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Traditional to Contemporary: Food consumption changes in the Irular Tribal Community

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Abstract
Tribal food culture and choices are intertwined with issues of preferences and availability. This study aims to examine the food consumption pattern of irulat tribes Coimbatore district, Tamil Nadu. A semi-structured food frequency questionnaire was used to analyze the food consumption pattern among 415 selected adult irular tribes. All the selected irular subjects consumed parboiled rice every. Finger millet was consumed on a weekly basis by 85% of the subjects. Red gram dhal, green gram dhal and whole green gram were consumed weekly twice or thrice by all the selected subjects. Daily consumption of greens was found among 34%, as they had easier access to variety of greens. Ladies Finger, Cluster Beans, Brinjal, Drumstick, pumpkin and Gourd Varieties were found to be consumed among the selected irular community by weekly twice or thrice based on seasonality, availability, and preferences in meal planning. The consumption pattern of root vegetables like Vethalai velli kilangu and Mull velli kilangu was found to be in weekly basis by majority (92%) of the selected irulars. Selected irulars consumed SulliPalam, SangaraiPalam, SuruliPalam, Navapalam, Illanthai Palam, SooliPalam, SudaliPalam, and Figs in weekly twice or thrice mode. Fish was consumed weekly twice by 71%, chicken 51% and meat by 56%. Poultry and other birds was consumed weekly twice by 54% and monthly once by 46%. Among the selected irulars Majority (86%) of them reported that they consumed puffed rice, groundnuts, murukku or vadai as a snack for weekly twice as common snacks. Biscuits was consumed weekly twice as snack by 23%. Fast food consumption was consumed by seven percent of selected tribes occasionally and 93% recorded that they never tasted it. This shift from nutrient-rich traditional foods to energy-dense market foods signals an ongoing nutrition transition, a trend observed not only among other indigenous communities in India but also globally.

Keywords: food frequency, food culture, food consumption, irular tribes, nutrition transition

I. Introduction

The term "tribes" describes a group of people that occupy remote, undeveloped areas like mountains and forests which are quite from the most advanced contemporary societies (Narain, 2019). These communities have well-defined lifestyles, characterized by specific rule, morals, traditions, customs, language, and mode of worship (Sathiyanarayanan et al., 2019).

There are 36 Scheduled Tribe groups in Tamil Nadu. Among them, the Government of India identifies six as PVTGs: (1) Todas, (2) Kotas, (3) Kurumbas, (4) Irulas, (5) Paniyas, and (6) Kattunayakas. They live in and around the Nilgiris district (Gandhimathi, 2016). When the numbers of certain tribal groups decrease or remain stagnant, they become PVTGs. The others, which are scattered all over the country, are termed "dispersed tribes"(Senthilkumar & Gobalakrishnan 2020). The Irulas are also known as Eriligaru and are located in the name of Melanadu Irulas in Kotagiri Taluk of Nilgiri District. In the Coimbatore region, the Irulas are well spread from the northern sites to every village. The name Irulas is derived from the Tamil word "Irul‟ meaning dark, which refers to the skin nature of the Irulas. The term irula means "people of darkness" (Gnanamoorthy, 2015).

The food culture of the Irula tribes, indigenous to the Nilgiri Hills and surrounding regions of Tamil Nadu and Kerala, is basically linked with their natural environment. The Irulas consume a large portion of wild tubers, forest fruits, honey, small animals, etc., indicating a clear relationship between them and the forest. They practice farming in small plots where crops like millets and pulses are grown. Since their methods of cooking are simple, it often involves roasting or boiling. In this manner, what is available with every season dictates their diet, very much foregrounding their emphasis on sustainability focus and deep

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knowledge of the local ecosystem (Vijayakumar et al., 2010). Cooking modes include spices such as turmeric, cloves, cinnamon, mustard seeds, etc., are said to carry many medicinal properties and are consumed frequently. The tribal food culture is different from the mainstream food culture. It is centered upon food items that are believed to carry medicinal properties and are found abundantly in nature. Singh (2016) studied on the importance of ethnic food and opined that ethnic foods possess protective properties, antioxidant, antimicrobial, probiotics, bio-nutrients, including other health-benefits. Due to rapid urbanization, other developments, especially introduction of fast foods have adverse effects on production as well as consumption patterns of ethnic foods. An individual's nutritional behavior, eating patterns, and habits have a significant impact on how long they live, how well they age, and how many diseases they develop. Hence the present study was pursued to know the current food consumption pattern of irular community.

