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Factors Influencing Fish Purchase and Consumption Behaviour of Koraga and Soliga Tribes, Karnataka, India

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ABSTRACT

The study carried out in 2021-2022 investigates fresh and dried fish consumption patterns and factors influencing fish purchase among Koragas and Soligas; two major tribes of Karnataka, India. 400 fish-consuming tribal households were surveyed and per capita fish consumption was estimated at 1.04 and 2.02 kg/person/month for Koragas and Soligas respectively. Mackerel and Sardine were the two most important species preferred by the Koragas while Tilapia and Catla were the preference among Soligas. Among the 15 factors studied; the ones that were ranked with the highest contribution towards the fish purchase of Koragas were the 'price of fish' (7.68) and the 'availability of favourite fish' (7.36). Soligas ranked the 'availability of favourite fish' (10.42) as the most contributing factor followed by 'convenience perception' (6.69). Increasing awareness about the health benefits of fish consumption and building the capacity of tribes to prepare culturally compatible fish-based products can aid in improving fish consumption. The results of the study will be of utility to health department officials and policymakers in planning strategies to increase fish consumption and alleviate malnutrition among these tribes.

INTRODUCTION

Fish as food is an important tool for ending global hunger, achieving food security and improving nutrition as envisaged in the United Nations 2030 Agenda for SDGs (Bennet et al., 2021). One of the healthiest foods; fish with its high levels of Omega-3 fatty acids and docosahexaenoic acid (DHA) is advised for all age groups; especially for expectant and nursing mothers and growing children (WHO, 2011). Low fat content, high-quality proteins, and plenty of micronutrients including vitamins and minerals make fish and seafood widely acknowledged as a crucial part of any balanced and healthy diet (Yaktine & Nesheim, 2007). Positive perception of consumers in terms of nutritional content and health benefits of fish is found significant (Verbeke et al., 2008). World food fish consumption recorded an increase to 20.2 kg per capita in 2022 from 9.0 kg in 1961 thus helping 3.1 billion people to meet 20 per cent of their total animal protein intake from fish alone (FAO, 2022).

NSSO (2012) reports per capita fish consumption of 0.27 kg and 0.25 kg per month for urban and rural India, respectively. While ICMR recommends consumption of 12 kg fish per capita in a year, India is far away from achieving this target with the World Bank predicting per capita fish consumption of only 6.6 kg by 2030 (Msangi et al., 2013). Through the flagship "Blue Revolution" scheme, the Government of India tried to reach 20 MT fish production by the year 2022-23 (Shasani et al., 2020) which was not met yet. Karnataka records a meagre monthly per capita fish consumption of 0.163 kg in rural and 0.117 kg in urban areas (NSSO, 2012) far less than the national average as well as recommended intake. Identifying the factors influencing

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consumption aids planners in chalking out programmes for alleviating malnutrition and bringing down hunger among vulnerable populations (Sajeev et al., 2021a). Indians exhibit rich cultural values living in diversified societies under varied agro-climatic situations (Lenka & Satpathy, 2020). Dakshina Kannada (formerly South Canara) district in Karnataka is nestled between the Western Ghats and the Arabian Sea. The Koraga tribe is one of the two most primitive and backward tribes recognised by the Indian government mainly distributed along the regions of the Dakshina Kannada, Udupi and Haveri districts. Chamarajanagar is the southernmost district of Karnataka. Soliga is an Indian ethnic community mostly living in southern Karnataka's Biligiriranga hills and adjacent ranges covering the districts of Chamarajanagar in Karnataka and Erode in Tamil Nâdu. Both tribes are identified as highly vulnerable population concerning malnutrition and anaemia (Kamath et al., 2013; Prabhakar & Gangadhar, 2016). The inclusion of fish in the diet and intake of recommended dietary levels are proven to alleviate iron deficiency and anaemia. Hence, this paper is an attempt to study the fish consumption behaviour of Koragas and Soligas and to rank the factors influencing fish purchase as perceived by the tribes so as to aid planners and development officials in preparing strategies towards using fish for nutrition and health.

