A Study on Consumers' Behavior and Factors Influencing the Consumption of Fish in Selected Districts of North Karnataka, India

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Authors' contributions

This work was carried out in collaboration among all authors. Author HRHK designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors HAB and VP managed the analysis of the study. Author VP managed the literature searches and data collection. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Fish and fishery products are one of the most significant sources to meet sufficient animal-based protein. Knowledge of preference for fish is important for producers, consumers, and traders at the microeconomic level and also for policymakers and planners at the macroeconomic level. The present study has made an attempt to analyze the consumers' preference towards fish consumption in Dharwad and Belgaum districts of North Karnataka, India. Sixty fish consumers

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were selected randomly from wholesale-cum retail fish markets. Descriptive statistics and multiple linear regression analysis were employed to analyze socio-economic characteristics, consumers' preferences, and factors influencing consumer behavior. The majority (65%) of the respondents belonged to the age group of 20 to 40 years. Most of the consumers (30%) visited the fish market occasionally and one-third (33%) of them purchased 0.5-1.0 kg/visit from the market. Two third (66%) of them preferred to buy fish in cut pieces and 68 per cent have emphasized freshness. It was observed that around 63 per cent of consumers were comfortable paying Rs. 100 to 200 per kg. Regression results revealed that age (0.168), family income (0.598), and family size (0.131) are positive and significantly influences which implies that a unit increase in age, family income, and family size will increase fish consumption by 0.16, 0.59 and 0.13 kgs, respectively. While price of fish is negative and significant impact on consumption behavior.

1. INTRODUCTION

India is the second largest fish producing country in the world after China and contributes about 7.58 per cent to global production. India touches its all-time high by producing 14.16 million metric tons of fish during 2019-20. The fisheries sector contributes 1.24 per cent to Gross Value Product (GVA) and 7.28 per cent to the agricultural GVA during 2019-20. There is a huge demand for Indian marine products across the world, during 2019-20 India earns about 46,600 crores by exporting 12.9 lakh metric tons of marine products [1]. This sector provides livelihood opportunities especially for the marginalized and vulnerable communities, 28 million people were earning sustainable income from this sector by involving in various activities such as, fish producing, catching, marketing activities etc.,

Fish is an aquatic animal reared in both marine and freshwater. Fisheries sector is an important source of food, income, nutrition, and livelihood for millions of people around the world. Fish plays a major role in the human diet as they are rich in omega-3 fatty acids, amino acids, vitamins, and trace elements. Consumption of fish provides many health benefits such as increase in intelligence, healthy development of brain tissues and retina in children; lowers blood pressure, reduces blood clots, lowers blood fats, and increases good cholesterol; at the time of pregnancy it reduces the risk of delivering premature baby, increase breast milk and strengthens the bones of mother [2].

Fish and fishery products are one of the most significant sources to meet sufficient animal-based protein. There is a noticeable gap between developed and developing countries in terms of fish consumption. The annual per-capita consumption in developed countries is about 23.3 kg, whereas it is 14 kg in developing countries [3]. Over the last couple of decade's fish products consumption has seen an increasing trend in India and in many developing countries due to disposable income racing, urbanization, and health concerns. Fish consumption in a country depends on many factors such as increasing population along with a sufficient supply of fish and fish products, demand, income, education level, consumer preferences, and fish prices, each one of these factors have impact on fish consumption.

With this backdrop, the present research study was conducted to analyze (i) consumer behavior towards the consumption of fish (ii) factors influencing consumer behavior in the selected districts of North Karnataka.

2. MATERIALS AND METHODS

2.1 Study Area and Sampling framework

The present study was conducted in Dharwad and Belgaum districts of North Karnataka, India. Multistage random sampling technique was employed for the selection of sample. In the first stage, by considering the growth, popularity, and market potential of fish, Dharwad and Belgaum districts of North Karnataka was selected. In the second stage, out of five taluks in Dharwad district, three taluks (Dharwad, Hubli, and Navalgund) and out of ten taluks in Belgaum district, three taluks (Belgaum, Chikkodi, and Gokak) were selected purposively. In this third stage, from each taluk, one fish market was selected and in the fourth stage, ten fish consumers from each fish market were selected randomly, thus making up a total sample size of 60. The study was purely based on primary data; required information on socio-economic characteristics, consumer preference, consumer

behavior, etc., was collected through personal interview method from fish consumers with the help of a well-structured and pre-tested interview schedule exclusively designed for the study.