II. Methodology

A population-based cross-sectional study was carried out from October 2023 to September 2024. Ethical approval was waived by the human ethics committee of PSG Institute of Medical Science and Research, Coimbatore in view of the nature of study and all the procedures being performed were part of the routine care. Irular tribes are one of the second largest groups of Tamil Nadu after the Badgas. Anaimalai Hills, Nilgiris, Attappadi Hills, Anaikatti, Sadivayal, Shembukarai, Dhumanur, Kattasalai, Karamadai and Chinnampathy were the selected areas for the study. Participants aged 30 and above from both genders belonging to Irular tribe of Coimbatore district and willing to participate in the study were included for the study, whereas persons belongs to other tribal community and not interested in the study were excluded from the study. Sample size was estimated as 375 as the Irular population of Coimbatore was 14508 (Population census 2011). To still improve the validity it was added another 40 to the sample and the total study population was made to 415. A house-to-house survey was conducted using a semi-structured food frequency questionnaire through the interview method among randomly selected irular tribes at settlements in Coimbatore. The food groups included were cereals and millets, pulses and legumes, green leafy vegetables, other vegetables, roots and tubers, fruits, milk and milk products, fats and oils, sugars, meat and poultry, snacks and miscellaneous foods. The data were computed and analyzed.

III. Results and Discussion

The food frequency pattern of the selected Irular tribes typically reflects their traditional diet, which is influenced by their agricultural and forest-based lifestyle. Several researches reports that Rice and millets are often the main staple, consumed regularly as part of most meals typically consumed daily. Millets especially ragi and foxtail millet are also common, particularly in areas where rice is less accessible. Vegetables, pulses, and milk products may be consumed several times a week. Meat and wild foods are less frequent but are an important source of protein when available. These food patterns may differ depending on the season, regional availability, and lifestyle of the specific Irular communities. The types and frequency of foods consumed is displayed in below table.

Table - 1
Food Frequency Pattern of all the selected Irular subjects (n=415)

S.No	Food Groups	Fooditems	Daily		Weekly twice/ Thrice		Monthly once/Twice		Occasionally		Never	
			No	%	No	%	No	%	No	%	No	%
	Cereal, Millets and products	Rice Parboiled	415	100	-	-	-	-	-	-	-	-
		Raw Rice	-	-	355	86	55	13	11	5	-	-
		Rice Flakes	-	-	-	-	415	100	-	-	-	-
		Wheat/ Wheat flour	-	-	-	-	415	100	-	-	-	-
		Semolina/Maida	-	-	-	-	-	-	415	100	-	-
		Finger Millet	41	10	353	85	-	-	21	5	-	-
		Itallian Millet	-	-	121	29	273	66	21	5	-	-

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		Kodo Millet	-	-	121	29	273	66	21	5	-	-
		Little Millet	-	-	121	29	273	66	21	5	-	-
	Pulse Consumption	Red gramdhal			415	100	-	-	-	-	-	-
		Greengram dhal	-	-	415	100	-	-	-	-	-	-
		Whole green gram	-	-	415	100	-	-	-	-	-	-
		Bengalgram dhal	-	-	-	-	415	100	-	-	-	-
		Horse gram	-	-	-	-	415	100	-	-	-	-
		Cow Pea	-	-	-	-	415	100	-	-	-	-
		Meal makers	-	-	-	-	-	-	-	-	415	100
	Green Leafy Vegetables	Munna Keerai/ Seengai Keerai/ Panna Keerai/ Suruli keerai/ Maangeerai/ Vasala Keerai/ Siru keerai	141	34	274	66	-	-	-	-	-	-
		Manathakali	-	-	32	8	383	92	-	-	-	-
		Amaranthus	-	-	36	9	379	91	-	-	-	-
		Palak	-	-	18	4	397	96	-	-	-	-
		Ponnaganni	-	-	16	4	399	96	-	-	-	-
		Agathi	-	-	-	-	415	100	-	-	-	-
	Other Vegetables	Ladies finger	-	-	415	100	-	-	-	-	-	-
		Cluster beans	-	-	415	100	-	-	-	-	-	-
		Brinjal	-	-	415	100	-	-	-	-	-	-
		Drumstick	-	-	415	100	-	-	-	-	-	-
		Sundakai	-	-	115	28	300	72	-	-	-	-
		Gourd varieties	-	-	415	100	-	-	-	-	-	-
		Pumpkin	-	-	223	54	192	46	-	-	-	-
	Roots and Tubers	Vethalai velli kilangu	-	-	383	92	-	-	32	8	-	-
		Mull velli kilangu	-	-	383	92	-	-	32	8	-	-
		Tapioca	-	-	-	-	383	92	32	8	-	-
		Yam	-	-	-	-	383	92	32	8	-	-
		Radish	-	-	-	-	415	100	-	-	-	-
		Beetroot	-	-	-	-	415	100	-	-	-	-
		Potato	-	-	-	-	415	100	-	-	-	-
		Carrot	-	-	-	-	415	100	-	-	-	-
	Fruits	Sulli Palam	-	-	415	100	-	-	-	-	-	-
		Sangarai palam	-	-	415	100	-	-	-	-	-	-
		Suruli palam	-	-	415	100	-	-	-	-	-	-
		Navapalam	-	-	415	100	-	-	-	-	-	-
		Illanthai palam	-	-	415	100	-	-	-	-	-	-

