



Factors Influencing the Fish Consumption Preferences: Understandings from the tribes of Wayanad, Kerala

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ABSTRACT

Fish consumption preferences vary with communities. The study aims to study the socio-personal and fish consumption profile of the seven major tribes of Wayanad, Kerala. Species preferences, factors affecting the fish purchase and consumption, health profile and symptoms of tribes in relation with iron deficiency anaemia, association between fish consumption and health of tribes were investigated. Data were gathered through a questionnaire completed by 200 tribal households from different socioeconomic backgrounds. Results indicate that Sardine was the most consumed and preferred fish and percapita fish consumption of tribes was far below the state average. In conclusion, the price of fish ranked as the first and foremost important factor affecting the fish purchase and consumption of the tribes surveyed, and the fish consumption variables were highly associated with health values. Increasing awareness about the health benefits of fish consumption and building capacity of tribes to prepare fish-based products based on their taste and preferences can aid improved fish consumption among Wayanad tribes. Therefore, to establish and adopt fish consumption guidelines for the tribes of Wayanad, the factors mentioned in the study need to be integrated into the projects and policies.

INTRODUCTION

The importance of fish and fish products as an integral part of healthy and balanced diet is widely accepted (Ivoninskii, 2016) and their consumption contributes to dietary and nutritional requirement of populations in developed and developing countries (Majagi et al., 2020). Significant contribution of fisheries sector is evident in the fight to end global hunger, achieve food security, and improve nutrition as envisaged in UN 2030 Agenda for Sustainable Development Goals (Bennet et al., 2018). From a mere 9.0 kg in

1961, per capita food fish consumption rose to 20.5 kg in 2018 thereby meeting 20 per cent of the total animal protein intake of 3.1 billion people (FAO, 2020). Fish as the primary source of proteins, vitamins and minerals coupled with its low-fat content (Yaktine and Nesheim, 2007) is thus believed to make any diet sustainable, safe and nutritious. Consumer reaction in many studies have pointed out that fish is regarded as a healthy food compared to other non-vegetarian foods (Brunso, 2003; Gross, 2003).

Report No: 558 by National Sample Survey Organization indicates a meagre monthly per capita fish consumption of 0.27 kg

in rural India and 0.25 kg in urban India (NSSO, 2014). However, the Indian population derived just 2 percent of their protein intake from fish as converted into levels of protein consumption (Needham and Smith, 2014). While, World Bank (Msangi et al., 2013) predicts per capita fish consumption of 6.6 kg/year for India in 2030 it still falls way behind ICMR recommendation of 12 kg/year. Government of India has also set a target of 20 MT fish production by the year 2022-23 by laying renewed focus on the sector through a flagship scheme “Blue Revolution” (Shasani et al., 2020). Compared to national figures, Kerala predominantly reported high average annual per capita fish consumption (NSSO, 2012) of nearly 30 kg (2.26 kg in rural and 2.21 kg in urban areas) with tendency to include fish and seafood in daily diet being very common among Keralites (Sajeev et al., 2019).

Indian people are living in varied agroclimatic situations with rich cultural values in diversified societies (Lenka and Satpathy, 2020). Wayanad, a hilly district of Kerala situated in the North-East region of the state sharing border with Tamil Nadu and Karnataka is inhabited by 11 different indigenous tribal groups (2011 Census) namely, Paniya, Kurichyan, Kuruman, Kattunaykkan, Adiyar, Vettakuruman, Thachanadanmoopan, Wayanad Kadar, Mala Arayan, Karimballan and Ulladan. Wayanad has been selected for the study due to the reported prevalence of malnutrition as indicated by anaemia in children under five years (54.6%) and anaemic pregnant women (15.5%). As per NFHS-5 (2019-20) Wayanad had the highest proportion of stunted children in Kerala at 31 per cent, wasted children at 16 per cent and underweight children under 5 years age at 22.5 per cent (Chakraborty et al., 2021). Fish consumption is proven to alleviate iron deficiency anaemia and hence the higher incidence of anaemia among women and children of Wayanad in contrast to Kerala figures enables the district suitable for this study. The paper attempts to measure the 1. status of fish consumption among selected tribes of Wayanad, 2. determinants of fish consumption among the tribal population and 3. health profile of tribes and its association with their attitude and subjective norms.

METHODOLOGY

A total of 151,443 tribal people settled in 3,169 colonies containing 36,136 households distributed among different tribal communities of Wayanad. Stratified Probability Proportional Sampling technique was used for the study purpose. Six different tribal communities with highest population were considered for the study. Probability proportional to population size was computed from each stratum to calculate the number of households to be selected from each stratum. The final sample size of 200 was divided between selected 6 tribes as Paniya (88), Kurichyan (32), Kuruman (28), Kattunaykkan (26), Adiyar (16) and Vettakuruman (8).

