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Full Length Research

Fish consumption study at a household level in Dir Lower, Khyber Pakhtunkhwa, Pakistan

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ABSTRACT: Fishes are generally considered as cheap sources of protein and good quality nutrition for human consumption. A survey was conducted in District Dir Lower in Khyber Pakhtunkhwa Province of Pakistan. The survey was conducted through a properly structured questionnaire from March 13th to June 2nd, 2019 to determine the consumption of fish (i.e. Mahasheer, trout, catfish, Common Carp, Rohu, etc.) according to in educational levels, gender, per capita, based on species liking, size, time duration, the order of preference given by the people. The current survey results showed that fish consumption had no relation to the educational level because illiterate and educational males consumed 75.51 and 58.53% fish respectively. Similarly, the percentage for illiterate female was 66.67% and educational female was 55.17%. The per head consumption for lower class was 0.49 kg per year, followed by middle class 0.46 kg then upper class 0.37 kg per year. The percentage of persons consumed fish per month was 46.25% while it was only 8% a year. The people who avoided fish for its spines and the high cost were 50.75 and 31.25% respectively. It was observed that people know that fish eating can increase the eyesight, helps in high blood pressure and reduces the cardiac disease were 46.75, 13.25 and 25% respectively. It has been concluded that per head consumption was greater for the lower class followed by the middle and upper class. Most people of the district Lower Dir consume fish once a month while few people consume fish occasionally. The fish consumption has no relation with educational level because illiterate people consume more fish than educated people.

Keywords: Dir Lower, fish consumption, fishery, household level, Pakistan.

INTRODUCTION

Millions of people in developing countries of the world depend on aquaculture and fisheries. Overfishing, including the taking of fish beyond sustainable levels, is reducing fish stocks and employment in many parts of the world (Coulthard et al., 2011; Baset et al., 2020a). Fishery plays an important role in Pakistan's economy and is also considered to be an important source of nutrition, income, and employments (Jarwar, 2008; Baset et al., 2020b). The nutritional value of fish is very high, with protein content of 15 to 20 percent, low cholesterol content, and many useful dietary supplements (Izquierdo et al., 2001).

Around one thousand types of fish species are found in marine and crisp water in Pakistan. Dominant parts of these are edible. Moreover, a little work has been done on fish for presence of nematode parasites. The majority of marine fishes are incorporated among the consumable fishes (Memon et al., 2015; Baset et al., 2020c). Some of these including, *Scomberomorus, Pomadasys, Otolithus, Sphyraena, Sphyraena, Lates,* and *Silago* are mainstream consumable fishes in Pakistan, because of their flavorful taste and are full of nutrients, for example, proteins and vitamins especially vitamin E and vitamin D (Baset et al., 2020d; Baset et al., 2020e). In the freshwater fishes, mrigal carp, catfish, catla fish, common carp, rohu, trout and mahaseer are commonly eating in Pakistan (Chatta and Ayub, 2010).

Fish and seafood consumption vary in different regions of the world, with local average ranging from 1 kg to more than 100 kg per person per year (Baset et al., 2017). The per capita utilization of fish in Pakistan is minimal on the