2.2 Analytical Tools

Simple statistical tools like frequency, percentage and mean were used to analyze consumer profile (age, family size, sex, education and income) including the nature of consumer's interest and buying behavior. To study the factors influencing the consumption of fish in the study area, Multiple Linear Regression analysis (MLR) was carried out, with quantity of fish consumption as the dependent variable. The form of the function used was as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + u$$

Where,

Y= Consumption of fish (Kg /month)
a=Intercept
X_1 = Family income (Rs. /month)
X_2 = Expenditure on food products (Rs. /month)
X_3 = Average age of the family members (No.)
X_4 = Family size (No.)
X_5 = Price of fish (Rs./Kg)
X_6 = Family food habit Dummy (1=non-vegetarian household, 0=vegetarian household)
X_7 = Education (0= illiterate, 1=primary, 2=High school, 3=college, 4=Graduation)
u = Random disturbance term

"a" and "bi (i=0...7)" are the parameters to be estimated

The parameters were estimated by using ordinary least squares (OLS) technique. The obtained parameters were estimated and tested for its significance with 't' statistics.

3. RESULTS AND DISCUSSION

3.1 Socio-Economic Profile of Sample Respondents

The socio-economic indicators like gender, age, education, family size, family annual income, family type, and occupation were studied for in-depth analysis of the socio-economic status of fish consumers in Dharwad and Belgaum districts; and results are presented in Table 1. Majority (65%) of the consumers were in the age group of 20 to 40 years, followed by 40 to 60 years (23%), more than 60 years (10%) and around 1 per cent belonges less than 20 years in pooled category. Among the total sample respondents, 85 per cent were male and 15 per cent were female. This indicates less participation of females in fish purchase. The obtained results are in line with [4] where female participation in the fish purchase was 13.13 per cent in Tripura. About 40 per cent of the respondents were graduates, 30 per cent had attained education up to college (PUC), 15 per cent studied up to high school level, 10 per cent up to primary school, and about 5 per cent were illiterate. A majority (66%) of the consumers had a family size of 2-4 members, 26 per cent of consumers had 5-6 members and only 6 per cent of consumers had a family size of more than six members. Based on annual income, respondents were categorized into three income groups. The categories were; the low-income group (having an annual income less than Rs. 50,000), medium-income group (having an annual income between Rs. 50,000 - 2,50,000), and high-income group (having an annual income more than Rs. 2,50,000). Majority (51%) of the respondents.

Were in the high-income group followed by the medium-income group (36%) and low-income group (11%). With respect to the occupational structure, a large proportion (60%) of sample consumers were involved in business activities, 30 per cent were working in the Government sector, around 8 per cent were laborers and only 2 per cent involved in agricultural activity.

3.2 Frequency and Volume of Purchase of Fish

The frequency and volume of purchase of fish by consumers is presented in Table 2. It was found that 30 per cent of respondents visit occasionally, 26 per cent visit once in a month, 16 per cent visit once in week, 15 per cent visit twice in a week, 10 per cent visit fortnightly and around 1 per cent of them visits daily in the study area. In Dharwad district, it was observed that most of the consumers 12 (40%) visit the fish market occasionally, while 30 per cent of consumer visit once a month. Obtained results are in line with [5,6] found that respondents visit the market occasionally. As regards the quantity of purchase.

Table 1. Socio-economic characteristics of the sample fish consumers in the selected districts of North Karnataka

Particulars	Dharwad (n_1=30)		Belgaum (n_2=30)		Pooled (n=60)	
	Respondents (no.)	%	Respondents (no.)	%	Respondents (no.)	%
Gender						
Male	22	73.33	29	96.66	51	85.00
Female	8	26.67	1	03.34	9	15.00
Age (years)						
<20	0	0.00	1	03.37	1	01.66
20-40	19	63.33	20	66.66	39	65.00
40-60	9	30.00	5	16.64	14	23.33
>60	2	06.67	4	13.33	6	10.00
Education						
Illiterate	1	03.33	2	6.66	3	5.00
Primary	3	10.00	3	10.00	6	10.00
High school	4	13.33	5	16.66	9	15.00
College (PUC)	8	26.66	10	33.33	18	30.00
Graduation	14	46.66	10	33.33	24	40.00
Family size (No.)						
Small (2-4)	17	56.66	23	76.66	40	66.66
Medium (5-6)	11	36.66	5	16.66	16	26.67
Large (>6)	2	06.69	2	06.67	4	6.67
Annual income (Rs.)						
Low (<50,000)	5	16.66	2	6.66	7	11.66
Medium (50,000-2,50,000)	12	40.00	10	33.34	22	36.64
High(>2,50,000)	13	43.34	18	60.00	31	51.66
Family type (No.)						
Nuclear	26	86.66	28	93.33	54	90.00
Joint	4	13.34	2	06.67	6	10.00
Occupation						
Agriculture	1	03.33	0	0.00	1	01.63
Government Service	7	23.33	11	36.66	18	30.00
Business	19	63.34	17	56.65	36	60.00
Labour	3	10.00	2	06.69	5	08.37