A structured pre-tested questionnaire was used and the survey was carried out during the period from December, 2019 to February, 2020 through personal interview in 200 tribal households. Each survey took roughly 50 minutes to complete. Frequency and percentages were used for the analysis of socio-economic characteristics. Henry Garret Ranking Test was done to estimate and analyse the major factors affecting the consumption of fish among the respondent tribes. Using this technique, the participants

were asked to specify ranks for all factors ranging from 1 to 5, where 5 ranks the most important and 1 ranks the least important. The results of the rankings thus obtained were converted into percentage score value. Following Henry Garret (1969), the percentage score was computed using the formula:

$$\text{Percentage score} = \frac{100(R_{ij}-0.5)}{N_j}$$

Where R_{ij} = Rank, i^{th} item, j^{th} individual

N_j = number of items ranked by j^{th} individual

Increase in consumption of fish and fish products around the globe has also led to increase in the common interests of health authorities in this topic (Badr et al., 2015). Identifying the factors influencing consumption of fish and studying consumption behaviour aids the government in alleviating hunger and malnutrition among deprived sections and policy makers in developing food policy which aids the global society (Pieniak, 2010). Linear regression analysis was attempted to measure the associations between fish consumption variables and health values of tribes. Health values (dependant variable) was conceptualized as the index number derived from variables on tiredness, pale skin, chest pain, heart related, breathing related, dizziness, head pain, numbness, tongue wound, nail crack, appetite, iron deficiency. Fish consumption factor-1 (fishconsump1) was ‘attitude towards fish purchase and consumption’ while Fish consumption factor-2 (fishconsump2) was ‘subjective norms’ in the consumption of fish.

RESULTS AND DISCUSSION

The per capita fish consumption of tribes surveyed were estimated as 1.03 kg/month which is way below the state average of 2.5 kg/person/month but far better than national average of 0.25 kg/person (Table 1). The study recorded that per capita fish consumption was way higher than that of chicken (0.67), beef (0.01) and pork (0.10) for the tribes of Wayanad. It was found that majority of the tribal respondents (45.5%) consumed fish on a weekly basis while among the rest, 38% consumed fish 2-3 times per week. The assessment of the quantity of fish purchased at a time across the selected tribal hamlets in the district indicated that majority (61.5%) of the tribes purchased up to 0.5 kg of fish per purchase whereas 38.5% purchased between 0.5-1.0 kg per purchase. The tribes in the district were fully supported by monthly ration of groceries by the state tribal welfare department. Since most tribes were working as labourers their incomes were low and resulted in low consumption of fish and other meat. Study by various researchers highlight the vastly different fish

Table 1. Per capita monthly consumption of fish v/s meat among tribes

S.No	Tribes	Fish	Chicken	Beef	Pork
1.	Adiyar	1.5	0.7	-	-
2.	Kuruman	0.9	0.6	0.05	0.14
3.	Paniya	1.1	0.8	0.01	0.04
4.	Kurichyan	0.9	0.6	0.01	0.20
5.	Vettakuruman	1.4	0.9	-	0.04
6.	Kattunaykkan	0.4	0.4	-	-
	Per capita (kg/person/month)	1.03	0.67	0.01	0.10

consumption profiles ranging from way below national average in north zone of India to extremely high per capita fish consumption in states like Tripura, Kerala, Goa and Assam (Sabater et al., 2008; Mugaonkar et al., 2011; Prasad and Madhavi, 2014; Bhuyan et al., 2017; Salim, 2020).

The most frequently consumed fishes for the tribes surveyed includes sardine for nearly all (99%), mackerel for almost half of the respondents (50.5%), followed by pony fish (10.5%), sole fishes (3.5%), anchovies (3%), croakers (2%), tuna (1%), seer fish (1%), shark (0.5%), squid (0.5%) and snappers (0.5%). The most consumed fish and favourite fish was the same for about 87 per cent of the total respondents who favoured sardine. The rest of the species which were rated as most favoured fish by the tribes were mackerel (57%), shark (4.5%), pomfret (3%), crab (2%), pony fish (8%), sole fish (2.5%), threadfin bream (2%), seer fish (0.5%), squid (2%) and anchovies (1.5%). The unavailability of the favourite fishes and high price of favourite fishes forced the tribal respondents to consume the fishes that were available in the markets at the time of purchase. Since Wayanad is an inland hilly district, the fish consumers here depend on the supply from neighbouring coastal district of Kozhikode and other states like Karnataka and Andhra Pradesh. Majority of the tribal respondents (42.5%) preferred having fish for dinner while nearly one-fifth (18.5%) favoured having it with lunch. Only 2 per cent of the respondents preferred having fish for breakfast.