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		Sooli palam	-	-	415	100	-	-	-	-	-	-
		Sudali palam	-	-	415	100	-	-	-	-	-	-
		Figs	-	-	415	100	-	-	-	-	-	-
		Banana	342	82	73	18	-	-	-	-	-	-
		Guava	-	-	147	35	268	65	-	-	-	-
		Papaya	-	-	112	27	303	73	-	-	-	-
		Sapota	-	-	-	-	-	-	415	100	-	-
		Custard Apple	-	-	-	-	-	-	415	100	-	-
		Apple	-	-	-	-	-	-	415	100	-	-
		Grapes	-	-	-	-	-	-	415	100	-	-
		pomegranate	-	-	-	-	-	-	415	100	-	-
	Milk and milk products	Cow's milk	415	100	-	-	-	-	-	-	-	-
		Curd	415	100	-	-	-	-	-	-	-	-
		Buttermilk	351	85	64	15	-	-	-	-	-	-
		Butter	-	-	-	-	-	-	-	-	415	100
		Ghee	-	-	-	-	415	100	-	-	-	-
		Cheese	-	-	-	-	-	-	-	-	415	100
viii.	Oils and Fats	Palm oil	415	100	-	-	-	-	-	-	-	-
		Coconut oil	-	-	-	-	415	100	-	-	-	-
		Groundnut oil	-	-	-	-	415	100	-	-	-	-
		Sunflower oil	-	-	415	100	-	-	-	-	-	-
ix.	Sugar and sugar products	Refined sugar	415	100	-	-	-	-	-	-	-	-
		Jaggery	-	-	415	100	-	-	-	-	-	-
		Honey	-	-	-	-	415	100	-	-	-	-
		Palm sugar	-	-	415	100	-	-	-	-	-	-
x.	Non Veg Consumption	Egg	-	-	304	73	111	27	-	-	-	-
		Fish	-	-	296	71	119	29	-	-	-	-
		Crab	-	-	-	-	119	29	101	24	195	47
		Poultry (Chicken/ Other birds)	-	-	224	54	191	46	-	-	-	-
		Mutton	-	-	234	56	181	44			-	-
		Beef	-	-	-	-	-	-	-	-	415	100
		Pork/Rat/Mice/ Cat/ Rabbits/ Snails/ Squirrels/ Crabs	-	-	18	4	282	68	115	28	-	-
xi.	Snacks/ Miscellaneous foods	Biscuits	-	-	96	23	319	77	-	-	-	-
		Fried foods (Murukku/Vadai)	-	-	355	86	60	14	-	-	-	-
		Puffed Rice groundnuts	-	-	355	86	60	14	-	-	-	-
		Fast foods Puffs Pizza/Burger Chat items	-	-	-	-	-	-	29	7	386	93

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		Proprietary drinks boost, Bournvita, Horlicks	-	-	-	-	-	-	29	7	386	93
		Commercially available Sweets/ Ice creams	-	-	-	-	-	-	29	7	386	93

(i) Cereals and Millets consumption

All the selected 415 irular subjects (100%) consumed parboiled rice every day as it was provided under Public Distribution System Services. At present parboiled rice found to be staple food in the Irular diet, consumed daily by every individual. Raw rice is consumed more regularly on a weekly basis by 355 subjects (86%), Monthly Once/Twice by 55 subjects (13%), and 11 subjects (5%) consumed occasionally. Rice flakes are consumed monthly, and no one consumed them daily or weekly. This suggests that rice flakes are likely used for special meals or snacks, and perhaps have a seasonal or occasion-based consumption pattern. Rice flakes was prepared as a light meal, like poha, or used in breakfast dishes. Wheat was consumed monthly, as it was distributed in Public Distribution System Services and it was likely not a primary staple in the Irular diet.