METHODOLOGY

The study was carried out during 2021-22 in the Dakshina Kannada and Chamarajanagar districts of Karnataka to obtain an account of the fish consumption pattern and ranking of factors influencing the purchase among the Koragas and Soliga tribes. As per the last census conducted by the Government of India in 2011, Koraga tribes were 14,794 in number (Roy et al., 2015) while Soligas had a population of 33,871 members in Karnataka (Spandana et al., 2023). Fish consumption is a long-proven remedy in alleviating iron deficiency anaemia. The vulnerability of Koraga and Soliga tribes towards anaemia enabled them suitable for the study. Considering the group of tribal hamlets as strata and households as units, stratified random sampling technique was used to select 400 tribal households (200 each from Koraga and Soliga tribes). A structured pre-tested interview schedule was used and the survey was carried out through personal interviews. The data sets obtained through the survey were analysed using descriptive statistics analysis to infer results. Garret's Ranking technique was applied to rank the factors perceived by the tribes as having important contributions towards fish purchase and consumption. The responses were recorded from 1 to 5 for all factors; where the most important was ranked 5 and least important was ranked 1, and then converted into score value by using the Garret ranking method and standard formula.

RESULTS AND DISCUSSION

Fish and meat consumption profile of Koraga and Soliga tribes

Table 1 provides information on monthly per capita consumption (kg) of fish and different meat items by Koragas and Soligas. Among both tribes, fish consumption was above ICMR recommended levels (12 kg/annum) which is a very good sign as far as extension efforts towards the alleviation of malnutrition are concerned. The fish consumption was also higher compared to that of other meat items. Per capita monthly fish consumption was 1.44 kg among Koragas and 2.02 kg for Soligas. While more than one-third of the Koragas (36%) consumed fish two to three times a week, 29 per cent of them reported having fish at least once a week. Meanwhile, in Chamarajanagar, 61 per cent of the Soligas consumed fish at least once weekly while nearly 15 per cent of them consumed fish twice a week. The other popular meat items were chicken, pork and mutton. Chicken consumption was relatively lower compared to fish in both regions, but was still a popular choice among the tribes. The per capita monthly consumption of chicken was 0.86 kg and 0.90 kg among Koragas and Soligas, respectively. The pork consumption was relatively lower than fish and chicken among Koragas with the per capita monthly consumption of only 0.26 kg. The per capita monthly consumption of mutton was 0.24 kg among the Soliga respondents. Vastly varying fish consumption profiles which range from way below the national average in the north zone of India (Sabater et al., 2008; Mugaonkar et al., 2011) to extremely high consumption in states like Tripura, Kerala, Goa and Assam have been already highlighted by various researchers (Prasad & Madhavi, 2014; Bhuyan et al., 2017; Shyam, 2020; Sajeev et al., 2021a; Shil et al., 2022).

Table 1. Per capita consumption of fish and other meat among Koragas and Soligas

S.No.	Meat consumed	Per capita consumption (kg)			
		Koragas		Soligas	
		kg/month	kg/year	kg/month	kg/year
1.	Fish	1.44	17.28	2.02	24.24
2.	Chicken	0.86	10.32	0.90	10.8
3.	Pork	0.26	3.12	-	-
4.	Mutton	-	-	0.24	2.88

Fish species preference among the tribes

The most commonly purchased fishes by the Koragas were Mackerel and Sardine which were preferred and consumed by all (Table 2). The other fish preferred by Koragas were Sole fish by 10.5 per cent of the respondents followed by Prawns (10.0%), Red Snappers (7.5%), Croakers (5.5%) and Cat fish (2.5%). The most favourite fishes consumed by the respondents were not found different from the ones frequently purchased by them.

Table 2. Fish species preference among the tribes

S.No.	Fish species	Purchased by % of Koragas	Fish species	Purchased by % of Soligas
1	Mackerel	100.0	Tilapia	100.0
2	Sardine	100.0	Catla	86.0
3	Sole fish	10.5	Sardine	6.5
4	Prawn	10.0	Kandhu (Shoulder fish)	2.5
5	Croaker	5.5		
6	Red snapper	7.5		
7	Catfish	2.5		

Koragas were found to have an affinity for marine fish since their availability was in plenty due to the presence of a large number of harbours in the Dakshina Kannada district. In the case of Soligas of Chamarajanagar, the species preference seemed entirely different with more preference for inland and farmed fish. This is rational because of the land-locked nature of the district and the non-availability of marine fish due to the large distance from the coastal harbours. Most Soligas preferred and purchased Tilapia (100%) and Catla (86%) followed by Sardine (6.5%) and Kandhu (Shoulderfish) (2.5%). Preference for marine fishes in coastal districts and farmed/river fishes in inland districts is obvious and has been reported recently among similar populations (Sajeev et al., 2021a, 2022).

