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Traditional food consumption in the modern era: assessing the millet consumption behaviour among south Indian urban women

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Abstract

Once a staple food in India, after many decades of being ignored and considered as food fit for cattle, now millet is back and is considered one of the humble superfoods of the Indian diet. The hectic lifestyle of urban Indians has a direct influence on food choices. A balanced nutritional diet and regular exercise are recommended by World Health Organization (WHO) to avoid any health risks. Participation of women in the workforce has left Indian women managing multiple roles and responsibilities that have negative consequences on their health. Modern-day working women are notched low in terms of nutrition due to a lack of knowledge, and awareness and ignoring health-related issues. In terms of nutritional values, millet is considered five times higher than rice and wheat. Even after contributing 10% to India's food basket with an annual production of 18 million tonnes, it is not used in the same quantity. Therefore, the study aims to evaluate the level of awareness of millet grains and their nutritional benefits among urban women in South India. For the purpose of the study, a sample of 400 women respondents was selected using non-probability i.e. Convenience Sampling Technique. The study found that the majority of respondents consume millet for maintaining overall health. On the other hand, the study has proved that, in spite of having awareness about millet, people still show their reluctance towards its consumption due to inhibiting factors like "Lack of awareness about nutritional benefits" and "Non-availability" and "Expensive than rice and wheat".

1. Introduction

Reportedly, out of ten Indians in urban cities, seven follow a diet themselves or in consultation with an expert. Convenience food is gaining a lot of importance in the Indian kitchen making women's lives easier. The cereal market in India has also seen significant growth of more than 17% CAGR to become $751 million by 2023 (Business Wire, 2019). Growing preferences towards convenience food and processed cereals for fitness and health is a rising concern. Most of the processed foods which are being consumed in India are rice and wheat.

Millets are a traditional staple across different parts of the world. Millets are often referred to as food that is good for the individual and for the planet (Kane-Potaka *et al*., 2021). Millets play a significant role in traditional diets in many regions and it is considered one of the most important cereal grains. Till recently, millets were called coarse cereals but now they have been renamed Nutri-cereals as it is rich in nutrients such as iron, zinc and calcium (Kulkarni, 2018). Being one of the first grains used for domestic purposes and the oldest foods known to humans' millets are described as super-grain, super-food and wonder-grain (Varshney, 2019). People in many states in India still consume millet as a traditional diet. Millets have abundant nutritional and agrarian value due to which millets production and consumption still survive. Fast lifestyle has bought a transition in food habits and current lifestyle choices moving from traditional food to ready to eat and ready to cook food. Traditional recipes with abundant nutritional value have been replaced by recipes promoting refined grains which were predominantly captured by rice and wheat. Compared to rice and wheat which are consumed on a large scale in India, the proportion of millets consumption is less in spite of having tremendous nutritional value. Millets are easily digestible food as it is rich in lecithin and non-glutinous (Michaelraj and

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Shanmugam, 2013). Indian women are the most vulnerable group who are undernourished due to socio-economic and cultural conditions as even today Indian women are last to consume every meal in a family and get the least nutrition (Chakraborty, 2019). Even modern -day working women, are notched low in terms of nutrition due to a lack of knowledge, awareness and ignoring health-related issues (Singh, 2019). Changing lifestyle of urban Indians has a direct influence on food choices. A growing number of women participating in the workforce has left Indian women juggling multiple roles and responsibilities. Often managing multiple roles and responsibilities has negative concerns related to their health (Sorensen and Verbrugge, 1987).

Millets have tremendous health benefits and have a high nutritional value that reduces the effects of many diseases that human beings are prone to. Millets are far more superior to rice and wheat in terms of mineral content, fibre, iron, calcium and zinc (Kumar *et al.*, 2018). Few varieties of millets like foxtail are little millet that is far more ahead of rice and wheat that is consumed largely in India (Indianet, 2017). Millets reduce obesity, help in weight management by satisfying hunger (Ambati, 2019). The effect of millet-based dietary interventions among diabetic patients and reported that millets have a high potential of becoming a dietary option in combating diabetes (Kam *et al*., 2016). The major reasons for purchasing the millets were nutritional values, price, taste, convenience, weight reduction, the best food for diabetes and reducing the consumption of rice and wheat (Kalaiselvi and Fatima, 2016). The majority of the South Indian population are not aware of the benefits of millets because in South India rice is a staple food and people can afford it compared to millets, thus people prefer to go with rice as it can fill their stomachs at an affordable price (Saranya, 2017). India is one of the topmost producers of millets followed by Nigeria and a particular segment of people in India consume millet as it reduces the risk of heart disease, protects from diabetes, improves digestion, lowers the risk of cancer, detoxifies the body and they have also stated the nutritional facts of pearl millet, finger millet, small millet (Rao *et al*., 2017). High acceptability of millet based meals among children and significant improvement in stunting a body index mass indicate the potential of millets to replace traditional rice-based mid-day meals (Anitha *et al*., 2019). The summary of the review of the literature clearly shows that millet is a healthier alternative to other food items offering many benefits, the level of awareness of millets and the reasons for not consuming the same among the women respondents in the study area remains scanty.

