

RESEARCH ARTICLE

Awareness and Consumption of Millet Products Among College Students in YSR (Kadapa) District, Andhra Pradesh

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ABSTRACT

The millets or "Nutri-cereals" or superfoods, are highly nutritious and offer various health benefits. Despite their advantages, millet production has declined in India from 2010-11 to 2020-21 at -0.94 Compound Annual Growth Rate (CAGR). This study focuses on assessing the awareness, analyzing the consumption pattern and the factors influencing the consumption of millet products among college students in the YSR (Kadapa) district, Andhra Pradesh. The primary data for the study was gathered through structured interviews with 120 college students from four colleges in the study area. The respondents' demographic, economic, social, psychographic, and behavioral features were analyzed. The study revealed that most respondents (94.17 per cent) were aware of millet based products, and 80.83 per cent respondents were aware through word of mouth from family and friends. Products made with Ragi millet were the most consumed millet products. The health and nutritional benefits was the key factor influencing millet product consumption. The findings can assist businesses in effectively marketing their millet-based products.

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INTRODUCTION

Millets are a broad group of small-seeded cereals mainly grown in dry and semi-arid environments. They are known as "Nutri-cereals" or "superfoods" because of their high nutritional content, little water and other resource needs, and capacity to grow in harsh environments. Aside from vital minerals like calcium, potassium, magnesium, iron, manganese, zinc, and vitamin B complex, millets also provide good-quality lipids, carbs, proteins, and dietary fiber.

Sorghum, Pearl Millet, Finger Millet, Foxtail Millet, Proso Millet, Little Millet, Barnyard Millet, Brown Top Millet, and Kodo Millet are the nine traditional millets that are frequently grown in India. India is the major producer of millets, accounting for 20 per cent of world production and 80 per cent of that in Asia. The nation is also one of the top five exporters of millets in the world, with export volumes rising consistently at a CAGR (Compound Annual Growth Rate) of roughly 3 per cent over the last five years. India produces more millets than any other country, with a yield of 1239 kg/ha compared to the global average of 1229 kg/ha (FAO Stat, 2021).

Traditional millet products include malts like ragi malt, breakfast batter, porridge etc. Modern millet products include millet biscuits, vermicelli, sweets, multigrain atta. (Kavitha, 2011; Stanly and Shanmugam, 2013).

The global millet market was valued at 9.95 billion dollars in 2020 and is projected to reach 14.14 billion dollars in 2028, growing at a CAGR of 4.5 per cent from 2021 to 2028 (Atal New India Challenge Report, 2022). Pearl millet market is projected to grow with a CAGR of more than 3 per cent by 2025. The key players in Indian millet products market are ITC Limited, Marico and Tata Consumers Private Limited.

In a significant effort to promote millets globally, India proposed the observance of the International Year of Millets to the United Nations General Assembly (UNGA). This proposal received support from approximately 70 countries, leading to the resolution to observe 2023 as the International Year of Millets officially.

India's population is dominated by youth. They are interested in sports and will be more health conscious. So, youth forms a significant market for millet-based products. Hence, a need arises to study the awareness and consumption pattern of millet products among college going youth to give firms a clear picture of millet products' consumption. Therefore, the current study was conducted among college students in YSR (Kadapa) district, where millet consumption was a part of the traditional diet. But due to increasing rice production, millet consumption would have been affected. Hence the study focused on analyzing the current trend of consumption of millet based products.

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The specific objectives of the study were to assess consumer awareness, to analyze consumption pattern and identifying the factors influencing the consumption of millet products.

A comparison of area and production of rice and millets in India over past six decades is furnished in Table 1,

Table 1. Comparison of Area and Production of Rice and Millets in India over 6 decades

YEAR	RICE		MILLETS	
	Area (million hectare)	Production (million tons)	Area (million hectare)	Production (million tons)
1970-71	37.59	42.22	45.95	30.55
1980-81	40.15	53.63	41.78	29.02
1990-91	42.68	74.29	36.32	32.70
2000-01	44.71	84.97	30.26	31.08
2010-11	42.86	95.97	28.34	43.40
2020-21	45.76	124.36	24.12	51.32

(Source : Economics & Statistics Division, Department of Agriculture & Farmers Welfare)

Table 1 explains that the area under rice cultivation has increased substantially, and the production has almost increased to three times. Whereas area under millet cultivation has reduced to almost half while the production has increased mere 0.6 times which was less when compared to three times increase in rice production. This shows that there was a proportionate shift in the consumption habits from millets to rice.