Status and frequency of dried fish consumption among the tribes

Dried fish was the primary form in which trade and consumption of fish catches were done before the advent of technologies for ice-making and cold chains. Preservation allows for overcoming seasonal variations in fish abundance and scarcity throughout the year. Historical records globally dating back to a millennium show huge evidence of widespread production, storage, trade and consumption of dried fish (Fagan, 2017). Because of the easiness in storage and transport, dried fish reaches hinterlands where fresh fish is scarce.

Both Koraga and Soliga tribes were found consuming dried fish frequently (Table 3). While 64 per cent of Koraga tribes consumed dried fish monthly once, 54 per cent of the Soliga tribe did the same. On the other hand, the Soliga tribe consumes dried fish more frequently, which is twice a month (16%), whereas 16.5 per cent of Koragas consume dried fish at least weekly once. The weekly as well as monthly consumption frequency of dried fish among both tribes was found very satisfactory. The findings give scope for the development of products based on dried fish aimed at better health and alleviation of malnutrition.

Table 3. Frequency of dried fish consumption among the tribes

Frequency of consumption	Koragas (%)	Soligas (%)
Monthly once	64.0	54.0
Twice a month	1.5	16.0
Weekly once	16.5	9.0
Once in 2-3 days	16.0	11.0
Daily	2.0	10.0

Factors influencing the purchase and consumption of fish as perceived by tribes

Three broad categories namely products, indicators, and environment influence the selection and evaluation of any food product (Sparks & Shepherd, 1994) including fish. Though these factors vary with consumers, they are crucial to understand the important determinants of fish consumption. An increase in awareness of health benefits and increased consciousness regarding safety and quality have created new determinants of fish consumption (Sajeev et al., 2019) with a change in purchase behaviour (Sajeev et al., 2021b) in India. To rank the determinants of tribal fish purchase and consumption, Garret's ranking method was applied. Among the 15 factors presented; 'price of fish' and the 'availability of favourite fish' were ranked as having the highest influence on their fish purchase behaviour by Koragas. Among Soligas, the 'availability of favourite fish' was ranked the most influencing factor, followed by 'convenience perception'. Wenaty et al., (2018) reported that the manifold factors affecting the consumption and purchase of fish included price, availability, accessibility, convenience and health concerns of the population. The geographic locations and socio-cultural features of consumers also were reported to affect the frequency and purchase of fish consumption (Can et al., 2015).

'Price of fish' was ranked as the most important factor affecting the purchase and consumption of fish among the Koragas (Table 4). The high retail fish prices nearing Rs. 200kg^{-1} in Dakshina Kannada district during the period of study (2021-2022) were found to act as a barrier for fish consumption among Koragas. The lower percapita fish consumption among Koragas compared to Soligas may be attributed to the high price of marine fish in the region. 'Price of fish' was the third most contributing factor for Soligas. However, the supply and price of Tilapia and Catla, the most favoured fishes of Soligas, were found to be relatively stable compared to that of marine fishes favoured by Koragas. Birch et al., (2012); EUMOFA (2017) & Helsedirektorat (2020) also documented the factor, 'price of fish' acting as a barrier to the purchase of fish. The driver effect of 'affordable fish price' in the purchase of fish by Indians was confirmed by Prasad & Madhavi (2014) & Bhuyan et al., (2017).

