

Millet Buying and Consumption Position: A Participatory Study with Diabetic Patients in Tiruchirappalli

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ABSTRACT

Millets have traditionally played an important role in farming and food culture in many regions of the world, including Sub-Saharan Africa and South Asia, with India being the world's largest producer of these crops. Millets mature quickly, a valuable trait important for rain-fed farming, and require relatively few inputs compared to major cereals. They grow under a range of day lengths and in poor soil, making them an attractive crop for marginal farming environments. In addition to these agronomic advantages, millets can offer other benefits in ecological, nutritional, and socioeconomic areas. Despite these potential benefits, however, in India overall production of millets has increased over the past few decades, from 7.7 Mil tons in 1961 to 10.7 in 2012, but the area dedicated to Minor Millets has fallen. To present study aims to find out the millet buying and consumption position: a participatory study with diabetic patients in Tiruchirappalli. Samples of 452 respondents selected on simple random basis were studied. The statistical tools that were used to analyse the collected data are Correlation analysis, Multiple Regression and t-test analysis. The findings and observations are the result and outcome of the interpretations made during the study of analysis so as to make the effectiveness in its application and results.

Keywords : Preference, Buying Behaviour and Consumption Pattern

INTRODUCTION

A study on Urban Indian Population to study the association of dietary carbohydrates & glycemic load with risk of type - 2 diabetes mellitus conducted. By the diabetologist informed

that millets have a higher proportion of non starchy polysaccharides and dietary fibre and they release sugars slowly and thus have a low glycemic index (GI). A study was conducted to study the Glucose response after consumption of rice and millet based breakfast in persons with Type 2 diabetes. The study was conducted with an aim to determine the short term effect of rice and millet based breakfast on glucose levels in persons with Type 2 diabetes. 34 persons were taken for the study @ 18 males and 16 females and their anthropometric measurements were registered both before and after shifting the food pattern to millets. Moreover, their biochemical parameters like glucose levels both at fasting and post prandial were measured.

The millet based value added products suited for diabetic patients that are produced by the trust were listed : Breakfast foods – Combination of multigrain dosa mixes and variations and millet based traditional mixes – pongal, paniyaram, adai and puttu. For meal items, following stuffs are prepared: Ready to cook / ready to eat, millet based Sambar rice mix, Tomato rice mix, Bisibele bath mix, Pulav, Jeera mix and biriyani. To meet the Snacks requirement of diabetic patients : Millet Kakkra, Millet bar, Millet laddu, Millet blended chocolate are prepared. Moreover, Nutritious blends like Nutri beverage, Malt and commercially viable products like Millet based bakery products, extruded products and flaked products are prepared. It could be noted that sprouting millets increases the bioavailability of many nutrients such as iron and zinc. The dietary advantages of common millet preparations viz., Cumbankali, cumbu roti, cumbupoori, cumbupaniyaram, cumbudosai, cumburasam, cumbuadai, ragidosai, ragidosai with drumstick leaves, ragi kanji, ragiidli, ragipakoda, cholaidiyappam, cholavada, thinaimurukku, samaipongal, kuthiraivalimurukku, kuthiraivalikarappam and varagarisiidli. The nutritional superiority of thinai was discussed in detail viz., thinai shown to prevent CVD by reducing TG, TC, LDL and VLDL. Similarly cholam grain is good for diabetes as it has high ratio of insoluble fibre to soluble fibre which indicates about the low availability in soluble sugars.

Pearl Millet (Bajra), Finger Millet (Ragi), Sorghum (Jowar), Little Millet (Varai, Sanwa) are millets that are easily available locally. Each of them supplements the diet with minerals, fibres, proteins and phytochemicals - the combination of which helps beat diabetes. Besides these nutrients, a non-nutrient yet beneficial component of millet is the fibre in it. Fibre is an indigestible part of food and helps in slow release of sugar into the blood after the breakdown of food, along with improving of insulin sensitivity ie, human body cells respond to the insulin and

in turn use up the sugar released into the blood, thereby controlling blood sugar levels. Similar to fibre, proteins also help in controlled and slow release of sugar into the blood. Millets being a rich source of protein and fibre handle the sugar load in body more efficiently.