MATERIAL AND METHODS

The YSR Kadapa district of Andhra Pradesh was chosen because it is mostly a rainfed area and millets are grown here since ages. The total area under millet cultivation in the district is 170 hectares (Andhra Pradesh season and crop report, July 2023). In this region, the consumption of millet was a part of traditional diet.

For the study, four colleges from around 300 colleges in YSR (Kadapa) district were selected using simple random sampling. Total strength of students in each college was 1140, 300, 369, 380, respectively. From each college, thirty students were randomly selected, resulting in a total of 120 students participating in the study.

The data collection process involved conducting interviews using a well-structured and pre-tested interview schedule. The interviews took place at the respondents' respective colleges, and the purpose of the study was clearly explained to ensure their understanding and cooperation. The data collected was analyzed.

Multiple linear regression was used to analyze the influence of gender, family income, location and interest in sports on expenditure on consumption of millet based products in rupees/month/individual.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_i X_i$$

Where, Y = Dependent variable (Expenditure on consumption of millet-based products (rupees/month/individual)

β_0 = Intercept

β_i = Slope for X_i

X = Independent Variables

X_1 = Gender of the respondent. It is a dummy variable. Male is labelled as 1 and female is labelled as 0, assuming that males consume more quantity of millet products than female.

X_2 = Average family income of the respondent (Rupees/month).

X_3 = Location of the respondents. It is a dummy variable. Rural is labelled as 1 and urban is labelled as 0, assuming that rural people consume more millet products than urban people.

X_4 = Interest in sports. It is a dummy variable. Interested people are labelled as 1 and not interested people are labelled as 0, assuming that interested people consume more millet products when compared to uninterested people.

All these factors are assumed to have positive impact on expenditure on millet based products.

Rank Based Quotient (RBQ) was used to analyse the factors influencing the consumption pattern of millet products (Nisha A and VimalrajKumar N, 2019).

$$RBQ = \sum_{i=1}^n \frac{(F_i)(n+1-i)}{Nn} \times 100$$

Where RBQ = Rank Based Quotient

F_i = Frequency of the respondents reporting the i th rank of the factor

N = Number of respondents contacted for factor identification

n = The maximum number of ranks given for various factors

The factor with highest RBQ score was ranked first and hence considered the most important factor by the respondents.



RESULTS AND DISCUSSION

The socio-economic characteristics of the respondents are given in Table 2.

Socio-economic characteristics of sample respondents

From Table 2, it is inferred that the majority of respondents (93 per cent) were unmarried and 65 per cent were female. Average age of male consumers was 21 and of female consumers was 19 years. Most respondents (29.5 per cent) were from the Bachelor of Arts education stream. Most of the respondents (42.5 per cent) who get scholarships received an annual award of Rs.13,000/-. Most of the sample respondents (40 per cent) belonged to the nuclear with elders family type. The majority of the sample household's (44.16 per cent) members were middle-class (seekers). In the sample population, there were 4 adults and 2 children on average per family. The majority of respondents (46.7 per cent) were from rural areas.

AWARENESS ABOUT MILLET PRODUCTS

Details about number of people who were aware about millet products are shown in Figure 1.

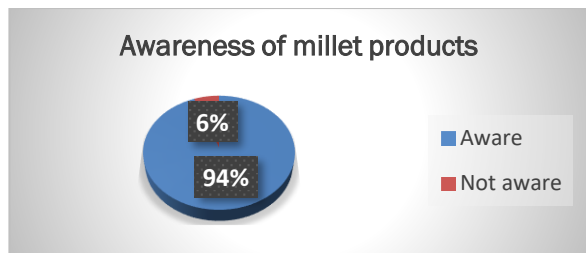


Figure 1 . Awareness about Millet Products

From the Figure 1, it is clearly evident that majority of the respondents (94.17 per cent) were aware of millet based food products. This study thus indicates that majority of the college students were having an idea of what are millet based products. Hence there is a need to create awareness among rest of the respondents (6 per cent). There is also a need to turn respondents who were already aware into more active consumers of new products.

Details on awareness about different products made of millets are shown in Figure 2.