Convenience food is gaining a lot of importance in Indian kitchens making women's lives easier. Growing preferences towards convenience food and processed cereals for fitness and health is a rising concern. In India, most processed foods are based on rice and wheat. Compared to rice and wheat, millet is considered five times superior in terms of nutritional value (Rao *et al*., 2017). But even after contributing 10% to India's foodgrain basket with an annual production of 18 million tons, it is not being consumed in the same proportion as mainstream cereals i.e. that is rice and wheat. So, it is imperative to study the awareness level of millet cereal and its nutritional benefits among Indian urban women. Thus, the study aimed to determine the reasons for the consumption of millet, various inhibiting factors which limit the consumption of millet and factors influencing reasons for the consumption of millet among south Indian urban women.

2. Materials and methods

2.1 Research design

The study has adopted a descriptive research design. As the study aims to describe the consumption of millets among a particular population i.e., south Indian urban women, the researchers affirm that a descriptive research design is more appropriate.

2.2 Selection of respondents

The study has been mainly conducted with women respondents. The study has been carried out in Metropolitan cities in South India. The study area includes Chennai, Bengaluru and Hyderabad.

2.3 Sampling technique

A sample of 400 women respondents was selected using non-probability i.e., convenience sampling technique.

2.4 Sources of data

The study was predominantly based on primary data and the required primary data was collected using the survey method. To conduct a survey, a structured questionnaire method has been used. Statistical Package for the Social Sciences (SPSS) 21.0 version has been used in this study to analyze the data using statistical tools such as Analysis of Variance (ANOVA) and Chi-square.

3. Results and discussion

3.1 Demographic profile of respondents

The study found that the majority of respondents fall under the age group 41-50 followed by 20-30 years and the average income ranges between Rs. 26,000 to Rs.

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40,000 (Tables 1 and 2). The majority of the respondents were graduates (Table 3). Among the sample respondents, the majority of the respondents are professionals and non-vegetarians (Tables 4 and 5). The respondents were facing health issues like obesity, diabetes, gastric issues and hypertension (Table 6).

Table 1. Age group of the respondents

Particulars	Frequency	Percentage
20-30 Years	120	30%
31-40 Years	165	41%
41-50 Years	80	20%
>50 Years	35	9%
Total	400	100%

Table 2. Income of the respondents

Particulars	Frequency	Percentage
Rs. < 10,000	105	26%
Rs. 11,000 to 25,000	95	24%
Rs. 26,000 to 40,000	150	38%
Rs. >40,000	50	12%
Total	400	100%

Table 3. Education of the respondents

Particulars	Frequency	Percentage
No Formal Education	105	26%
School Level	95	24%
College Level	200	50%
Total	400	100%

Table 4. Occupation of the respondents

Particulars	Frequency	Percentage
Home Maker	120	30%
Professional	165	41%
Students	80	20%
Business	35	9%
Total	400	100%

Table 5. Diet preference

Particulars	Frequency	Percentage
Vegetarian	100	25%
Non Vegetarian	200	50%
Eggetarian	70	18%
Gluten free	30	7%
Total	400	100%

Table 6. Specification of health issue among the consumers of millet

Particulars	Frequency	Percentage
Cardiovascular diseases	10	7%
Diabetes	30	20%
Obesity	50	33%
Gastric /Indigestion issue	30	20%
Hypertension	22	15%
No Issues	8	5%
Total	150	100%

3.2 Awareness of millet

The results of the study confirmed that almost a hundred percent respondents are aware of the existence of millets (Table 7) and word of mouth was the predominant source of awareness of millets (Table 8), the word of mouth came either through elders in the family, friends or neighbours. The majority of respondents have opined that social media creates a lot of awareness about millets (Table 9) and among the various types of social media food, informative blogs about millets create more awareness followed by Instagram and Facebook (Table 10). Though the majority of the respondents are aware of various varieties of millets, there exists a lack of awareness about a few millets' varieties like little millets particularly Buckwheat (Table 11).