Phytochemicals, found in the bran layers of millet are the non nutrient component commonly found in plant based food. It has protective or disease preventive properties and hence considered to be anti-diabetic as it is attributed to improve insulin action. Each millet has a different mineral to offer, hence we can say that the 'M' in millet stand for Minerals. Let's read about the top 5 Millets available locally and how they can control diabetes.

RELATED REVIEW OF LITERATURE

The researcher collected most pertinent reviews to frame and locate the gap for research study. They are; **Mikhail Miklyaev, Shahryar Afra, Melani Schultz, Adeline Awantang and Mathilde Laval (2017)**, examined the sorghum and millet value chains (VCs). The analysis looks at evaluating the recent Feed the Future, activities implemented under the Africa RISING' large-scale diffusion of technologies for sorghum and millet systems (ARDT_SMS). It is seen that ARDT_SMS project has produced positive economic returns, with an ERR of 24 percent and an ENPV of USD 14.33 million. The annual income of the millet farmers has increased from 27 to 126 USD/ha. In the sorghum VC the annual income of farmers has increased from 50.0 USD/ha to 115.0 USD/ha. Another important finding of the analysis is that significant fiscal savings due to reduced subsidy on fertilizers can be attributed to the project. The annual fiscal savings for the GoM from reduced subsidy requirement are estimated at 816,011 USD. The PV over project life amounts to 6.8 mill USD. Moreover, positive environmental impacts can be attributed to the project due to the reduced fertilizer consumption.

Chandi. G.K and Annor. G.A (2016), adapted various soils and climates for the growth of minor millets as food and fodder since ancient times. Owing to their limited requirement for water and early maturity, they are commonly grown as catch crops in some regions. Porridge, gruel, flatbreads, pancakes, and fermented beverages have been the most common forms of millet foods. Among the nutritional benefits, the perceived hypoglycemic property made minor millets particularly popular and hence their use in the management of type II diabetes. Their hypoglycemic response could be attributed to the presence of polyphenols, soluble fiber, and

starch–protein–lipid interactions. Decortication results in significant reduction in these components, causing an increase in the expected glycemic index of millets.

Christina Handschuch and Meike Wollni (2016), assess the factors that influence adoption decisions among finger millet farmers in western Kenya. Based on cross-sectional household data from 270 farmers, we estimated a multivariate prohibit model to compare the adoption decisions in finger millet and maize production. While improved practices such as the use of a modern variety or chemical fertilizer are relatively well adopted in maize production, they are less common in finger millet production. Social networks as well as access to extension services play crucial roles in the adoption of improved finger millet practices.

Melinda Smale, Michael T. Diressie and Ekin Birol (2016), tested the relationships among cultivar choice, seed source on pear millets in Maharashtra, and information sources. The data confirm that pearl millet is more likely to be grown by poorer households in drier, drought-prone areas. Scheduled castes are more likely to grow popular hybrids, and less likely to grow minor cultivars, but are no less likely to acquire seed from commercial vendors than less privileged people. Farmers who ascribe more importance to consumption attributes are more likely to grow minor than popular hybrids. De facto, popular pearl millet varieties are likely to reach less privileged farmers. To attain adoption potential, popular hybrids could be targeted for iron enrichment, and commercial marketing strategies should be pursued with diversified public and private sector partnerships.

Em-lio Jos, Montero Arruda Filho, Agenilson Jonatan Corra dos Santos and Eliane Pereira Zamith Brito (2015), analysed consumers' buying intention regarding integrated products in the virtual space, by exploring the interaction between utilitarian/hedonic characteristics and usage predictions. The study is based on data collected through four different experiments applied to 122 students of different courses at a university in the north of Brazil. The product studied was a digital reader (or 'e-reader'), which had recently integrated various services and devices into its overall structure. The factors that directly influence the choice and use of the product were examined, with purchase intention quantified in terms of fun, wellbeing, satisfaction, perceived value, utility, and importance related to the product, which, ultimately, justify the behaviour of technology consumers.