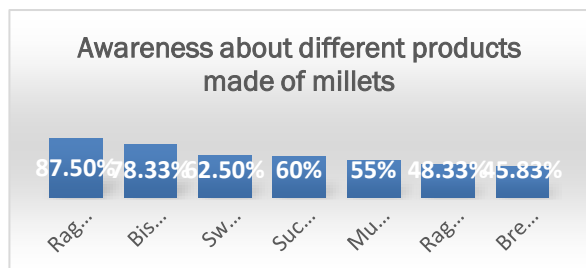


Figure 2. Awareness about different Products made of Millets

Figure 2 shows that majority of the respondents (87.5 per cent) were aware of Ragi malt followed by millet biscuits (78.33 per cent of respondents). Breakfast batter was known to very less respondents (45.83 per cent). Except for Ragi malt and biscuits, there was very less awareness for remaining products. If there is no awareness, there will not be any consumption. Hence, businesses should create awareness about less aware products like vermicelli, breakfast batter and multigrain atta to expand their market share and increase their revenue.

Details on source of awareness about millet products are shown in Figure 3.

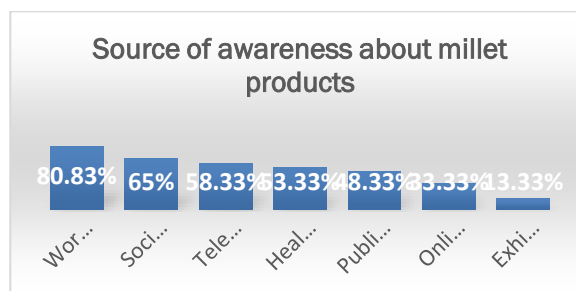


Figure 3. Source of Awareness about Millet Products

From Figure 3 , it is clearly evident that majority of the respondents (80.83 per cent) were aware of millet-based products through Word of mouth followed by social media (65 per cent).The respondents were least aware of millet based products by means of exhibitions (13.33 per cent). This study thus projects that Word of mouth through elders, family members, friends and social media are the major marketing tools for creating awareness about millet based food products. Hence building loyal customers will help businesses to increase their sales. Exhibitions could create awareness among very few people. So, spending money on exhibitions will not be a profit making strategy.

CONSUMPTION PATTERN OF MILLET PRODUCTS

Details on period from which millet products were being consumed are shown in Figure 4

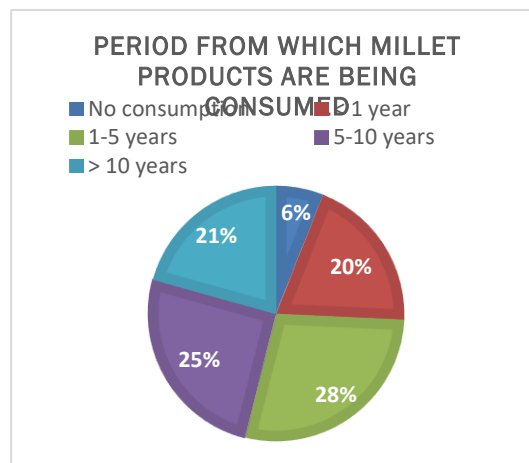


Figure 4. Period from which the Millet products are being consumed



Table No 2 . Socio-economic Characteristics of Respondents (n=120)

S.No	Characteristic	Number of Respondents	Percentage
I. Gender			
1.	Male	78	65.00
2.	Female	42	35.00
II Age of the Respondents			
		Average	Standard deviation
1.	Male	21	3.24
2.	Female	19	3.16
III Number of Family Members			
1.	Adults (>18 years)	4	1.64
2.	Children(<18 years)	2	1.14
IV Marital Status			
		Number	Percentage
1.	Unmarried	112	93.00
2.	Married	8	7.00
V Stream of Education			
1.	Intermediate	30	25.00
2.	Diploma	15	12.50
3.	Engineering	20	16.66
4.	Bachelor of Arts	35	29.16
5.	Bachelor of Science	20	16.66
VI Family type			
1.	Joint	35	29.00
2.	Nuclear with elders	47	40.00
3.	Nuclear without elders	38	31.00
VII Average Monthly Income of Respondents' Family			
1.	Deprived (Rs. < 7500)	7	5.83
2.	Aspirers (Rs. 7500-16666)	31	25.83
3.	Seekers (Rs. 16667-41666)	53	44.16
4.	Strivers (Rs. 41667-83333)	17	14.16
5.	Global Indian (Rs.> 83.333)	12	10.00
VIII Location of the Respondents			
1.	Urban	49	40.80
2.	Semi urban	15	12.50
3.	Rural	56	46.70
IX Scholarship			
1.	Receiving	51	42.50
2.	Not receiving	69	57.50
X Preferences & Family details			
1.	Interest in sports	80	66.60
2.	Family owning farming land	62	51.60
3.	Affinity towards environment	118	98.30
4.	Presence of doctors in family	5	4.20
5.	Vegetarian	32	26.70

