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Fish Consumption Pattern and its Association with Household Characteristics in Select Coastal and Non –Coastal Districts of Andhra Pradesh

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Abstract: ***The purpose of this study was to explore the regional differences in the fish consumption pattern and its association with select household (Hh) characteristics, utilizing the survey data obtained from two districts of the state of Andhra Pradesh. The survey was carried out with representative samples from the non-coastal Tirupati and the coastal Nellore urban areas. The randomly selected non-vegetarian households representing each of the urban region was grouped according to religion, social status, occupational lifestyle and economic status. The sample consisted of 1200 respondents (700 Hhs from Tirupati and 500 Hhs from Nellore), who were responsible for food purchasing and cooking in the households. The fish consumption pattern was examined in terms of regional availability of fish, fish consumption habit, frequency and varieties of fish consumed. The results reveal that no significant association was observed between religion and fish consumption in Tirupati Hhs; whereas, a significant association (P<0.01) was evident for the Nellore Hhs. There was no significant association observed between social groups, occupational lifestyle and fish consumption when the data of both urban areas were assessed independently. A significant association (P<0.05) was observed between the family monthly income of the Hhs with respect to the fish consumption in Tirupati; no significant association was observed in the Nellore urban Hhs. The frequency and variety of fish consumption was high among Nellore urban Hhs when compared with Tirupati urban Hhs. Although a number of differences between households with respect to their fish consumption intake are uncovered, the findings suggest that fish consumption traditions and habits – accounts for large differences between the regions.***

Keywords: fish consumption, urban area, religion, social status, occupation, income.

1. Introduction

Fish makes a vital contribution to the survival and health of a significant portion of the world's population. Fish and seafood products were recommended to take a prominent position in the human diet due to their beneficial role in the prevention of chronic degenerative diseases, more so in the context of the CVDs. Further, role of fish towards reducing poverty and hunger is well recognized.

Fish consumption depends on many factors such as increasing population along with sufficient supply of fish and fish products, demand, income, education level, consumer preference and fish prices.

During 1980 to 2000, the per capita consumption of milk increased from 43 kg to 63 kg, of fish from 3.5 kg to 5.8 kg, and of meat and poultry from 5 kg to 6.8 kg (Paroda and Kumar, 2000). The consumption of fish has grown faster than that of any other animal product. Disparities in the fish consumption pattern exist widely across the income groups, location of the Hhs (rural, urban, costal, etc.), and regions (Kumar and Dey, 2004). The fish production and consumption in India is characterized by a large number of species coming from marine and inland sources. Each species varies with its commercial value which is governed by the catch and production pattern, consumer's taste and preference. Production requirements, consumer's preference and demand elasticity may vary across sources of fish and its species (Kumar and Dey, 2004).

In this backdrop the present study was undertaken focusing on the regional fish consumption pattern among the coastal Nellore and non- coastal Tirupati urban regions. Further, the association existing between fish consumption pattern and select household characteristics was also discussed.

2. Materials and Methods

The present study involves the urban communities from two districts of the state of Andhra Pradesh, India. The two districts were purposively chosen representing coastal and non-coastal districts. Tirupati urban of non-coastal Chittoor district and Nellore urban of coastal Sri Potti Sri Ramulu Nellore district were chosen to focus on the fish consumption pattern.

A preliminary survey was undertaken to obtain the first hand information on general and socio-economic backgrounds of households (Hhs) within the city limits excluding the newly expanding suburban areas. The study area was visited many times to identify and enlist the non-vegetarian households belonging to different income groups in each area. On the basis of income the households were categorized into Low Income Group (LIG), Middle Income Group (MIG), and Higher Income Group (HIG)). From each income group statistically appropriate number of households was randomly chosen. Thus, 700 Hhs from Tirupati urban and 500 Hhs Nellore urban formed the sample of the study. A house-to-house survey was conducted using a survey schedule including the items on general information, food habits and specific items pertaining to fish consumption and practices.

3. Statistical Analysis

All the collected data were tabulated and subjected to descriptive analyses using the computer software SPSS (Statistical Package for Social Sciences, version 20.00) and Microsoft Office Excel 2007 to understand the differences between the variables. Throughout the report an attempt has been made to include data which clearly demonstrates significant trends, associations and differences.

4. Results

The sample Hhs were classified as fish consumers and non-consumers and further subdivided based on the chosen familial characteristic and the results obtained were presented and discussed.