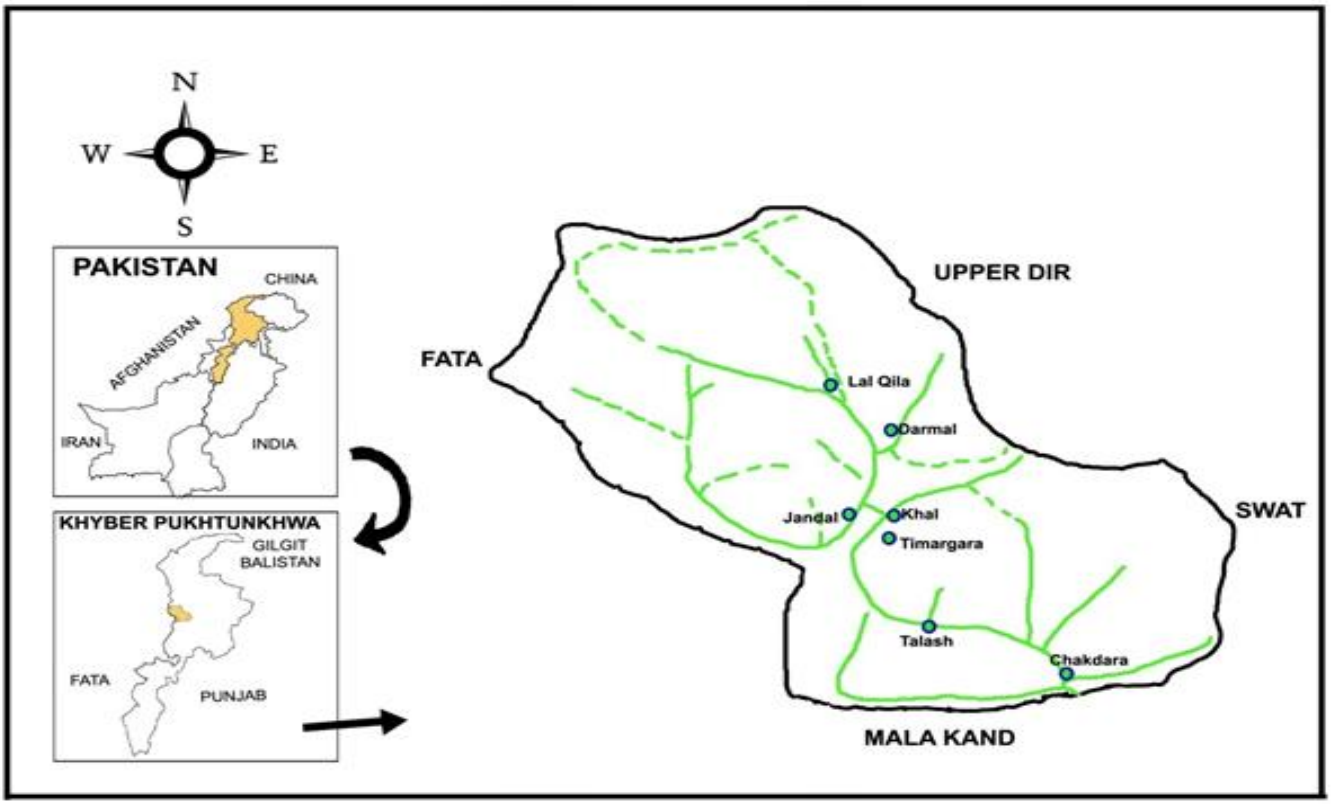

Figure 1. Map of District Lower, Khyber Pakhtunkhwa, Pakistan.

planet with just 2 kg every year contrast to world normal 17 kg every year (Mohsin, 2017). Consumption of fish worldwide per capita was estimated in 2019 to be about 20.9 kilograms. In the same year, the consumption of fish in North America was estimated at 23.7 kilograms per capita. The demand for fish products increases, therefore, resulted in an increase in the number of fish farms and pisciculture worldwide to fulfill the requirement of food. China contributes the main portion in the fish production worldwide. Fish production, from pisciculture of inland as well as marine increases annually (FAO/WHO, 2011).

Thus, this study evaluated average annual per capita fish for the year 2019 at the house hold level based on status level, education level, and gender in the district Dir Lower, Khyber Pakhtunkhwa, Pakistan.

MATERIALS AND METHODS

Study area

During the winter season, the average rainfall is more than the summer. The average annual rainfall of the study area was 1468.8 and 253.7 mm during December and March respectively. Humidity is low throughout the year (Akbar et al., 2019). The district consisted administratively in seven tehsils named Timergara, Adenzai, Balambat, Lal Qila, Khal, Munda, and Samar Bagh (Khalid et al., 2019). The plane area of Lower Dir is irrigated by the River Pangkora, large streams with numerous sub tributaries (Figure 1).