Table 3 . Details about Consumption of various Millet Products/month (n=120)

S.No	Product Name	Most preferred Millet	Percentage of Respondents	Schedule of Consumption	Average Quantity of Consumption (in Kilograms)	Average Price Paid (in Rupees/Kg)	Place of Production	Place of Purchase
1.	Malt	Ragi	85.83	Breakfast	4.80	112.50	Home made	Moving vans
2.	Millet Biscuits	Ragi	68.33	Snacks	1.45	305.00	Local bakeries	General stores
3.	Sweets	Ragi	56.66	Snacks	0.60	264.40	Local bakeries	Super market
4.	Murukulu mix	Bajra	51.66	Snacks	2.80	414.00	Self Help Groups	Moving vans
5.	Multigrain Atta	Sorghum	45.00	Dinner	3.87	49.00	Special Manufacturing Plants	Super market
6.	Breakfast batter	Ragi	35.83	Breakfast	2.00	90.00	Self Help Groups	Super market
7.	Vermicelli	Ragi	35.00	Breakfast	2.80	120.00	Special Manufacturing Plants	Super market
8.	Porridge	Ragi	10.83	Lunch	1.30	158.40	Home made	Moving vans



Figure 4 indicates that majority of the respondents (28 per cent) have been consuming millet based products since 1-5 years range followed by 25 per cent respondents consuming since 5-10 year range. Certain portion of respondents (20 per cent) have been consuming during the past 1 year. Only a small share of respondents (6 per cent) were not at all consuming. Thus the study projects that consumption of millet based products by college students was not something new but had been almost as a part of traditional diet. So, awareness should be created among people who are not consuming and awareness should be increased among people who consume since the past one year.

Details on frequency of consuming millet products are shown in Figure 5.

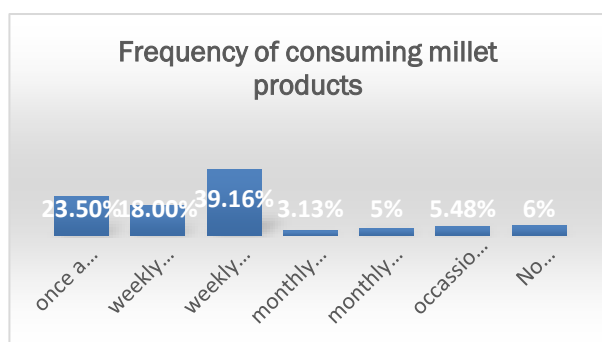


Figure 5. Frequency of Consuming Millet Products

From Figure 5, majority of the respondents (39.16 per cent) used to consume millet based products twice per week, followed by once a day (23.5 per cent). Very few (3.13 per cent) respondents said that they consumed monthly once. Thus the study projects that the college students were somewhat health conscious. Awareness should be created and strategies to be developed in such a way that respondents should increase their consumption to atleast once a day.

Details about consumption of various millet products/month are shown in Table 3

From Table 3, it is clearly evident that majority of the respondents consumed millet products made of Ragi millet. The highly consumed millet product was Malt (85.83 per cent respondents) and the least consumed millet product was Porridge (10.83 per cent respondents). The respondents consumed millet products during different schedules like breakfast, lunch, snacks and dinner. The millet products were manufactured at various places like Special Manufacturing Plants, Bakeries, Self Help Groups and at Home. They purchased millet products mostly from super markets. This shows that there was no penetration of millet products other than those made up of ragi millet. Here arises an opportunity for businesses to expand their market in other millet products like multigrain atta, vermicelli, breakfast batter, porridge and those products which are made up of millets other than ragi like sorghum, bajra and minor millets.

REGRESSION ANALYSIS

Regression was used to analyze the influence of gender, family income, location and interest in sports on expenditure on consumption of millet based products in rupees/month/individual. It is shown in table 4.