Factors affecting fish purchase and consumption among tribes

Among the twelve parameters analysed, price of fish ranked as first and foremost important factor affecting fish purchase and consumption of the tribes surveyed (Table 2). The high average retail fish prices (Rs. 175/kg) prevailing in Kerala during the period of study (2019-2020) acted as a barrier for tribes resulting in low levels of fish purchase and consumption in comparison with mainstream population of rest of Kerala. Price of fish was found to act as a driver and barrier according to fluctuations in fish price. Price was identified as a barrier to fish purchase by many previous researchers (Birch et al., 2012; EUMOFA, 2017; Helsedirektorat, 2020) while the driving effect of affordable fish price was also found documented regularly (Prasad and Madhavi, 2014; Bhuyan et al., 2017). For the tribes of Wayanad, 'availability of favourite fish' emerged as the second most important factor influencing their fish

Table 2. Factors influencing fish purchase and consumption among tribes

S.No	Particulars	Total score	Rank	Contribution (%)
1	Price of fish	13363	1	9.04
2	Availability of favourite fish	13156	2	8.90
3	Market accessibility	12794	3	8.65
4	Health benefits	12509	6	8.46
5	Safety of fish	12634	5	8.54
6	Quality of fish	11779	10	7.96
7	Convenience Perception	11767	11	7.96
8	Sensory Perception	11722	12	7.93
9	Knowledge of fish recipes	11873	7	8.03
10	Place of origin of fish	11802	9	7.98
11	Source of fish	11849	8	8.01
12	Production Method	12651	4	8.55
	Total	147899		

purchase. Sardine and mackerel were found to be their most favoured fish species. Mugaonkar et al., (2011) had found out that majority of consumers were species specific while buying fish. It may be worthwhile to note that availability and affordability of sardine and mackerel, the most favourite fishes in Kerala are declining over the years (ENS, 2020). Non-availability of preferred species was earlier identified as a factor which hindered the consumption of fish (Christenon et al., 2017). 'Market accessibility' emerged as the third most important factor perceived as barrier for tribal fish purchase and consumption. This is due to the fact that tribes need to travel from inside their dwellings in forest and settlements to nearby markets to purchase fish and hence the factor may be acting as a barrier to frequent purchase and consumption. Salim (2020) had recently identified that access to the selling points enhanced the fish demand in Kerala. Production method was earlier identified as a determinant of fish purchase by Akpınar et al., (2009). Whether the fish is captured or farmed was found to be of importance to the tribes of Wayanad who in turn were experts in fish capture and thus didn't vouch much for farmed fish. 'Safety of fish' emerged as an important factor affecting fish purchase and consumption due to the wide scale media highlight on fish adulteration in Kerala (Sajeev, 2021). Accordingly, 'Safety of fish' was found to be the fifth most important factor influencing tribal fish purchase and consumption in Wayanad. The fact that fish comes from nearby district and states to wayanad has made the tribes doubtful about the safety of fish which they are purchasing. 'Health benefits' of eating fish ranked as 6th important factor influencing fish purchase and consumption of tribes in Wayanad. Positive and negative effects of fish consumption behaviour have been studied by many (Oken et al., 2012; Liu et al., 2018). Nutritive value of fishes was earlier identified as favourable factor influencing fish consumption (Birch et al., 2012; Prasad and Madhavi, 2014; Bhuyan et al., 2017). The study identified that few factors which are often overlooked like 'Knowledge of fish recipes' (7th rank), 'source of fish' (8th rank) and 'place of origin of fish' (9th rank) were also found influencing fish purchase of wayanad tribes although with lesser contribution. Quality concerns were found to hinder fish consumption (Christenon et al., 2017). For the Wayanad tribes, quality of fish was another factor found having less influence on their purchase decision (10th rank). Their lack of control and helplessness in buying fish coming from nearby states and districts has led to this response. Freshness of fish and quality were identified by many previous

Table 3. Symptoms in related with the iron deficiency anaemia

S.No.	Characteristics	Never (%)	Rarely (%)	Sometimes (%)
1.	Fatigue	58.50	26.00	15.50
2.	Pale skin	97.00	1.50	1.50
3.	Chest pain	91.00	5.50	3.50
4.	Fast heartbeat	91.50	4.00	4.50
5.	Shortness of breath	89.00	9.00	2.00
6.	Dizziness	50.00	37.00	13.00
7.	Light headedness	29.50	57.50	13.00
8.	Numbness	67.00	19.50	13.50
9.	Tongue wound	97.00	1.00	2.00
10.	Nail crack	96.50	1.00	2.50
11.	No appetite	86.00	10.50	3.50
12.	Unusual temptation	98.00	0.50	1.50

