Consumer perception and factors influencing consumption of millets

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Received 05 June 2021; received in revised form 13 September 2021; accepted 14 September 2021

Abstract

Consumers' purchase intention and preferences are influenced by price, quality, health-related benefits, and awareness about the product. This paper aims to know and understand the consumer perception of millets and to recognize the factors that influence their purchase. The primary data was collected through an online questionnaire covering fourteen districts of Kerala, India. Factor Analysis, Friedman test, T-test, and One-way ANOVA were used for testing the objectives and hypothesis. Factors identified were grouped as perceived value, essential nutrients, and a healthy lifestyle. Friedman test revealed that there wasa significant difference among the mean values of most nutritious cereals, and maize was the most preferred cereal over others in Kerala. Based on the findings, the study recommends certain strategies like food manufacturing companies could introduce variety of millet-based snacks. In addition to this, the concerned food and health department could also devise certain policies that would be aimed at promoting millet-based food.

Keywords: Awareness, Consumption pattern, Factors, Kerala, Millet.

Introduction

Millets are well known for their superior quality and high nutritional values. Millets are plentiful in minerals like iron, potassium, phosphorous, and magnesium and are ideal for human beings. These are also called 'nutritious millets' or 'nutricereals'. This cereal is favoured due to its productivity, climate resilience, resistance to pests, and supporting low carbon farming. They are of different shapes and sizes and are subdivided into 'large millets', which include sorghum, pearl millets, and 'small millets', that consist of finger, barnyard, little, kudo, foxtail, and proso millet. People's perception of food has changed over the years. Earlier emphasis was on satisfying hunger and survival, but now it is moreon the nutraceutical food, which promotes better health. Millets are used as nutraceuticals as it contains agood source of minerals than cereal crops like rice and wheat (Rajput et al., 2019). Including millets inthe daily meal can help to overcome malnutrition issues and can control illness such as diabetes, cancer, improvethe digestive system, and strengthen the immune system (Behera, 2017).

Consumption of millets is influenced by various factors. Consumers perceived value towards millets also have a crucial role in the consumption pattern. Barratry and Rajapushpam (2018) reveals that consumers include millets in their daily diet because of its healthy and high nutritional content. In addition to this, Kalaiselvi et al. (2016) found that one of the factors that influence consumers to purchase millets is because it is the best food for diabetics. Dhevika and Saradha (2018) found that consumers prefer cereals and millets because it prevents high blood pressure. According to Patil (2013), millets' health benefits are the major factor that influences consumers to consume millets. Further more, consumers prefer millet because it is free from adulteration (Bharathy and Rajapushpam, 2020). In addition to this, it was also found that nutritional value is a major reason behind the

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preference of consumers towards millets (Chitra and Sulaiman, 2017; Harshitha and Jayaram 2019). It has been observed that consumers who want to adopt a healthy lifestyle tend to include millets in their daily diet. Supporting this in a study conducted byShadang and Jaganathan (2017), it was found that one of the reasons consumers consume millets is because of the advice from their nutritionist. Patil and Sankangoudar (2019) found that consumers consume millets only during special occasions as it is considered as traditional food.

Kerala is known for agriculture, rice is one of the staple cereals grown. Millets are another cereal that is gaining much importance in recent years. Even though millets are gaining popularity in the state, not many studies have been conducted to know the awareness level and factors that influence consumers to include them in their daily diet. With this kept in mind, the present study was performed to understand the awareness ofmillets in Kerala and to find out the reasons for its non-consumption. Further, the study was conducted to find out and classify the factors influencing the consumption pattern of millets and to identify the most nutritional cereal considered by the consumers.The following hypothesis were formulated for the study;

$\mathbf{H_0}$: There is no significant difference between the mean values of the nutritious cereals.
$\mathbf{H_1}$: The factors related to the consumption of millets vary according to the demographic characteristics (age, gender, income and occupation)of consumers.