Nature of research

In order to get information about fish consumption, the survey was conducted in the District Dir Lower, in 2019. A random sample was drawn from individuals from fish markets, fishing places, Pakistani citizens, athletes, or individuals who participate in social activities. Parks, fishing piers, fishing huts, restaurants, and other open-access areas were visited. Also, fish markets were visited on regular basis, on weekdays and weekends at all times of the day (From 7:00 AM until 6:00 PM).

Data collection

The primary data were gathered through a questionnaire answered by 400 randomly selected individuals that have different socio-cultural and socio-economic backgrounds and are from district Dir Lower Timergara along with Samarbagh, Munda, Lal Qila, Talash, and Chakdara (Akbar et al., 2019). The data collection began on March 13th to June 2nd, 2019. Prior to the start of the field

Table 1. Findings revealed social status with duration of time.

Social Status	Once a week	Twice a week	Once a month	Bimonthly	Yearly	Occasionally	Total
Upper class	10	12	25	14	10	14	85 (21.25%)
Middle class	44	21	145	25	22	25	282 (70.5%)
Lower class	08	06	15	04	0	0	33 (8.25%)
Percentage	15.5	09.75	46.25	10.75	08	09.75	100%

Table 2. Results for gender with size of fish like to buy.

Gender of respondents	Fish Size		
	Large	Medium	Small
Female	10	22	09
Male	111	187	61
Total	121	209	70
Percentage	30.25%	52.25%	17.5%

research, the questionnaire was pre-tested on consumers for validity and reliability test.

Data evaluation

To calculate annual fish consumption for each respondent, five of the most commonly consumed fish species were determined using pre-tested questionnaires. Later, the questionnaires on annual fish consumption were answered.

Statistical analysis

The relationship between the consumers' socioeconomic characteristics and fish consumption ranks rate were analyzed using correlation coefficients. In this study, the fish consumption level was selected as the dependent variable. The age of consumers, social status, and the order of preference (meat, beef, chicken, and fish), consumed by the respondents were the main concern of the current study. The data analysis was conducted in order to examine the difference in the consumption of fish in subgroups of consumers. After the collection of data and interviews from the selected area, data was arranged, tabulated and analyzed by using Excel and SPSS software.

RESULTS

Fish consumption with time duration

Of 400 respondents that were interviewed for fish consumption, 46.25% were consuming fish once a month, 15.5% once a week while, 10.75% bimonthly. The people who consumed fish twice a week were recorded as 09.75%, occasionally 09.75% and 08 % were consuming fish once a year. On the basis of social status, of 400 respondents 85 (21.25%) were from the upper class status, 282 (70.5%) were from the middle class and 33 (8.25%) belong to the lower class (Table 1).

Fish buyers based on gender and fish size

According to the present survey, results for fish consumption on the basis of size were conducted. The people of district Dir Lower like to buy medium size fish with the highest percentage of 52.25% and 30.25% of people like the large size fish, whereas about 17.5% of people like the small size of fish (Table 2). The highest percentage of medium size fish may be due to the affordable cost since large size fish were expensive. In the Lower Dir, a smaller number of females as compared to male bought fish.

Reasons for avoiding fish

From the present study, most people avoid fish due to spines in them (50.75%) while 31.25% avoid due to high prices. Similarly, some people avoid fish eating due to smell (12.25%) and 4% due to taste. Whereas, 01.75% people avoid fish due to fear of leukoderma. According to the survey (Table 3), the middle class people avoid fish due to spines (51.77%), followed by the lower class with 54.54%, while 45.9% people from the upper class avoid fish due to spines.

Relationship between educational levels and reasons for fish consumption

From the findings (Figure 2), the common reason why

Table 3. Results for relation of social status with people avoiding fish to eat.