Ramesh. S.V and Divya. M (2015) in their research article “A study on consumers awareness attitude and satisfaction towards select Organic food products with reference to Coimbatore” have studied the awareness of customers towards organic food product and also the attitude towards buying and willingness to pay for organic food products. The study revealed awareness on organic food products is necessary. The study further concluded that an individual allocation must be made in departmental stores for organic food products.

Research Gap

There are various research is conducted on millet buying and consumption position: a participatory study with diabetic patients in Tiruchirappalli. This gap was identified and that has raised between millet buying and consumption position are considered as research gap. For the research gap, the researcher framed a conceptual framework and the present study was conducted on millet buying and consumption position: a participatory study with diabetic patients in Tiruchirappalli.

STUDY OBJECTIVES

The objectives of the study are;

- To analyze the diabetic patients’ mode of consumption and buying behaviour on millet food products.
- To examine the diabetic patients’ factors determining buying and repeated buying of particular brand of millet food.
- To investigate the diabetic respondents’ views on customer satisfaction of consumption of millet food.

RESEARCH METHOD

This study emphasis towards analyzing the diabetic patients’ millet good preference, buying behavior and consumption pattern in Tiruchirappalli. In this study, diabetic patients’ attitude towards buying millet food, indicators of buying behavior factors determining buying and repeated buying millet food products millet food product, indicators of customer satisfaction of consumption and problems and prospects of buying and consuming millet food products could be identified under exploratory research framework.

The identified indicators of buying behavior attitudes towards millet food products, customer satisfaction of consumption and problems and prospects of buying and consuming millet food product and cross tabulated with the socio-economic status of the respondents. Thus thereby it gives analytical orientation of the study. Thus this study is partly exploration in nature and partly analytical in nature. In this study attitude on millet food product consumption, products attributes of buying the millets, customer satisfaction of millet food consumption, problems of millet food consumption, problems of buying millet food have been assessed on the basis of five point rating scale. In total 452 diabetic patients are selected as sample. Thiruchirapalli has 6 specialized diabetic health care institutions.

The relevant primary data are collected from the respondents with the help of interview schedule method. The researcher collected the address of the registered diabetic patients' from the official records of the selected diabetic health care institutions and on the basis of collected address of the respondents, the researcher made a household visit and met the respondents in their household. The purpose and importance of the study was explained to them. The respondents are is encouraged to give and frank responses. The respondents extended full co operation in successful data collection. By and large the respondents are good and fair. The data collection was carried out during January 2019 to June 2019.

In order to study the association between independent variables and diabetic patients' millet food preference, the chi square test is applied. To study the factors of customer satisfaction, problems and prospects of buying and consuming millet food products, the ANOVA two way model is applied. To study the factors determining the consumption of millet food products, the multiple regression models is applied. The general data interpretation is done with the help of percentage and average analysis.

DISCUSSION AND RESULTS

This paper furnishes the analyses and interpretation of the collected data for **“Millet Buying and Consumption Position: A Participatory Study with Diabetic Patients in Tiruchirappalli”**. The present study highlights towards utilization issues and its outcome

possibilities. The collected data are analysed and interpreted with suitable techniques to bring out appropriate results.

Table 1 Gender Wise Respondents Rating on Attitude on Millet Food Product Consumption

Variables	Male	Female	Mean
Milletts are more safe and reliable	2.60	2.15	2.38
Milletts have better quality	4.18	3.68	3.89
Milletts are pro-healthy	3.47	2.69	3.07
Milletts are high in nutrition	4.22	3.98	4.10
Milletts taste better	3.26	2.73	2.96
Milletts look very fresh	3.82	3.04	3.42
Having trust on milletts	2.51	2.06	2.29
Having trust on milletts producers	4.09	3.59	3.80
Organic goods consumption helps protecting the environment	3.95	3.13	3.51
Millet consumption results in freshness and healthy status	2.72	2.27	2.50
Consumption of milletts leads to better immunity and work capacity	2.23	1.89	2.10
Milletts should carry certified logo	3.11	2.60	2.84
Milletts are generally consumed by diabetic people	4.11	3.82	3.97
Consumption of milletts reflects social status	3.65	2.87	3.25
Milletts are very expensive	3.03	2.23	2.62
Shape and appearance of milletts are so attractive	4.16	3.87	4.02
Milletts lack in variety	3.91	3.40	3.63
Milletts are not easily available	2.40	1.95	2.18
Very few milletts are available in market	4.11	3.50	3.74
Milletts get spoiled easily	3.76	2.98	3.36
Sharing millet consumption experiences with friends and relatives to increase its awareness	3.05	2.53	2.77
Average	3.44	2.90	3.16