Materials and Methods

An online survey questionnaire was developed to collect information regarding consumer perception and factors influencing the consumption of millets. The survey was conducted in Kerala, India,and covered fourteendistricts. The survey includedfour parts: (i) demographic information, (ii) awareness and reasons for not consuming millets, (iii) factors influencing consumption of millets,and (iv) identifyingthe most nutritious cereal considered by the consumers.Convenience sampling method was used for collecting data from a sample of 641. The data was collected during the pandemic time, and hence there was a lot of restrictions. Thus, following a random sampling was not easytherefore the researchers decided to adopt convenience sampling. It was also ensured that large sample was collected in order to avoid any biases. The respondents were informed that participation and contribution were voluntary and could withdraw at any time. Out of 641 respondents, it was found that only 278 respondents consumed millets. The study used 278 samples for analysis as the paper was aimed to study the factors influencing the consumption pattern of millets.Various tools such asfactor analysis, Friedman test, t-test, and one-way ANOVA were used for hypothesis and objective testing. Factor analysiswas used to recognize the factors influencing the consumption pattern of millets, Friedman test using a Wilcoxon signed-rank test with a Bonferroni-adjustmentwas used to identify the most nutritional cereal considered by the consumers. Further, to check whether the consumption of millets vary according to the demographic characteristics of consumers, T-test and One-way ANOVA were used.

Results and Discussion

The above frequency table shows that most of the respondents belong to the age category of 21-30 years, and only 1.09% belong to the category above 61 years. Of the sample collected, 51.9% are male, and 48.04% are females. With respect to monthly income,it was not applicable for 44.30%, 13.57% had income between Rs 5,000 – Rs 15,000, and 14.66% had income level ranging between Rs. 25,000 – Rs.35,000. Only 10.29 per cent had a monthly income above Rs 45,000. In terms of occupation, most of them were students, 29.64 per cent were employees, while 14.97 were professionals. It was found that more than half of the respondents did not consume millets, and only 43.46 per cent of them consumed millets.

Table 1. Characteristics of the Respondents

		Frequency	Percent
Age	21 - 30 years	399	62.24
	31 - 40 years	65	10.14
	41 - 50 years	115	17.94
	51 - 60 years	55	8.58
	Above 61 years	7	1.09
Gender	Male	333	51.95
	Female	308	48.04
	Others	0	0.00
Monthly Income	Not Applicable	284	44.30
	Rs. 5000 - ¹ 15000	87	13.57
	¹ 15000 - ¹ 25000	62	9.67
	¹ 25000 - ¹ 35000	94	14.66
	¹ 35000 - ¹ 45000	48	7.48
	¹ 45000 and above	66	10.29
Occupation	Employee	190	29.64
	Business	28	4.36
	Professional	96	14.97
	Homemaker	41	6.39
	Student	286	44.61
Millet Consumption	Do consume millets	278	43.36
	Do not consume millets	363	56.63
Reason for not consuming	Not heard about millets	125	34.43
	Feel it is of low quality	32	8.81
	Do not like the taste of millets	86	23.69
	Feel it is of high price	41	11.29
	Not accepted by family	79	21.76
Awareness about nutritiousaspects of millets	Yes	154	42.42
	No	209	57.57

The major reason for not consuming millet is 'not heard about the millets' (34.43%), followed by 'do not like the taste of millets' (23.69%), and 'not accepted by family' (21.76%). Furthermore 8.81per cent of respondents are not consuming millets because they 'feel it is of low quality' and 11.29 per cent'feel it is of high price'. Majority of the respondents who do not consume millets are not aware of its nutritious aspects (57.57%).

Further analysis was done on the 278 respondents who consumed millets. Factor analysis was used for data reduction and summarization**.** Principal Component Analysis was used to extract factors and Varimax with Kaiser normalisation rotation was used for rotation of factors.Kaiser-Meyer-Olkin (KMO) was 0.809, signifying that the sample is sufficient for factor analysis. Bartlett's Test of Sphericity was 0.000, signifying that correlation matrix is significantly different from an identity matrix.