Traditional food formulations are important sources of many nutrients for the most vulnerable sections of society (Rakesh, 2017). Finger millet was consumed most frequently on a weekly basis by majority of the subjects (85%), indicating that it was an important food in the daily diet of the Irular community. Finger millet is highly nutritious, rich in calcium, iron, and fiber, making it a common choice for regular consumption in the form of ragi porridge, ragi balls, or flatbreads. Italian millet also known as proso millet was consumed mostly on a monthly basis (66%), with a smaller portion consuming it on a weekly basis (29%). This suggests that Italian millet was a secondary cereal grain in the diet, eaten more for variety than as a primary staple. It was used in upma, khichdi, and sometimes as a substitute for rice. Kodo millet and little millet follows a similar consumption pattern to Italian millet, with most people consumed it monthly (66%). It was used less frequent than finger millet but is still an important component of the diet in areas where millets are grown and consumed. Like Italian millet, Kodo millet and little millet was also used as an alternative to rice and can be prepared in similar ways.

(ii) Pulses and legumes

Red gram dhal (Toor Dal), green gram dhal (Moong dal) and whole green gram were consumed weekly twice or thrice by all the selected subjects, likely indicating its importance as a regular part of the diet. It was one of the main sources of protein for the Irular community, used to prepare dal or curry that accompanies their staple food. Bengal gram dhal was consumed less frequently, twice a month. This suggests it was reserved for specific dishes like channa dal curry or sundal. Horse gram was consumed twice in a month, used as kulthi dal or in rasam. Cow pea was consumed similarly to horse gram, with a frequency of twice a month. As a nutritious legume these were used by irulars in various dishes like curries and accompaniments.

(iii) Green leafy vegetables

The fact that 274 people consume these green leafy vegetables twice or thrice a week suggests that these vegetables are a regular part of their diet. Daily consumption of greens was found among 141 individuals (34%), as they had easier access to these types of greens. Some of these greens, like SuruliKeerai, SeengaiKeerai, are known for their medicinal properties and might be consumed daily for their perceived health benefits like improving digestion, blood circulation, and skin health.Some *keerai* varieties, like *SuruliKeerai*, are used in home remedies and traditional medicine for their detoxifying and anti-inflammatory properties. Manathakali, Amaranthus, Palak, and Ponnaganni were the most commonly consumed greens, especially on a monthly basis by most irulars. This suggests it was a popular choice but may not be a daily staple in their diets. Agathi was consumed on a monthly basis by the selected irular community. This reflects seasonal availability and cultural practices that influence its inclusion in the diet.

(iv) Other vegetables

Ladies Finger (Okra), Cluster Beans, Brinjal, Drumstick, pumpkin and Gourd Varieties were found to be consumed among the selected irular community by weekly twice or thrice based on seasonality, availability, and preferences in meal planning. Sundakai has a distinctive place in the

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Irular diet, where it was consumed by a larger proportion (72%) of the selected irulars on a monthly basis, with a smaller group (28%) incorporating it weekly basis. These vegetables are often used in traditional dishes and have medicinal properties. It was consumed for its perceived health benefits, particularly for its anti-inflammatory and antimicrobial properties. The lower weekly consumption could be related to its stronger, bitterer taste, which some individuals prefer to consume less frequently.

(v) Root vegetables

The consumption pattern of root vegetables like Vethalai velli kilangu and Mull velli kilangu was found to be in weekly basis by majority (92%) of the selected irulars. Tapioca, Yam, Radish, Beetroot, Potato, and Carrot were consumed monthly once or twice rather than daily, possibly due to availability. The Irular community, like many other indigenous groups, had specific dietary habits that prioritize leafy greens, grains, and legumes, and consumed root vegetables and tubers. Some of these tubers, especially Vethalai velli kilangu and Mull velli kilangu, had cultural and medicinal significance, influencing their consumption.