Religion vs Fish consumption:

The data presented in table no.1 reveal that Hindus were the dominant religious group in both the urban areas Tirupati and Nellore with 91.4 and 79.6 per cent respectively. This was followed by 6.6 and 15.2 per cent belonging to Muslim community in Tirupati and Nellore respectively. The proportion of Christian Hhs was the least in both urban areas with a per cent distribution as 2.0 and 5.2 respectively. Fish consumption was observed that 20.6 per cent among Hindus, 10.9 per cent of Muslims and 14.3 per cent of Christians were non fish consumers.

Table 1: Distribution of households as per religion and fish consumption

Religion	Tirupati Urban Hhs			Nellore Urban Hhs		
	Total Hhs Per cent (no)	Fish consumers	Non fish consumers	Total Hhs Per cent (no)	Fish consumers	Non fish consumers
		Percent (no)	Percent (no)		Percent (no)	Percent (no)
Hindu	91.4 (640)	79.4 (508)	20.6 (132)	79.6 (398)	85.9 (342)	14.1 (56)
Muslim	6.6 (46)	89.1 (41)	10.9 (5)	15.2 (76)	100.0 (76)	0.0 (0)
Christian	2.0 (14)	85.7 (12)	14.3 (2)	5.2 (26)	92.3 (24)	7.7 (2)
Total Hhs	100 (700)	80.1 (561)	19.9 (139)	100 (500)	88.4 (442)	11.6 (58)
X^2 –value	2.845 ^{NS}			12.72**		

** Significant at p<0.01
* Significant at p<0.05
NS Not Significant

The data on religion as related to fish consumption reveal that among Tirupati urban Hhs a higher percentage (89.1) of Muslims consume fish when compared to either Hindus (79.4) or Christians (85.4). In Nellore urban Hhs a similar trend was observed. While, 100 per cent of Muslim Hhs consumed fish, 95.9 per cent of Christians and 85.9 per cent of Hindus consume fish. It was observed that 14.1 per cent among Hindus, and 7.7 per cent of Christians were non fish consumers. The results reveal that no significant association was observed between Religion and fish consumption in Tirupati Hhs; whereas, a significant association (P<0.01) was evident for the Nellore Hhs.

Social status vs. Fish consumption:

The data presented in table no.2 reveal that BC's are the dominant social group (54.4 per cent) in Tirupati urban Hhs, followed by the other social groups of OC, SC and ST with 32.3, 8.2 and 5.1 per cent respectively. In Nellore urban Hhs the dominant social group was OC's (75.8 per cent) followed by BC, SC and ST with 15.4, 6.0 and 2.8 per cent respectively. It was observed that among the Hhs of SC, BC, ST and OC's non fish consumers were 24.6, 20.5, 19.1 and 19.0 per cent respectively.

Table 2: Distribution of households as per social groups and fish consumption

Social groups	Tirupati Urban Hhs			Nellore Urban Hhs		
	Total Hhs Per cent (no)	Fish consumers	Non fish consumers	Total Hhs Per cent (no)	Fish consumers	Non fish consumers
		Per cent (no)	Per cent(no)		Per cent (no)	Per cent (no)
OC	32.3 (226)	81.0 (183)	19.0 (43)	75.8 (379)	87.9 (333)	12.1 (46)
BC	54.4 (381)	79.5 (303)	20.5 (78)	15.4 (77)	88.3 (68)	11.7 (9)
SC	8.2 (57)	75.4 (43)	24.6 (14)	6.0 (30)	90.0 (27)	10.0 (3)
ST	5.1 (36)	88.9 (32)	19.1 (4)	2.8 (14)	100.0 (14)	0.0 (0)
Total Hhs	100 (700)	80.1 (561)	19.9 (139)	100 (500)	88.4 (442)	11.6 (58)
X^2 –value	2.712^{NS}			2.019^{NS}		

** Significant at p<0.01
* Significant at p<0.05
NS Not Significant

The data related to social group revealed that fish consumption was high among ST's in both the urban areas, Tirupati and Nellore with 88.9 and 100 per cent respectively. This was followed by 81.0 and 75.8 per cent of consumption of fish by OC group, 79.5 and 88.3 per cent in BC group and 75.4 and 90.0 per cent of SC in Tirupati and Nellore areas respectively. The non fish consumers among the Hhs of OC, BC, and SC's were 12.1, 11.7 and 10.0 per cent respectively. There was no significant association observed between social groups and fish consumption when the data of both urban areas were assessed independently.