Table 4. Association between fish consumption variables and health values

Health values	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
fishconsump2	0.2530	0.1460	1.73	0.085*	-0.0348	0.5409
fishconsump1	-0.1737	0.0983	-1.77	0.079*	-0.3676	0.0202
_cons	0.2067	0.0789	2.62	0.009**	0.0512	0.3623

* Significant at 10 % level, ** significant at 5% level. *** significant at 1% level R²=0.178

researchers as significant factors of fish purchase (Mugaonkar et al., 2011; Birch et al., 2012; Geethalakshmi et al., 2013; Prasad and Madhavi, 2014). Surprisingly, the least importance given by tribes while purchasing fish were on convenience and sensory perception. Eventhough handling, dressing and cooking of fish is cumbersome and time consuming for most modern families, the tribals surveyed didn't express any negative sensory or convenience perception. The factors convenience and sensory perception were found having very important role in fish purchase and consumption of mainstream population in many studies (Gofton, 1995; Leek et al., 2000; Birch et al., 2012).

Health profile of tribes in relation with iron deficiency anaemia

Iron being an integral part of blood protein, its deficiency results in anaemia. The symptoms of iron deficiency anaemia include tiredness, pale skin, chest pain, fast heartbeat, shortness of breath, dizziness, light headiness, numbness, nail crack and lack of appetite. The consumption of fish bears a key influence on maintaining the blood iron levels. We found that the respondent tribes and their family members were referred for blood tests in nearby Primary Health Centres on different occasions. The blood test was done for tribal women at the time of pregnancy and many were identified with iron deficiency anaemia. Since the iron deficient tribes and their family members were provided with iron tablets from Primary Healthy Centre (PHC) or through nearby Anganawadi, symptoms of iron deficiency anaemia never recurred for majority of tribes (Table 3). The respondents exhibited various symptoms in relation with the iron deficiency anaemia as shown. In about 70 per cent of the surveyed respondents, light headedness was experienced more often than any other symptoms.

Association between fish consumption and health of tribes

Studies have shown that socio-cultural norms, especially family and friends, media publicities, nutritious family meal patterns, and personal factors such as attitude, tendencies, nutritional resources accessibility and cultural competence impact healthy eating habits and behaviour (Story, 2005; Matlabi et al., 2013; Dhami et al., 2020). For the Wayanad tribes, fish consumption was mainly associated with marriage, death, festivals, etc. in earlier times (Narayana et al., 2004; Prajith et al., 2016). Our study revealed that selected tribal fish consumption variables significantly affect their health values. The fish consumption factor-1 includes the tribe's attitude towards fish purchase and consumption. As the tribes develop a positive attitude on the benefits of fish consumption, their health values seem to be improving. The attitude includes the good feeling on eating fish, positive evaluation of fish as a meal, fish taste, quality, etc. It was found that all the tribes of Wayanad prefer fish, and they have excellent attitude towards fish consumption. Kuruman and Kurichyan tribes were found actively

involved in fishing activities. Their settlement pattern is mostly close to inland water bodies. The tribes scored high on subjective norms which also positively impacted their health values, which is conceptualised as fish consumption factor 2 (Table 4). The subjective norms include the tribal family's wish to eat fish, support of their tribe to eat fish, locality of tribal settlement and other preferences to eat fish regularly. Reduction in fish availability due to construction of check dams, high market price, etc., has reduced the fish consumption rate of Wayanad tribes. The independent variables attitude and subjective norms were found to be statistically significant, which helped drawing meaningful conclusions by explaining 17.8 per cent variability in health values of tribes. However, it was impossible to include all the relevant predictors to explain health values in the present study, especially since the respondents were tribes who found difficulty in responding to a highly scientific set of questions presented to them.

CONCLUSION

Many researchers and analysts always mention the association between fish consumption and health. Studies have revealed that the fish consumption rate of Kerala is very high compared to national average. The fish consumption rate of tribes in Wayanad district estimated in this study is far below the Kerala figures. The fish purchase and consumption of tribes was found to be influenced by factors like price, availability of favourite fishes, market accessibility and production method. Possible strategies to increase the fish consumption among tribals is to increase awareness about the health benefits of fish consumption and build capacity of tribes to prepare fish-based products based on their taste and preferences.

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