For the Soliga tribes of Chamrajanagar, 'availability of favourite fish' was the most important determinant influencing their fish purchase. Tilapia and Catla were the most favoured fish species of Soligas. 'Availability of favourite fish' was the second most important determinant of fish purchase by Koragas with the marine fishes Mackerel and Sardine being their favourite fishes. Mugaonkar et al., (2011) reported species specificity among the majority of consumers during the selection and purchase of fish. It may be noted that unlike the dwindling availability of marine fish like sardines and mackerels (ENS, 2020), the availability and affordability of farmed fish like Tilapia and Catla were mostly stable over time. 'Non-availability of preferred species' was earlier identified by Christenon et al., (2017) as a hindering factor for fish consumption. Adequate supplies of fish and fisheries products drove fish consumption in China (Feng et al., 2009).

'Convenience perception' was ranked as the second most important determinant influencing the fish purchase behaviour of the Soligas (Table 4). Convenience refers to the saving of physical or mental energy and time, at all stages of the overall meal acquisition process. The meal planning process starting with shopping followed by storage, preparation and consumption ending with cleaning and disposal of fish waste as well as leftovers (Gofton, 1995; Bech, 2001; Olsen et al., 2007), all come under the issue of convenience. Most modern families consider activities like visiting fish markets, checking fish, handling fish, dressing and cooking fish as inconvenient and time-consuming (Sajeev et al., 2021b). The Soliga households also valued more free time and expressed high priority for 'convenience perception' since handling,

Table 4. Factors contributing to the purchase and consumption of fish by tribes

S.No.	Factors	Koragas		Soligas	
		Contribution (%)	Rank	Contribution (%)	Rank
1	Price of fish	7.68	1	6.66	3
2	Availability of favourite fish	7.36	2	10.42	1
3	Market accessibility	6.52	7	6.57	6
4	Health benefits	6.54	6	6.56	7
5	Safety of fish	6.69	4	6.57	5
6	Quality of fish	7.13	3	6.63	4
7	Convenience Perception	6.58	5	6.69	2
8	Sensory Perception	6.43	13	6.45	9
9	Knowledge of fish recipes	6.47	10	6.18	12
10	Place of origin of fish	6.46	9	6.00	14
11	Source of fish	6.46	11	5.99	15
12	Production Method	6.44	12	6.25	11
13	Information on fish sold in the market	6.49	8	6.53	8
14	Availability of dressing facility	6.36	15	6.35	10
15	Provision of home delivery	6.36	14	6.14	13

dressing and preparation of their favourite fishes like Tilapia and Catla were not found easy by most families. Added to the above; disposal of fish waste was another big issue for families living in congested colonies. Convenience and sensory perception were found to have a very important role in fish purchase and consumption by the mainstream population also (Gofton, 1995; Leek et al., 2000; Birch et al., 2012).

For Koragas, 'quality of fish' was another determinant having a high influence on their purchase decision (3rd rank) which attributes to the physical condition, freshness, quality and nutritional content of the fish (Bremner, 2000). Quality is a factor related strongly to the raw material itself (Grunert, 2002) and also connected to sensory perception (Wesson et al., 1979). Concerns regarding fish quality were found to act as a barrier to fish consumption among many consumers (Christenon et al., 2017). The lack of control over markets and helplessness in buying available fish without knowing the source has led to this response among Koragas. Being a landlocked district, Chamarajanagar also faced fish quality issues making Soligas record 'quality of fish' as a matter of concern (4th rank). Quality and freshness were identified as significant factors influencing fish purchase by many previous researchers (Mugaonkar et al., 2011; Birch et al., 2012; Geethalakshmi et al., 2013; Prasad & Madhavi, 2014).

CONCLUSION

The Soliga tribes were identified as having a higher fresh fish consumption rate than Koragas. The factors; fish price, availability of favourite fish and convenience perception were the most influential factors affecting purchase and consumption. However, the difference in the order of importance suggests regional differences in tribal preferences and purchase behaviour. Fish consumption can aid in the alleviation of nutritional and health vulnerability among Koragas and Soligas. Hence, the findings from this study can be useful for health department officials and policymakers in developing strategies to promote the purchase and consumption of fresh fish among these tribes. These findings will also aid fish vendors in more efficient marketing of fish and fish-based products in Dakshina Kannada and Chamarajanagar districts. Further research is needed to identify the factors that influence fish purchase behaviour among the general population in comparison with the tribes of these districts.

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