Table 2. Frequency and volume of fish purchase by sample consumers

Particulars	Dharwad district (n_1=30)		Belgaum district (n_2=30)		Pooled (n=60)	
	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Frequency of visit						
Daily	1	3.33	0	0.00	1	1.66
Once in a week	3	10.00	7	23.33	10	16.66
Twice in a week	4	13.33	5	16.66	9	15.00
Fortnightly	3	10.00	3	10.00	6	10.00
Once in a month	7	23.33	9	30.00	16	26.66
Occasionally	12	40.00	6	20.00	18	30.00
Volume of purchase (Kg/visit)						
0.5-1	16	53.33	4	13.33	20	33.33
1-2	8	26.66	10	33.33	18	30.00
2-3	4	13.33	8	26.66	12	20.00
>3	2	6.66	8	26.66	10	16.66

Per visit, the results show that 33 per cent of respondents were purchase 0.5 to 1 kg per visit, 30 per cent were purchase 1 to 2 kg per visit, only 20 per cent of consumers purchase 2 to 3 kg per visit, and around 16 per cent purchase more than 3 kg per visit in the study area. It is clear that the majority of the consumers (53%) prefer to purchase 0.5 to 1 kg of fish per visit in Dharwad, while one-third (33.33%) of the respondents in Belgaum prefer to purchase 1 to 2 kg per visit. Similar results were obtained by [7,8,9]. Table 3 depicts that, in pooled it was observed that, the majority of sample fish consumers (66%) prefer to buy fish in cut pieces, while 33 per cent wishes to buy whole fish. About 66 per cent and 73 per cent of fish consumers in Dharwad and Belgaum district would prefer to buy cut fishes. It is important to note here that, the preferred type depends on the dishes consumer would like to prepare [10].

3.3 Purchasing Behavior of the Consumer

Fish can be consumed in fresh as well as processed fish such as frozen fish, salted and dry fish, etc.. Consumers' preference towards form of purchase revealed that 68 per cent of consumers in the study region (pooled) preferred to purchase fish in fresh form, 18 per cent purchase frozen fish and only 13 per cent purchase salted and dry fish. Maximum consumers (75%) in both districts were more emphasize to the freshness of fish more than the processed form. It may be due that majority of the consumers were from high-income family groups and they accorded freshness. The obtained are similar to [11] found that freshness was the most preferred choice by the respondents in Mumbai.

The assessment of consumers' preferences towards different pricing of fish revealed that the majority of the respondents (63%) were willing to pay Rs.100-200 per kg, while 11 per cent were ready to pay Rs.200-500 per kg and 25.00 per cent of the respondents were comfortable to pay Rs. >500 per kg. As regards different districts, most of the farmers in Dharwad (70%) and Belgaum district (56%) prefer to pay Rs. 100-200/kg [12,13]. It is clear from Table 3 that most of the consumers in the study area prefer to pay Rs.100-200/kg this is mainly because of the fish variety as a majority of consumers prefer Banguda and its price ranges between Rs.140-180/kg and also consumers were ready to pay more than Rs. 500/kg) for rare and more demanded varieties like Pomfret and Surmai.

3.4 Socio-Economic Factors Influencing Fish Consumption Behaviour

The multiple linear regression model was employed to study the various socio-economic factors influencing the quantity of fish consumption. The quantity of fish consumption was taken as explained/dependent variable (Y). The explanatory/independent variables considered to influence the quantity of consumption were family income (X_1), expenditure on food products (X_2), age (X_3), family size (X_4), price of fish (X_5), family food habit (X_6) and education (X_7). The results of this model were presented in Table 4. The family size exerted a positive and significant influence on the quantity of fish consumption in the Dharwad (0.535), Belgaum (0.634), and Pooled (0.598). It was indicated that each person's addition to a family increase the quantity of fish consumption by about 0.53, 0.63 kg and 59kgs respectively. Similar results were in accordance with [14] found that family size has a positive impact on fish consumption. Family income was found to have a positive and significant influence on the quantity of fish consumption in Dharwad and Belgaum districts. It was observed that for one unit increase in the family income, the quantity of fish consumption was increases by 0.02 and 0.15 kg. Similarly, the average age of the household was found to have a positive and significant influence in Dharwad and Belgaum districts. It showed that, for every year increase in the average age of the household, the quantity of fish consumption was increased by 0.14 kg in Dharwad district, 0.20 kg in Belgaum district and 0.17 kg in pooled. However, the price of fish showed a negative and significant influence on the quantity of fish consumption in Dharwad district. It showed that every rupee increase in the price of fish decreased the quantity of fish consumption by 0.10 kg in Dharwad district and the rest of the variables were.