Occupational Lifestyle vs Fish consumption:

The life style of head of the Hhs was assessed from occupation and calculation of physical activity ratio (PAR). The data presented in table no.3 reveal that in both the urban areas the sedentary lifestyles were predominant among the head of the Hhs with 66.6 per cent and 61.4 per cent respectively in Tirupati and Nellore urban Hhs. This was followed by 18.8 per cent and 25.0 per cent of respondents respectively in Tirupati and Nellore belonging to moderate work lifestyle. The proportion of heavy work group was the least in both urban areas with a per cent distribution of 14.2 and 13.2 respectively. It was evident from the data that a majority of respondents in the sedentary (81.3 per cent) moderate (80.3 per cent) and heavy work (74.5 per cent) groups were fish consumers. It was observed that the remaining 25.5 per cent among heavy, 19.7 per cent of moderate and 18.7 per cent of sedentary work groups were not consuming fish.

Table 3: Distribution of households as per lifestyle of head of the family and fish consumption

Occupati-onal lifestyle	Tirupati Urban Hhs			Nellore Urban Hhs		
	Total Hhs Per cent (no)	Fish consumers Per cent (no)	Non fish consumers Per cent (no)	Total Hhs Per cent (no)	Fish consumers Per cent (no)	Non fish consumers Per cent (no)
Sedentary	66.6 (466)	81.3 (379)	18.7 (87)	61.4 (307)	86.6 (266)	13.4 (41)
Moderate	18.8 (132)	80.3 (106)	19.7 (26)	25.0 (125)	89.6 (112)	10.4 (13)
Heavy	14.6 (102)	74.5 (76)	25.5 (26)	13.6 (68)	94.1 (64)	5.9 (4)
Total Hhs	100 (700)	80.1 (561)	19.9 (139)	100 (500)	88.4 (442)	11.6 (58)
X^2 –value	2.449 ^{NS}			3.266 ^{NS}		

** Significant at p<0.01
* Significant at p<0.05
NS Not Significant

In Nellore urban Hhs higher percentage (94.1) of heavy work group were consuming fish when compared to either sedentary (86.6) or moderate work (89.6) groups. It was observed that 13.4 per cent among sedentary work, 10.4 per cent of moderate work and 5.9 per cent of heavy work groups were not consuming fish. No significant association was evident between lifestyle and fish consumption in Tirupati, Nellore urban areas.

The data presented in table no.4 reveal that middle income group (MIG) with a monthly income of Rs. 8000 to 20000/- is the dominant group in both the urban areas with 37.4 and 48.0 per cent Hhs in Tirupati and Nellore respectively. This was followed by 26.6 and 35.2 per cent of low income (LIG) (Rs. <8000/-), 36.0 and 16.8 per cent high income (HIG) (Rs. >20,000/-) groups respectively among Tirupati and Nellore urban Hhs.

Monthly Income vs Fish consumption:

Table 4: Distribution of households as per monthly income of the family and fish consumption

Monthly income in Rs. (Income Group)	Tirupati Urban Hhs			Nellore Urban Hhs		
	Total Hhs Per cent (no)	Fish consumers Per cent (no)	Non fish consumers Per cent no)	Total Hhs Per cent (no)	Fish consumers Per cent (no)	Non fish consumers Per cent (no)
<8,000 (LIG)	26.6 (186)	78.5 (146)	21.5 (40)	35.2 (171)	90.3 (159)	9.7 (12)
8,000 to 20,000 (MIG)	37.4 (262)	76.3 (200)	23.7 (62)	48.0 (240)	88.8 (213)	11.2 (27)
>20,000 (HIG)	36.0 (252)	85.3 (215)	14.7 (37)	16.8 (84)	83.3 (70)	16.7 (14)
Total Hhs	100 (700)	80.1 (561)	19.9 (139)	100 (500)	88.4 (442)	11.6 (58)
X^2 –value	6.943*			2.778 ^{NS}		

** Significant at p<0.01
* Significant at p<0.05
NS Not Significant

The data on monthly income of the family as related to fish consumption reveal that among Tirupati urban Hhs a higher percentage (85.3) of HIG Hhs consume fish when compared to either LIG (78.5) or MIG (76.3) Hhs. It is evident that the Hhs not consuming fish range from about 15 to 23 per cent. In Nellore urban area a higher percentage (90.3) of LIG Hhs consume fish when compared to either MIG (88.8) or HIG (83.3). It was observed that the Hhs not consuming fish range from about 10 to 17 per cent. A significant association

(P<0.05) was observed between the family monthly income of the Hhs with respect to the fish consumption in Tirupati; no significant association was observed in the Nellore urban Hhs.