Table 2. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.809
Bartlett's Test of Sphericity	Approx. Chi-Square	512.223
	Df	45
	Sig.	0.000

Factor analysis was performed with the primary goal of data reduction. There were ten items that determined the factors for the consumption of millets. Through principal components method, using varimax rotation, three factors with eigenvalue greater than onewas retained. The above mentioned three factors count for 55.25 % of the variance in the data. These factors were labelled as: perceived value, essential nutrients and healthy lifestyle.

The first factor, labelled 'perceived value', explained a large part (32.35%) of the total variance and containedfour items relating to factor 1. The

Table 3. Factor Loading

Factors	Factor Loadings	Mean	SD	Eigenvalues (% of variance)
Factor 1: Perceived Value (4 items)				
Good for Dietary	0.762	4.03	0.834	3.235
Measures(diabetics)				(32.349)
More fiber contents	0.749	4.12	0.917	
Lowers High Blood Pressure	0.662	3.70	0.850	
Gluten free and non-allergic	0.577	3.77	0.910	
Factor 2: Essential Nutrients (3 items)				
Improve Immunity	0.829	4.02	0.870	1.281
Rich in iron, minerals and vitamins	0.788	4.16	0.778	(12.810)
High Protein Content	0.635	4.21	0.798	
Factor 3: Healthy Lifestyle (3 items)				
Part of Traditional diet	0.770	3.63	1.049	1.009
Suggested by doctor	0.641	2.87	1.166	(10.092)
Taste	0.616	3.64	0.867	

Table 4. Correlation matrix and descriptive statistics

Factors	Perceived Value	Essential Nutrients	Healthy Lifestyle	Mean	S.D.
Perceived Value	1.000			3.90	0.64
Essential Nutrients	.463**	1.000		4.13	0.64
Healthy Lifestyle	.362**	.217**	1.000	3.37	0.72

**. Correlation is significant at the 0.01 level (2-tailed).

second factor labelled 'essential nutrients', explained 12.81 per cent of the total variance and containedthree items relating to factor 2. The third factor labelled 'healthy lifestyle', explained 10.1 per cent of the total variance and containedthree items relating to factor 3.

Table 4 indicates the Pearson's correlation coefficient between the variables. All variables in the range 0.217 - 0.463 are significantly correlated. The descriptive statistics revealed that the essential nutrients factor had a higher mean score of 4.13 with little variation (SD=0.64),which signifies that people are consuming millets mainly because of the essential nutrients, followed by Perceived Value (M=3.90, SD=0.64) and Healthy Lifestyle (M=3.37, SD=0.72).

Table 5. Friedman Test Result

Test Statistics[a]	
N	278
Chi-Square	80.503
Df	5
Asymp. Sig.	.000

Friedman rank test was carried out to check H_0. In the Test Statistics table, the Chi-Square ($\div^2$) is 80.503, the degree of freedom (df) is 5 and p = 0.000. So, we fail to accept the null hypothesis, and there is a significant difference between the mean values of most nutritious cereals. Post-hoc tests using a Wilcoxon signed rank test with a Bonferroni-adjusted alpha level of 0.003 (0.05/15) showed thatthe median was 3 for maize andbarley and 2 for rice, millets, wheat and oats. Statistical significance was found for oats *vs* maize (Z= -3.888, p= 0.001) andall other combination valueswas below the alpha level of 0.003. It was found that maize is the most preferred cereal.

Table 6. Hypothesis testing result

Null Hypothesis	Test	Sig.	Decision
The distribution of Rice, Millets, Wheat, Maize, Barley and Oats are the same.	Related -Samples Friedman's Two-Way Analysis of Variance by Ranks	0.000	Reject the null hypothesis.