Source: Primary Data

t Statistical Value 13.52, t Critical Value 1.72

Table 9 depicts the sex wise respondents' rating attitudes on millet food product consumption. The male respondents ranks the first position in their overall rated attitudes on millet food product consumption as per their secured a mean score of 3.44 on a 5 point rating scale. The female respondents hold the second position in their overall rated attitudes on millet food product consumption as per their secured a mean score of 2.90 on a 5 point rating scale.

The t test is applied for further discussion. The computed t value 13.52 is greater than its tabulated value at 5 per cent level significance. Hence there is a significant difference between male respondents and female respondents in their overall rated attitudes on millet food product

consumption. It could be seen clearly from the above discussion that the female respondents lag behind the male respondents in their overall rated attitudes on millet food product consumption.

Table 2 Multiple Regression Results on Factors Determining the Millet Consumption

Variable	Co-efficient	Standard Error	t Value
Constant	437417.71	206167.32	2.09
X ₁ = Occupation	87144.52	16215.72	5.37
X ₂ = Age	43771.41	17212.52	2.54
X ₃ = Education	92406.08	19473.44	4.75
X ₄ = Income	34352.60	10820.33	3.17
X ₅ = Family Size	43120.32	10421.52	4.13
X ₆ = Duration of Diabetics	37452.22	10223.35	3.66
X ₇ = Caste	65324.42	19857.85	3.28
X ₈ = Sex	76521.25	18256.76	4.19
R ²	0.8762		
F ratio	18.36		

Source: Primary data

Table 2 gives the multiple regression results on factors determining the millet consumption. Analysis of the data corresponding to the study overall respondents using multiple regression technique leads to the following results. It is inferred from the table with regard to all the respondents, the F statistics calculated is 18.36 which is significant at 1 per cent level. Hence, the R² value, which is equal to 0.8762, is taken to be significant as regards the independent variables. The t test shows that the age of the respondents and income of the respondents and duration of diabetics of the respondents has positive regression co-efficient on millet consumption. It means, higher the age of the respondents, higher the consumption of millet food and the vice versa and also income status and duration of diabetics of the respondents have positive regression co-efficient on millet consumption. Further the occupation level, educational status of the respondents family size of the respondents, and Caste of the respondents, have positive regression coefficient on millet consumption.

Table 3**The Stepwise regression analysis predicting Millet Buying and Consumption Position**

Sl.No	Step/Source	Cumulative R ²	ΔR^2	Step t	P
1.	Age	0.040	0.037*	3.075	0.01
2.	Occupation	0.057	0.051*	2.623	0.01
3.	Education	0.073	0.064*	2.013	0.01
4.	Income	0.085	0.073*	2.401	0.01
5.	Duration of Diabetics	0.100	0.086*	2.332	0.01

Source : Primary Data

* P < 0.01

Constant value = 16.587

Five variables viz age, occupation, education, income and duration of diabetics have significantly contributed for predicting the Millet Buying and Consumption Position. The variable age predictive value of Millet Buying and Consumption Position seems to be 0.040, when paired with the variable occupation it is 0.057, with number of education 0.073, with income 0.085 and with duration of diabetics 0.100. The predictive value of these variables separately is 0.01.

Table 4**The correlation between the Millet Buying and Consumption Position and demographic variables**

Variables	Millet Buying and Consumption Position
Age	0.362*
Occupation	0.250*
Education	0.246*
Income	0.374*
Duration of Diabetics	0.384*

** Significant at 0.01 level

Source : Primary Data

Table shows the correlations between the variables Millet Buying and Consumption Position and demographic variables (age, occupation, education, income and duration of diabetics) were worked out for the general sample of 452 respondents.