Per Capita Income vs Fish consumption:

The data presented in table no.5 reveal that a high (41.4) per cent of Hhs in Tirupati have per capita income of Rs>5,000 per month, followed by 32.0 per cent and 26.6 per cent of Hhs with an income of Rs. 2,000 – 5,000/- per capita income and <Rs. 2,000/- per capita income respectively.

Table 5: Distribution of households as per monthly per-capita income of the family and fish consumption

Monthly per capita income in Rs.	Tirupati Urban Hhs			Nellore Urban Hhs		
	Total Hhs Per cent (no)	Fish consumers	Non fish consumers	Total Hhs Per cent (no)	Fish consumers	Non fish consumers
		Per cent(no)	Per cent(no)		Per cent (no)	Per cent (no)
<2,000	26.6 (186)	78.5 (146)	21.5 (40)	30.6 (153)	90.8 (139)	9.2 (14)
2,000 to 5,000	32.0 (224)	80.8 (181)	19.2 (43)	38.6 (193)	87.6 (169)	12.4 (24)
>5,000	41.4 (290)	80.7 (234)	19.3 (56)	30.8 (154)	87.0 (134)	13.0 (20)
Total Hhs	100 (700)	80.1 (561)	19.9 (139)	100 (500)	88.4 (442)	11.6 (58)
X^2 –value	0.433*			1.316 NS		

** Significant at p<0.01
* Significant at p<0.05
NS Not Significant

In Nellore urban 38.6 per cent of Hhs have per capita income of Rs. 2,000/- to 5,000/- followed by 30.8 and 30.6 per cent of Hhs having a per capita income of Rs. > 5,000/- and < 2,000/- respectively.

The data on monthly per capita income as related to fish consumption reveal that among Tirupati urban Hhs a higher percentage (80.8) with a per capita monthly income of Rs. 2,000- 5,000/- consume fish when compared with Hhs with a monthly per capita income of Rs. >5,000/- (80.7 per cent) and those Hhs with per capita income of Rs. <2,000/- (78.5 per cent). It was evident that in Tirupati Hhs not consuming fish range from about 20 to 22 per cent. In Nellore urban a higher percentage of Hhs (90.8) with a per capita income of Rs. <2,000/- consume fish when compared to Hhs either with monthly per capita income of Rs. 2,000- 5,000/- (87.6 per cent) or those with a per capita income of Rs. >5,000/- (80.7 per cent). It was observed that the Hhs not consuming fish range from about 10 to 20 per cent in Nellore.

The X^2 test for association revealed a significant association (p<0.05) between per capita income and fish consumption among Tirupati Hhs and no association among Nellore urban Hhs.

Frequency and variety of fish consumption:

The data on distribution of urban Hhs according to frequency and variety of fish consumption is presented in table no.6. The data reveal that in Tirupati urban a highest percentage (32.5) of Hhs consume freshwater fish weekly, followed by monthly (21.6 per cent), fortnightly (18.6 per cent) and seldom (7.4 per cent). Whereas in Nellore urban a highest percentage (38.0) of Hhs consume freshwater fish monthly, followed by fortnightly (24.6 per cent), weekly (21.8 per cent) and seldom (3.4 per cent).

Table 6: Percentage distribution of urban households according to frequency of consumption of fish varieties

Frequency	Tirupati(700 Hhs)						Nellore(500 Hhs)					
	Fresh water fish		Sea fish		Dry fish		Fresh water fish		Sea fish		Dry fish	
	No	Per cent	No	Per cent	No	Per cent	No	Per cent	No	Per cent	No	Per cent
Weekly	228	32.5	16	2.3	164	23.4	109	21.8	125	25.0	91	18.2
Fortnightly	130	18.6	29	4.1	88	12.6	123	24.6	147	29.4	65	13.0
Monthly	151	21.6	38	5.4	47	6.7	190	38.0	134	26.8	120	24.0
Seldom	52	7.4	140	20.0	13	1.9	17	3.4	37	7.4	11	2.2
Never	139	19.9	477	68.2	388	55.4	61	12.2	57	11.4	213	42.6
Total	700	100.0	700	100.0	700	100.0	500	100.0	500	100.0	500	100.0

The sea fish consumption data shows that a high percentage (29.4) of Nellore urban Hhs consume fortnightly, followed by monthly (26.8 per cent), weekly (25.0 per cent) and seldom (7.4 per cent). Whereas in Tirupati urban a highest percentage (20.0) of Hhs consume sea fish seldom, followed by monthly (5.4 per cent), fortnightly (4.1 per cent) and weekly (2.3 per cent) frequency.

