing its health benefits and weight reduction properties. Preference for *malt* form, with its superior malting characteristics, is notable. Conversely, taste aversion hampers consumption in North Coastal Regain of Andhra Pradesh. Some studies shown that traditionally; the millet malt is utilized for infant feeding purpose (Shirisha, 2018). This finding aligns with a similar discovery made by Jayawardana et al., (2020). Srikakulam residents prioritize health benefits, while weight reduction drives consumption in Vizianagaram and Visakhapatnam, aligning with recent research findings Amrutha et al., (2024). This underscores the importance of tailored awareness campaigns to enhance Millet consumption across regions. Also farmers *prefer to consult the information sources of immediate availability and their concern to subject and policies* (Peer et al., 2011) as such must be taken care. Respondents prefer finger millet due to its easy availability and perceived health benefits, especially in Vizianagaram and Visakhapatnam. People are increasingly aware of millet's nutrition and health advantages, regardless of income. Finger, Foxtail, and Pearl Millets are popular choices due to their higher availability and demand. Vizianagaram residents show better

Figure 3. Consumers intention towards consumption of Finger Millet in the study area



knowledge and attitude towards Finger Millet, likely due to scientist-led awareness efforts.

CONCLUSION

The comprehensive analysis of consumer's knowledge levels, attitude and practices towards Finger Millet across Srikakulam, Vizianagaram and Visakhapatnam districts were revealed notable variations. Vizianagaram district exhibited more favorable attitude and practices towards Finger Millet and a higher level of knowledge compared to the other two districts. These findings underscore the necessity for targeted interventions, such as educational initiatives and awareness campaigns, to address disparities in knowledge, attitudes and practice towards Finger Millet across remaining districts. By implementing such measures, efforts can be made to promote the consumption and utilization of Finger Millet effectively and widely, contributing to improved nutrition and agricultural sustainability in diverse geographical areas.

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