POLICY IMPLICATIONS AND CONCLUSION

From a humble crop that once satiated the poor to the base of a gourmet meal, for the health conscious, millets have made a comeback. The Tamil Nadu government too has been rolling out initiatives to encourage farmers who grow millets, especially because they grow well in dry zones. In the last five years as a result of a policy-driven initiative by the state government, millet production has more than doubled.

Millets need very little inputs for their sustenance and require only 25% of the water consumed by crops such as sugarcane and banana. Millets do not demand rich soils for their survival and growth; they can even grow on skeletal soils that are less than 15 cm deep. They can grow well with the use of farmyard manures and household produced bio fertilisers as nutrients, so usage of synthetic fertilizers are avoided. They can also be termed as pest free crops since they are not attacked by pests during their growth or storage. All these extraordinary qualities of millet farming system make them the climate change compliant crops.

Millets are highly nutritious, non glutinous and non-acid forming foods. Hence they are soothing and easy to digest. They are considered to be the least allergenic and most digestible grains available. Millets contain about 8 per cent protein and 4 per cent fat. They are rich source of vitamins and minerals. Millets are especially rich in calcium. The dietary carbohydrate content of millets is also relatively high.

Millets need very little water for their production. Compared to irrigated commodity crops currently promoted by policy measures, millets need no irrigation and require just around 25% of the rainfall regime demanded by crops such as sugarcane and banana. Thus, they do not burden the state with demands for irrigation or power. Millets are adapted to a wide range of ecological conditions often growing on skeletal soils that are less than 15cm deep. It does not demand rich soils for their survival and growth. Hence, for the vast dry land area, they are a boon.

Millet production is not dependent on the use of synthetic fertilizers. Most millet farmers therefore use farmyard manures and in recent times, household produced biofertilisers. Therefore, they can significantly reduce the huge burden of fertilizer subsidy borne by the

government. Grown under traditional methods, no millet attracts any pest. They can be termed as pest-free crops. A majority of them are not affected by storage pests either. Therefore, their need for pesticides is close to nil. Thus, they are a great boon to the agricultural environment.

Regular consumption of millet is very beneficial for postmenopausal women suffering from signs of cardiovascular disease, like high blood pressure and high cholesterol levels. Children's intake of whole grains like millet and fish has been shown to reduce the occurrence of wheezing and asthma. A high source of fiber, millet is very beneficial against breast cancer in post – menopausal women. According to research and recent studies, consumption of millet can help women combat the occurrence of gallstones, as they are a very high source of insoluble fiber. This form of cereal grain is very high in phosphorus content, which plays a vital role in maintaining the cell structure of the human body. The key role of this mineral is that it helps in the formation of the mineral matrix of the bone and is also an essential component of ATP (adenosine tri-phosphate), which is the energy currency of the body.

A single cup of millet provides around 24.0% of the body's daily phosphorus requirement. This mineral is a very important constituent of nucleic acids, which are the building blocks of genetic code. Recent research has indicated that the regular consumption of millet is associated with reduced risk of type 2 diabetes mellitus. This is mainly due to the fact that whole grains like millet are a rich source of magnesium, which acts as a co-factor in a number of enzymatic reactions in the body, regulating the secretion of glucose and insulin. Magnesium is also beneficial in reducing the frequency of migraine attacks. It is even very useful for people who are suffering from atherosclerosis and diabetic heart disease. To get the health benefits of millet, serve it warm with milk as an alternative to hot oat meal in the morning. Its nutty taste can be enhanced by gently roasting the grains in a pan on the stovetop. It can also be popped like popcorn to create a healthy “puffed” cereal. It can be ground into gluten-free flour and added to baked goods. One can also use it in soups, casseroles, and as a side-dish in place of rice. It is right time for potential minor millets like barnyard millet to be woven in the fabric of daily diet. Future trends need increasing productivity and trade (regionally and internationally) and adding value to products by improving / increasing processing and utilization in industry.

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