Non-significant. Similar results were obtained by [15,16] that price had a negative impact on consumer behavior. The coefficient of multiple determination (R^2) for factors influencing fish consumption behavior of the consumer in Dharwad, Belgaum district and pooled was 0.47, 0.54, and 0.45 respectively, indicating that the variables in the model explained about 47, 54 and 45 per cent of the total variation [17,18].

Table 3. Purchasing behaviour fish by the sample consumers

Particulars	Dharwad district (n_1=30)		Belgaum district (n_2=30)		Pooled (n=60)	
	Frequency	%	Frequency	%	Frequency	%
Preferred type						
Whole fish	11	36.66	8	26.66	19	31.66
Cut pieces	19	63.33	22	73.33	41	68.34
Form of purchase						
Fresh fish	23	76.66	23	76.66	46	76.66
Frozen fish	5	16.66	5	16.66	10	16.66
Salted & Dry fish	2	6.66	2	6.66	4	6.66
Preferred price (Rs/kg)						
100-200	21	70.00	17	56.66	38	63.33
200-500	4	13.33	3	10.00	7	11.66
>500	5	13.67	10	16.67	15	25.00

Table 4. Socio-economic factors influencing the consumption of fish and fish products

Sl. No.	Particulars	Dharwad district (n_1=30)	Belgaum district (n_2=30)	Pooled (n=60)
1	Intercept	0.674	0.032	0.389
2	Family income	0.021*	0.153*	0.131**
		(0.001)	(0.001)	(0.001)
3	Expenditure on food products	0.144	0.244	0.197
		(0.001)	(0.001)	(0.001)
4	Age	0.144**	0.197*	0.168**
		(0.008)	(0.007)	(0.006)
5	Family Size	0.535**	0.634**	0.598**
		(0.082)	(0.067)	(0.054)
6	Price of fish	-0.106**	-0.168**	-0.136**
		(0.001)	(0.001)	(0.001)
7	Family habit (dummy)	-0.227	0.128	-0.107
		(0.220)	(0.180)	(0.143)
8	Education	-0.174	0.091	-0.177
		(0.094)	(0.080)	(0.060)
9	R^2	0.546	0.61	0.494
10	Adjusted R^2	0.471	0.547	0.455

Note   1: Figures in the parenthesis represents standard error
*2: ** Significance at 5% level, * Significance at 1% level*

4. MAJOR FINDINGS OF THE STUDY

✓ Most of the respondents (30%) consume fish occasionally in the study area. In Dharwad district, 40 per cent of respondents were consuming occasionally while in Belgaum district, 30 per cent were consume once in a month.

✓ More than 50 per cent of respondents in Dharwad purchase 0.5 to 1 kg per visit which less compared to respondents of Belgaum

✓ More than 60 per cent of respondents in the study area preferred to purchase fish in the form of cut pieces in the study area.

✓ Maximum consumers (75%) in both the districts were more emphasize to freshness of fish than processed form

✓ Family income, age and family size were positive and significantly influencing the consumption behavior of the respondents.

✓ Price of the fish is negative and significantly influences the consumer behavior.

5. CONCLUSION

Fish and fishery products are great sources of omega-3 fatty acids and vitamins such as D and B_2 (riboflavin). By considering the health benefits of fish the present study analysed consumer

behavior and factors influencing consumer behavior towards consumption of fish in Dharwad and Belgaum districts of North Karnataka. The study has pointed out that most of the consumers consume fish occasionally and purchase 0.5-1.0 kg per visit. The majority of the consumer preferred fish to a great extent in fresh condition in the form of cut pieces. The majority of the consumers were comfortable to pay Rs.100-200/kg. The study also revealed that family income, age and family size were positive and significantly influences the consumption behavior of the respondents, while price of fish is negative and significant. Hence, by considering the health benefits, it is recommended to promote the consumption of fish by the concerned departments.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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