The dry fish consumption data reveal that in Tirupati urban a highest percentage (23.4) of Hhs consume weekly, followed by fortnightly (12.6 per cent), monthly (6.7 per cent) and

seldom (1.9 per cent). Whereas in Nellore urban Hhs a highest percentage (24.0) of Hhs consume dry fish monthly, followed by weekly (18.2), fortnightly (13.0) and seldom (2.2).

5. Discussion

The survey carried out in the present study constitute the most important part focusing on the profile of familial characteristics that are related to fish consumption among the Hhs (Hhs) of Tirupati and Nellore urban areas. These data provide useful information on the different characteristics of the Hhs such as religion, social status, occupational lifestyle and income aiding in the understanding of the fish consumption behavior of communities. It is important to have as much detailed information as possible of the Hhs not only for assessing their socio-economic status and associated characteristics, but also to understand the nature of determinants of fish consumption that are dynamic and thus, serve as pointers towards promotion of fish consumption.

The distribution of Hhs belonging to Tirupati and Nellore urban areas reveal that in both regions the religious group of the Hindus (H) were dominant compared to Muslims (M) or Christians (C). The social group of BCs were high in Tirupati urban, whereas in Nellore OCs were higher than the other groups. ST Hhs constitute a small per cent in both the urban areas. The sedentary lifestyle was more dominant in Tirupati and Nellore, followed by moderate work categories. Works in private or government sector, business were the occupation of sedentary working group. The percent of Hhs in heavy work category were lower. Studies by Vinod and Sharma (2011) showed that among urban communities the occupation of the bread winner or head of the family is the primary determinant of the lifestyle of the family members. The present survey revealed that a majority of Hhs in both Tirupati and Nellore belong to middle income group (MIG). The percentage of LIG families was less in Tirupati while the percentage of HIG was low in Nellore.

The data on monthly per capita income reveal that the Hhs with per capita income of Rs. > 5,000/- was dominant group in Tirupati. In Nellore the Hhs with monthly per capita income of Rs. 2,000/- to 5,000/- was high. The Hhs with per capita income of Rs. < 2,000/- was lower in both the urban areas. India is currently undergoing rapid socio-economic, demographic, health and nutritional transition. The rate of transition varies substantially between states, urban and rural population and income groups. It is essential that the trends in food consumption patterns are monitored to identify trend. Strengthening the positive trends and combating the negative ones can go a long way in improving the dietary intake, lifestyle and nutritional status of the population (NSSO, 2005).

The general food consumption pattern of the Hhs can be arrived at, on the basis of food habit survey with a special focus on the survey of specific items pertaining to fish consumption and practices. It gives an overview of the meal patterns and variety and frequency of fish consumed and aids in identifying the dietary etiological factors of fish consumption in the urban area being studied.

In the present context the fish consumption behavior studied among 700 Hhs of Tirupati urban reveal that only 561(80 per cent) Hhs were consuming fish as food. In Nellore urban out of 500 Hhs, 442 (88 per cent) Hhs were consuming fish. It was thus observed that irrespective of community about 80 to 90 per cent of Hhs were in the habit of consuming fish in Tirupati and Nellore areas. The reasons put forth by non-vegetarians for not consuming fish in the present study were non-availability of fresh fish, cost factor, cumbersome cleaning, dislike of smell and taste. Similar reasons were reported by Leek, et.al, (2000) and Olsen, et.al, (2007) that the Hhs of non-vegetarians also were not consuming fish because of prime reasons such as fish availability, perceived difficulty or easiness in the preparation and cooking of fish, perception that fish is expensive compared to other food types, physical properties such as bones and smell, and taste preference. And these factors were found to be important factors shaping fish consumption.