Table 7. Awareness of millet

Particulars	Frequency	Percentage
Yes	400	100%
No	0	0
Total	400	100%

Table 8. Source of awareness

Particulars	Frequency	Percentage
Just heard of it (WOM from Elders in family, friends)	250	63%
Exclusive Organic Shop	70	17%
Organized Retail Outlet	80	20%
Total	400	100%

Table 9. Awareness of millets created through social media

Particulars	Frequency	Percentage
Yes	272	68%
No	128	32 %
Total	400	100%

Table 10. Predominant type social media which created awareness

Particulars	Frequency	Percentage
WhatsApp	49	18%
Instagram	52	19%
Facebook	54	20%
Twitter	35	13%
Food and Informative Blogs	82	30%
Total	400	100%

Table 11. Frequency of consumption

Particulars	Frequency	Percentage
Regularly	40	27%
Weekly twice or thrice	80	53%
Occasionally	30	20%
Total	150	100%

This study has shed light on the awareness about millets that are found to be moderate to high. This is validated by the study conducted by (Kalaiselvi and

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Fatima, 2016) who also reported that the majority of people are aware of millets and their health benefits such as their nutritional benefits to maintain overall health that is in line with the report of Indianet (2017).

3.3 Consumption pattern of millet

Among the sample, respondents only (38%) of the respondents are consuming millet (Table 12) of which (27%) consume it regularly (at least once a day) and 53 % of them consume it twice a week (Table 13). Amongst the respondents who consume millet, an effort has been put to determine the primary reasons behind the consumption; accordingly, the results revealed that "Nutritional Benefit" and "Maintenance of Overall health" are the prime reasons for consumption followed by "An alternate to rice and Wheat", "For Weight Loss" and "To maintain Blood Sugar level". Other reasons that also motivate to consume millet include "To Boost Immunity", and "To Enhance Digestion". Other reasons that are also taken into consideration for consumption of millet comprises "Gluten-free Consumption" and "To maintain Blood Pressure" and "To Enrich Hemoglobin" and lastly to avoid "Cardiovascular Risk" (Table 14). Despite having awareness about millets, people still show their reluctance towards its consumption with inhibiting factors like "Lack of awareness about nutritional benefits" followed by "Non-availability", "Expensive than rice and wheat", "Not familiar with millet recipes" and lastly "Dislike the taste and considered it as rural Food" (Table 15).

Table 12. Level of awareness various about types of millet

Particulars	Yes	No
Foxtail millet	375(94%)	25 (6%)
Finger Millet (Ragi)	400 (100%)	0
Little Millet	150 (38%)	250(62%)
Buck Wheat	10(3%)	390(97%)
Pearl Millet	250(62%)	150(38 %)
Barnyard millet	250 (62%)	150(38 %)
Kodo Millet	300(75%)	100(25%)
Sorghum Millet	0	400 (100%)
Proso/Broomcorn Millet	0	400(100%)
Amarnath Millet	0	400(100%)

Table 13. Consumption of millet

Particulars	Frequency	Percentage
Yes	150	38%
No	250	62%
Total	400	100%

Millets are consumed as an alternative to rice and wheat among informed people. Others consume it for being gluten-free, for weight management, for haemoglobin formation, for maintaining diabetes, and blood pressure and for reducing cardiovascular diseases which are validated by the study of (Ambati, 2019) and (Kam *et al*., 2016). It was also reflected in the responses that many people who have a fair idea about this coarse grain are completely ignorant about its nutritional benefits. It indicates that mass awareness among the public is vital for making millet a mainstream staple to balance nutrition and maintain overall health. There is an

Table 14. Reasons for usage/consumption of millets among women consumers

Particulars	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Weighted Score	Weighted Average
For weight loss	120 (80%)	0	0	30 (20%)	0	660	10.3
To maintain blood sugar level	50 (33%)	100 (67%)	0	0	0	650	10.1
To boost immunity	50 (33%)	40 (27%)	60 (40%)	0	0	590	9.2
To avoid cardiovascular risks	10(7%)	0	0	140 (93%)	0	330	5.2
For gluten free consumption	50 (33%)	0	0	70 (47%)	30 (20%)	420	6.5
Enhancing digestion	30 (20%)	0	100 (67%)	20 (13%)	0	490	7.6
For blood pressure	30 (20%)	9 (7%)	11 (7%)	100 (66%)	0	419	6.5
Alternate for rice and wheat	100 (67%)	50 (33%)	0	0	0	700	10.9
To enrich hemoglobin	0	50 (33%)	50 (33%)	10 (7%)	40 (27%)	410	6.4
For nutritional Benefit	150 (100%)	0	0	0	0	750	11.7
To maintain overall health	150 (100%)	0	0	0	0	750	11.7
To keep body warm	0	21 (14%)	0	21 (14%)	108 (72%)	234	3.6
						6403	100