Table 4 : Expenditure on consumption of millet based products (rupees/month/individual)

Variables	Factors	Regression coefficient	Significance	
Dependent variable	Constant	0.826	0.032*	
	Independent variables	Gender	0.264	0.792
		Family income	0.561	0.043*
		Location	0.059	0.953
Interest in sports		0.216	0.048*	
No.of Observations	113			
R ² value	0.612			

(*5% level of significance)

The R square value obtained was 0.612 and the result revealed that family income and interest in sports contributed to 61.2 per cent of the variation in the expenditure on consumption of millet based products.

It could be concluded from the Table 4 that family income and interest in sports showed significance at 5% level. And it was concluded that the expenditure on consumption of millet products would increase by 0.561 rupees with every one rupee increase in family income. Expenditure would increase by 0.216 rupees with increase in people who are interested in sports. This increase can be seen when all other variables were kept constant.

FACTORS INFLUENCING THE CONSUMPTION OF MILLET PRODUCTS

A few of the factors influencing millets customers' buying decisions are increased education levels, greater disposable income, and consumer health consciousness. The nutritional value, quality, and health benefits of millet products were also demonstrated to be connected to consumer purchase patterns (Chan Sulthana, 2014). The main influencing variables for consuming millet-based goods are shown in Table 5 as rankings, which were determined using the Rank Based Quotient (RBQ) approach



Table No. 5: Factors Influencing the Consumption of Millet Products (n=120)

S.No	Factors	RBQ Score	Rank
1.	Health and nutritional benefits.	90.42	I
2.	Part of traditional diet.	71.04	II
3.	Availability of Ready to Eat (RTE) and Ready to Cook(RTC) products.	67.71	III
4.	Interest towards innovative products.	47.08	IV
5.	Influence of users.	43.96	V
6.	Taste.	43.85	VI
7.	Availability of number of varieties.	43.44	VII
8.	Available in markets at cheaper price.	42.50	VIII

From Table 5 it is clearly evident that majority of respondents (90.42 per cent) consume millet products because of health and nutritional benefits which is on par with the Chan Sultana's study which was conducted in 2014 on purchasing habits for millet products. Consuming as a part of the traditional diet was the second most influencing factor (71.04 per cent) for consuming millet products. Thus, the study explains that there are many socio-psychological factors which influence the consumption pattern of millet products among which health and nutritional benefits is the foremost one.

By leveraging social influence, role modeling, word-of-mouth, online presence, cultural trends, active participation in events, credibility, and personal connections, influential users can effectively promote millet products and contribute to increased consumption among their peers. Increase in the product portfolio and products which are receptive to taste buds will attract more customers because youth show more interest in experimenting new varieties than the old age people because of health advantage.

Making millet products available in markets at a cheaper price was a crucial factor in influencing college students' consumption patterns, as it addresses financial constraints, promotes healthier food choices, and stimulates market competition. By considering the affordability aspect, food producers and policymakers can encourage the adoption of millet products among college students, contributing to a more sustainable and healthy food culture.

Conclusion

Majority of the respondents (94.17 per cent) were aware of millet based products. Among the millet based products, most of them (87.5 per cent) were aware of ragi malt. Though new products like vermicelli, breakfast batter were available in the market, no big consumption was noticed for these products. Hence new products should be brought into limelight in this area. Majority of the respondents (80.83 per cent) were aware of millet based products through word of mouth from family and friends. Exhibitions could create awareness among very few people (13.33 per cent). Majority of the respondents (28 per cent) have been consuming millet products since 1-5 years range. Most of the respondents (39.16 per cent) used to consume millet based products twice a week. Most of the respondents were purchasing millet products from super markets which were prepared in local bakeries. This shows that national products were preferred less by respondents. Health consciousness and traditional diet were the major factors influencing the consumption of millet based products.

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Competing interests

Authors have declared that no competing interests exist.

Ethics statement

No specific permits were required for the described field studies because no animal subjects were involved in this research.

Originality and plagiarism

This is original research work and/ or words for others, has been appropriately cited.

Consent for publication

All the authors agreed to publish the content.

Data availability

All the data of this manuscript are included in the MS. No separate external data source is required. If anything is required from the MS, certainly, this will be extended by communicating with the corresponding author through kgomanthkumar@gmail.com

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