Social status	Total	High price	Smell	Taste	Spines	Fear of leukoderma
Upper class	85	11	07	04	39	0
Middle class	282	31	31	12	146	06
Lower class	33	83	11	03	18	01
Percentage	100	31.25	12.25	04	50.75	01.75

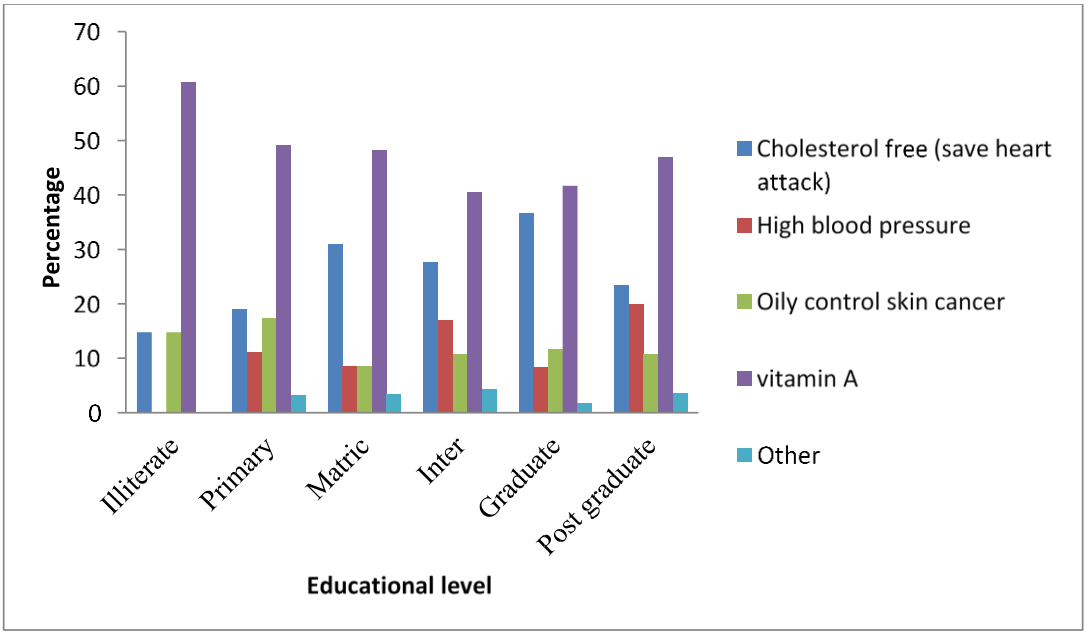

Figure 2. Relationship of educational levels and reasons for fish consumption.

people consume fish according to education levels (illiterate, primary, middle, matric, intermediate, graduate and post-graduate) in order to meet their health benefit was Vitamin-A (46.75%), the cholesterol free (25%), high blood pressure (13.25%), skin cancer (12.25%), and 2.75% for other benefits.

Effect of educational status on fish purchasing

According to the survey (Figure 3), the percentage of illiterate fish buyers were 75.51% followed by primary level with 62.26%, intermediate level with 47.61% while post-graduate and graduate with 58.53 and 58.18% respectively.

Per head consumption of fish

According to the findings, per head consumption in lower class was 0.49 kg, followed by middle class with 0.46 kg and upper class with 0.37 kg (Table 4).

DISCUSSION

Fish has a significant role in the food and nutritional security of every community, all over Asia and Pakistan. In many countries, catching or farming aquatic resources form a vital part of rural people's livelihoods and contributes a major source of protein, especially for weak populations (De Silva, 2011) The importance of fish in both intellectual and nutritional terms are clear, far harder to pin down is the actual amounts of fish that people throughout the region are consuming. In the face of being the popular dish, the consumption of fish per capita in Pakistan is the lowest with 2 kg per year compare to world average 17 kg per year (Needham and Funge-Smith, 2014).