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Table 15. Factors which inhibit the consumption of millet

Particulars	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Weighted Score	Weighted Average
Not aware of it	200 (80%)	50 (20%)	0	0	0	1200	24
Expensive	80 (32%)	110 (44%)	0	30 (12%)	30 (12%)	930	18.6
Not available in all the stores	150 (60%)	100 (40%)	0	0	0	1150	23
Do not like the taste	10 (4%)	50 (20%)	0	90 (36%)	100 (40%)	530	10.6
Do not know about the cooking procedure	50 (20%)	100 (40%)	0	50 (20%)	50 (20%)	800	16
It is a rural food	10 (4%)	0	0	100 (40%)	140 (56%)	390	7.8
						5000	100

urgent need to disseminate information regarding all varieties of millets among the public by designing a persuasive message to change the perception about millets being a staple of rural India.

3.4 Communication through various media

Social media has played a significant role in raising the awareness level of millet grain among South Indian women. The results of the study affirm that food informative blogs, Facebook and Instagram are the key social media platforms for disseminating information about nutria grains among South Indian Women (ICRISAT, 2017).

3.5 Hypotheses testing

Null Hypothesis H_{01}: The frequency of purchase of millets does not vary across the reason for purchase.

In order to test the relevance between the frequency of purchase of millets and the reason for purchase, Null Hypothesis H_{01} has been framed and tested using ANOVA. Accordingly, the frequency of purchase of millets has been considered as an independent variable and the reason for purchase has been considered as the dependent variable.

From ANOVA Table 16, it can be inferred that P-value is <0.05 and hence the null hypothesis is rejected and it can be concluded the frequency of purchase does vary across the reasons for Purchase

Null Hypothesis H_{02}: Frequency of consumption of millet and ongoing health issues is independent of each other.

In order to test the dependence between, the frequency of consumption of millet and ongoing health issues, Null Hypothesis H_{02} has been framed and tested using Chi-Square. For conducting the Chi-Square test, respondents without any health issues were exempted.

Table 16. Frequency of purchase of millet and reasons for purchase of millet

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	23.477	19	1.236	1.871	0.022
Within Groups	85.856	130	0.660		
Total	109.333	149			

Table 17. Cross tab between frequency of consumption of millet and health issues

	Regularly	Weekly	Occasionally	Row Totals
Cardiovascular	6 (2.82)	3 (5.63)	1 (1.55)	10
Diabetes	10 (8.45)	15 (16.90)	5 (4.65)	30
Obesity	10 (14.08)	30 (28.17)	10 (7.75)	50
Gastric	8 (8.45)	17 (16.90)	5 (4.65)	30
Hypertension	6 (6.20)	15 (12.39)	1 (3.41)	22
Column Totals	40	80	22	142 (Grand Total)
Pearson Chi Square Value				9.81

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From Contingency Table 17, it can be inferred that the chi-square statistic is 9.8138. The *p*-value is 0.278336. The result is not significant. Hence the null hypothesis (H_{02}) is rejected and it can be concluded that health issues and the frequency of consumption of millet are dependent on each other.

4. Conclusion

Communication remains the major inhibitor on various fronts starting from producers to consumers. Low market demand has forced farmers to reduce the production of millet reported by (Raj and Shanmugam, 2013) and on the other hand consumers' awareness and interest to adopt it as a staple is dismal due to a lack of knowledge and motivation to consume millets as daily meals.

The social media platform is emerging as a major source of information dissemination increasing awareness about millet. There is a need to identify the right social media tools, customized communication messages and influencers such as opinion leaders, celebrities, chefs, and peers to develop the motivation to consume millet.

Subsidizing the price for farmers will boost its production, ensure availability and would also be affordable for consumers to buy as it is not preferred over rice and wheat due to their high price. It is also desirable to proliferate its consumption by involving influencers like bloggers, chefs, doctors, and fitness instructors to discuss the health benefits of millet and share new recipes among the public.

Conflict of interest

The authors declare no conflict of interest.

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