The fish consumption was prevalent highly among Muslim (M) Hhs, when compared with Christians (C)or Hindus(H). Fish consumption thus appears to be to some extent dependent on the religion. Religion showed a significant association for Nellore and for the combined data. It is a known fact that fish eating habits are common among coastal areas. Therefore, the food related behaviors might get established as food habits. The fish consumption pattern studied in different community groups showed that seventy six per cent fish consumers were Hindus followed by Muslims (12.66per cent) (Vinod and Sharma, 2011).

The total amount of fish consumed and the species composition of the food fish supply vary according to regions and countries, reflecting the different levels of availability of fish and other foods, including the accessibility of fishery resources in adjacent waters as well as the interaction of several socio-economic and cultural factors. These factors include food traditions, tastes, demand, income levels, seasons, prices, and health infrastructure and communication facilities. Annual per capita apparent fish consumption can vary from less than one kg in one country to more than hundred kg in another. Differences may also be significant within countries, with consumption usually higher in coastal, riverine and inland water areas (FAO, 2012). When resources are limited the differences between groups tend to disappear as there are limited choices. The set trend in relation to religion was evident with Nellore coastal areas as plenty of fish were available regionally. Whereas, in Tirupati, fish availability being unstable scope for establishment of a set pattern of consumption of fish may not be evident.

The data on fish consumption as related to social group revealed that ST's were the dominant fish consuming group both among the Hhs in Tirupati (89 per cent) and Nellore (100 per cent). The fish consumption was high among all social groups of Nellore, when compared with social groups of Tirupati. However, only the combined data showed a significant association between the social groups and fish consumption. Dried fish in particular are a cheap non-vegetarian food consumed by those living in coastal as well as non-coastal areas. Therefore, the social classes in the lower order also have high scope for dry fish consumption.

The fact that fish consumption is high among all social groups in Nellore is justified for it being coastal area with a better availability of fish all through the year. Further, Scheduled Tribe (ST) communities whether nomadic or static have fishing and hunting for animals as a habit in the process of procuring food. For them fish consumption is a highly preferred food choice and is customarily included as an item in their regular dietaries particularly during fishing seasons.

The diet of the family mainly depends on the occupation of main income earner in a family (Jamdade, et.al, 2011). The occupational lifestyle data showed that the fish consumption was high among all occupations among Nellore Hhs, when compared with Tirupati. In the lifestyle groups the fish consumption was high in Tirupati sedentary work group, whereas in Nellore the consumption was high among heavy work groups. While occupation does not appear to be significantly associated with consumption of fish, when fish availability is limited the consumption of the sedentary lifestyle groups with the probability of also being a higher income group may surpass of other groups. On the other hand, where habits were established even among the lower income groups who engage in heavy works show higher frequency of consumption, through utilization of cheaply available fish varieties.

A study conducted in Kolhapur on fish consumption revealed that fish plays crucial role in the diet of poor. Cat fish though sold cheaply are rich source of protein for lower strata. This also indicates that the availability of a variety of fish products to suit individual household budgets may determines the fish consumption (Jamadade, et.al, 2011).

Incidence of the fish consumption was high among LIG of Nellore, which was higher than that of the HIG of Tirupati. Among all income groups high fish consumption was observed in Nellore, than in Tirupati. A significant association was observed between income and fish consumption in Tirupati urban area.

The monthly per capita income as related to fish consumption revealed that the consumption was high among all groups of Nellore compared with the Tirupati Hhs. A significant association was observed between the per capita income and fish consumption in Tirupati. It may be because of the fact that the fish was expensive item in Tirupati, thus the income influence the consumption of fish. Where as in Nellore, it is situated near to the coastline of Bay of Bengal and the Hhs include the fish as one of the main and regular food item in their diet. Further, fish was less expensive when compared with the Tirupati markets (non-coastal area). Therefore, all income groups prefer to eat fish in Nellore; with a greater diversification among the upper income groups.

Leoffer, et.al, (2003) stated that fish consumption pattern is heavily dependent on the religion and socio-economic back ground of the Hhs and distinct differences in fish consumption occur between regional areas. The observations of the researcher are in accordance with the findings of the present study.

The frequency of fresh water fish consumption was high in Tirupati. The frequency of sea fish consumption was observed to be high in Nellore. The frequency of weekly consumption of dry fish was observed in Tirupati urban Hhs and Nellore urban Hhs showed a preference to eat monthly. Despite the fact that dried fish is liked by all consumers, both in terms of taste as well as convenience, there is a certain degree of embarrassment in admitting it. This is partly because of the poor status value associated with its consumption and partly because of practical difficulties, viz, the strong and unpleasant smell, excessive salt content, poor quality etc.