(vi) Fruits

Selected irulars consumed SulliPalam, SangaraiPalam, SuruliPalam, Navapalam, Illanthai Palam, SooliPalam, SudaliPalam, and Figs in weekly twice or thrice mode. Nearly 82% of the selected irulars consumed Banana daily. Around 35% of selected irulars preferred guava and 27% consumed Sapota weekly twice or thrice. Custard Apple, Apple, Grapes and pomegranate were consumed in mothly once or twice.

(vii) Milk and milk products

The selected irular community maintained traditional diets based on locally available resources. Cow's milk, and curd were consumed daily by all the selected irulars. Nearly 85% of the subjects consumed buttermilk daily. Consumption of ghee was found to be monthly once or twice and they never prefer cheese.

(viii) Oils and Fats

Sunflower oil, popular for its lighter flavor, was used frequently but less often than palm oil as it was consumed by all the selected subjects. Palm oil is distributed to tribal communities, including the Irulars, through the Public Distribution System (PDS). The PDS aims to provide affordable and accessible cooking oil to marginalized communities, ensuring food security and helping alleviate financial pressures. Coconut oil and groundnut oil was used approximately twice per month by all the selected irular subjects.

(ix) Sugar and Sugar products

The sugar consumption pattern of the selected irulas reveals that they had a practice of using both refined and traditional sweeteners. Refined Sugar was used daily by all the selected irualrs, likely for convenience and accessibility as it is provided under PDS scheme. Jaggery & Palm Sugar was used about twice per week, adding whereas honey consumption was found to be about twice per month by the irulars.

(x) Non-Vegetarian foods consumption

Among the selected irulas, fish was consumed weekly twice by 71%, chicken 51% and meat by 56%. Poultry and other birds was consumed weekly twice by 54% and monthly once by 46%. Meat Consumption was found to be weekly twice by 56% and monthly once/twice by 44%. Animals like pork, rat, mice, cat, rabbits, snails, squirrels, ware also consumed weekly twice by four percent and monthly once/twice 68% and occasionally by 28% of selected irulas. The Irular community, in alignment with their cultural values and traditional practices, reported that they never consume beef.

(xi) Snacks

Among the selected irulars Majority (86%) of them reported that they consumed puffed rice, groundnuts, murukku or vadai as a snack for weekly twice as common snacks. Biscuits was consumed weekly twice as snack by 23%. Fast food consumption was consumed by seven percent of selected tribes occasionally and 93% recorded that they never tasted it.

Rajeevan et al., (2020) reports that dietary diversity in the diet has been conventionally measured as counts of consumption of diverse food groups over a longer period. Similar study by Jancirani et al., (2022) a cutoff score of <4 food groups is considered a minimum dietary diversity (MDD). They revealed that the majority (80.39%) of women did not meet the recommended MDD of more than four food groups and only (16.11%) of them had received a diversified diet with an inclusion of 5–6 food groups in their daily diet during the baseline study.

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Impact of modernization on food culture of selected tribes

Indigenous people across the world have been affected by the modernisation through introduction of technologies. Modern technologies, especially tele-communication and computer technologies, allow indigenous groups to participate in the larger societies and economics around them (Sarkar, 2017). Food practices in tribal communities are complex and influenced by a variety of interconnected factors, including culture, environment, economy, health, and social structure. As tribal people move to urban areas or come into contact with non-tribal populations, their food practices can be influenced by mainstream diets, leading to a shift towards processed foods, fast food, or foods from other cultures. Interaction with neighboring communities results in the adoption of new food practices, introduction of new crops, cooking techniques, and food preparation methods.

While the use of gas stoves is not widespread across all tribal communities, it is gradually increasing, especially in areas where government schemes and modernization have made gas access more feasible. However, traditional cooking methods such as wood, charcoal, and other biomass remain dominant in many tribal communities due to cultural practices, cost issues, and limited infrastructure. The shift towards gas stoves, though beneficial in terms of health and the environment, faces challenges that need to be addressed through continued government support and infrastructure development.

IV. Conclusion

The food frequency analysis revealed a noticeable inclusion of instant foods, fast foods, processed and packaged items under snacks and miscellaneous foods in the diets of both the selected Irular as well as toda tribal subjects. This shift highlights how improved access to markets has contributed to a rise in the consumption of non-traditional processed foods, which are often high in sugar, fat, and salt, in the daily diets of these tribal communities. This shift from nutrient-rich traditional foods to energy-dense market foods signals an ongoing nutrition transition, a trend observed not only among other indigenous communities in India but also globally.

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