Table 7. Variations according to demographic factors

Factors	Gender		Age		Income		Occupation	
	T	p	F	p	F	p	F	p
Perceived Value	-1.337	.182	1.991	.096	1.382	.243	1.990	.096
EssentialNutrients	-.426	.670	2.310	.058	2.172	.075	1.656	.161
Healthy Lifestyle	-.717	.474	.373	.828	2.308	.061	.025	.999

The results of t-test and one-way ANOVA is presented in table 7. T-test was conducted on gender toknow if there is any variation in the consumption of millets. The results show that the p value is more than 0.05 for all three factors, and hence we accept the null hypothesis. Thus, the factors related to the consumption of millets do not vary according to the gender of the respondent. One-way ANOVA was conducted on age, income and occupation. In all three cases, p value is more than 0.05 with regard to perceived value, essential nutrients and healthy lifestyle. Therefore, the null hypothesisis accepted whereby it is established that factors related to the consumption of millets do not vary according to the demographic characteristics such as age, gender, income and occupation of the consumers. These findings are in line with the study by Alekhya and Shravanthi (2019), where they found that income does not influence purchasing of milletsrather, it is based on the health benefits of millets, which people came to know through social media.

The current research identified three main factors that influence the consumption of millet, they are perceived value, essential nutrients and a healthy lifestyle.It was found that more than halfof the respondents do not consume millets, which was one of the highlighted findings in the study. When the researchers looked for the reasons, it was found that respondents were neither aware of millets nor did they like the taste, and unawareness was the key reason for not consuming millets. With a view to increase the consumption of millets, various strategies could be devised that would orient people more on the nutritious value and various health benefits of millets. The government could come up with various policies and schemes and include millets in their public distribution system, increasing the awareness and consumptionlevel. Through the public distribution system, millets could reach many households and thereby form a part of their daily diet, and the local crop can be popularised.

The findings also revealed that maize is the most preferred cereal in the state. Maize is preferred due to it's nutritional value as it is rich in fibre, minerals and vitamin B (Ranum et al., 2014). The study results also showed that factors related to the consumption of millets do not vary with the respondents' demographic profile. This is because consumers preference is based on the food properties. Supporting this in a study conducted by Costell et al. (2010). They found that factors such as sensory properties of food, information related to food, past experience and attitude of individuals,are some of the reasons for consuming maize since many years.

Considering the various benefits and qualities of millets, food manufacturing companies can come up with different varieties of millet-based food products that are easy to cook or ready to eat in nature and attract a large section of customers as people are now shifting towards a healthy lifestyle. In addition to this, millet-based breakfast cereals, biscuits and other products that could be consumed as snacks by people of all age categoriescould also be introduced. Already some parts of the country have few on-going awareness programmes. Also, training and development were provided for women members of Self-Help Groups in order to familiarise them with making bakery products and sweets from millets and the products were sold in various retailers and organic food markets(Kammar and Vanishree, 2017). Companies introducing millet-based products would also be helping the agriculture

sector in terms of growth. As millets are resistant to drought and can be cultivated even in extreme weather situations, farmers can grow millets and earn during unfavourable climate conditions.

The Kerala government has undertaken various initiatives to promote the cultivation of millets in the state.One such programme called Millet Village scheme was introduced in Attappady, Kerala for increasing cultivation of millets. Similar programmes and schemes could be undertaken in other districts to cultivate millets. Even though millets related schemes are introduced in Kerala and despite itbeing covered under insurance scheme for crops, it has not yet established its presence in the minds of people as the consumers of millets are low. Thus, introducing schemes alone will not be effective. The government could also evaluate the reach and effectiveness of these programs and schemes.

Acknowledgement

The authors would like to convey their indebtedness towards every respondent who contributed to this research by giving their responses through google forms during thepandemic situation. We would like to extend our appreciation towards School of Commerce, Finance and Accountancy of Christ (Deemed to be) University for their support.

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