Fish varieties available include a wide spectrum ranging from regionally available low cost varieties to costly locally available or important special varieties. The varieties of fish available in the Tirupati and Nellore urban markets were presented in table 7.

The varieties of fish consumed to a greater extent are dependent on the availability of fish locally, regionally or seasonally. When compared to the fish farming, the marketing has experienced tremendous developments. As a result the habituation of Hhs to the consumption of locally available fish variety have shown a shift to consuming other imported varieties too. In consequence, in addition to the local varieties of fish other fish inputs have increased.

It was observed that about 31 different varieties of fish were available in Nellore urban area among which 21 no. were sea fish varieties and rest was fresh water fish. In Tirupati urban markets only 16 fish varieties were reported to be available and of which majority are fresh water fish. It is also evident that the prices of about 90 per cent of fish varieties were higher in Tirupati markets when compared to that of Nellore markets; which may be attributed to the regional availability of fish. With regard to Tirupati the costs incurred through importing fish and consumer demand may influence the prices fixed for different varieties. It is evident that the availability of sea fish is limited to a few varieties of fish in Tirupati. While several different varieties were available in Nellore market, only few varieties such as thataku and small fish were available in Tirupati markets. Thus, the differential regional trends observed in fish consumption might to a considerable extent able to be dependent as the availability and prices of fish.

Table 7: The fish varieties available in Tirupati and Nellore

S.No	Fish Species available in Tirupati	Fish Species available in Nellore	Vernacular Name (Telugu)
1	Anchovies (S)	Anchovies (S)	Pasupuchukka
2	Bombay Duck (S)	Barracudas (S)	Seelabotu
3	Cat fishes (S and F)	Bombay Duck (S)	Vanamattalu/ Sawada
4	Catla (Bengal Carp) (F)	Cat fishes (S and F)	Jellalu

5	Croakers (F)	Croakers (F)	Goraka
6	Eels and Congers (F)	Eels and Congers (F)	Maluguchepa
7		Catla (Bengal Carp) (F)	Botcha
8		Goat Fish (F)	Golivindalu
9	Greas Carp fish (Carp) (F)	Greas Carp fish (Carp) (F)	Erramosu
10		King fish (S)	Peddah/ Mottam
11	Mackerals (S)	Mackerals (S)	Kanakanthalu
12		Mullets (S)	Kathipariga
13	Pomfrets (S)	Pomfrets (S)	Tella/Nalla Chanduva
14	Prawns (S and F)	Prawns (S and F)	Royyalu
15		Rays (S)	Teku cheap
16	Red Snapper (F)	Red Snapper (F)	Korameenu
17	Rohu (Carp) (F)	Rohu (Carp) (F)	Gandi
18	Ribbon fish (S)	Ribbon fish (S)	Savallu/ Savida
19		Salmon (S)	Maga/ Budatha Maga
20		Sardines (S)	Kavalu, Noona kavalu
21		Sea Basses/ Reef Cods (S)	Bontha cheap
22		Sea-Perches (S)	Pandu cheap
23	Seer-fishes (S)	Seer-fishes (S)	Vanjaramu
24	Sharks (S)	Sharks (S)	Sorra chepa/ Sorraputtu
25		Sickle fishes (S)	Chukkagoraka
26		Silver Bellies (S)	Karrachukka
27		Skates (S)	Yalam/ Tipulavi
28		Thread fins (S)	Maga/Bodu Maga
29		Tunas (S)	Thura
30	Tilapia (F)	Tilapia (F)	Jilebi cheap
31		Wolf Herring (S)	Parava/ Kannagi

6. Conclusion

This study was conducted in an ethnically diverse population to identify fish consumption patterns and the findings were similar to those reported in more heterogeneous populations. Consumption of frequency and variety of fish by all Hhs in Nellore urban area found to be high; whereas, among the Hhs of Tirupati urban area fish consumption was low. Findings of the study clearly indicate a strong association between fish consumption patterns and familial Hhs characteristics such as religion, social status and income. In addition uncertainties and low availability of fish, high prices may aggravate the already existing low fish intake particularly in the non-coastal areas. The findings thus focus on the dire need to encourage fish consumption through overcoming the barriers as a public health measure to prevent the mounting incidence of chronic degenerative diseases.

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