In Pakistan, fish is usually consumed throughout winter starting from October till April. The fish consumption in Pakistan is low. The major reason for the low consumption is the fact that most of the produced fish is exported (Alam, 2012). According to official information and records, most of the fish caught in Pakistan is from marine sources, which is declared to be 70 percent of the whole fish exports. Pakistan exports fish mainly to Europe, US,

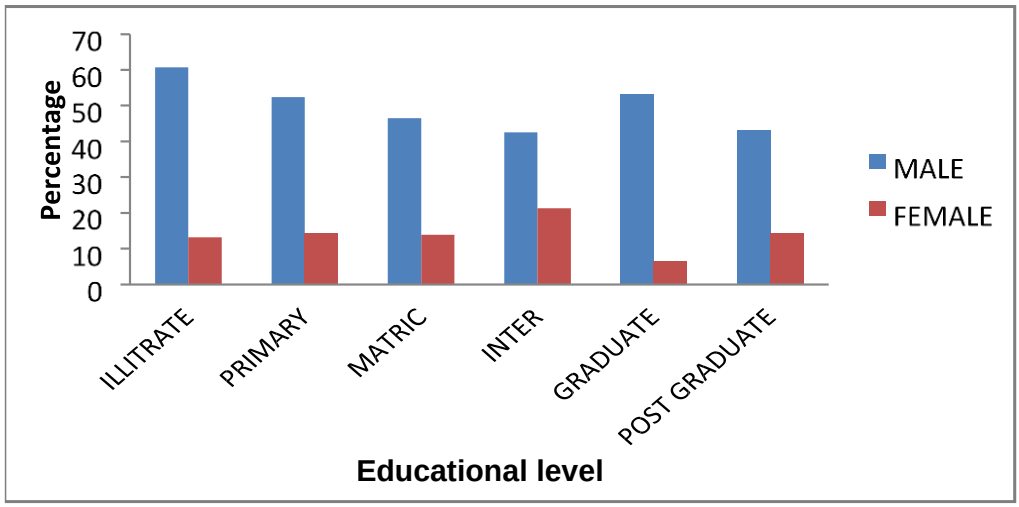

Figure 3. Fish buyer with respect to educational levels.

Table 4. Per head consumption of fish.

Social status	Total fish (kg)	Total No. of consumer	Per head consumption (Kg)
Upper class	550	1466	0.37
Middle class	90	195	0.46
Lower class	57	115	0.49

Japan, and Middle Eastern countries, accounting for only 0.25 percent of world exports. From the existing natural resources, the total export potential has been estimated to be about 1 billion US dollars (Haq et al., 2014). The present study finds the per head consumption in lower-class people of the district Dir lower was 0.49 kg which was higher than the middle and upper-class people of 0.46 and 0.37 kg respectively (Khan, 2007).

The per-head consumption was noted by a survey conducted in the district Charsadda, they determined per head consumption of fish in different classes of the community. The per head consumption of fish in the lower class was 0.40 kg which is the same as the present findings, while in the middle class was 0.65kg and 0.94kg in the upper class (Haq et al., 2014). In China, Zhang and Kanbur (2009) reported fish consumption and fish product by the level of income are 17.4 (kg/capita/year) in high-income people, 12.6 in middle and 10.0 in low-income people.

According to the Haq et al. (2014), the percentage fish consumption by people of Charsadda within the age group 15 to 25 years was 87.5% for males while for females it was 95.8%. Those whose age falls between 26 to 35 years were 96.1% in males and 97.7% in females. The percentage for the people of age group 36 to 45 years was 87.5% in males and 73.9% in females. The percentage for the people of age group 46 to 55 years was 80% for males and 82.6% females. For above 55 years, it was 81.25 and 90.32% in males and females respectively.

The present study established that the people who avoid fish as food are mostly due to spines (50.75%), high price (31.25%), smell (12.25%), and fear of leucoderma (1.75%). These results were supported by many studies; Pieniak et al. (2008) reported that fish may be considered expensive by the consumers. Aydın et al. (2011) reported that fish is misinterpreted as a luxury and that it only contributes to 3% of the amount needed to correct protein deficiency. According to the study that was reported from Turkey, the affordable of fish by consumers was 60% and high price was 30% (Kızılaslan and Nalınci, 2013). Pieniak et al. (2011) and Verbeke and Vackier (2005) reported a significant relationship between fish consumption level and income. Can et al. (2015) reported that Fish consumption, rate, and preference are affected by consumers' geographic, social, and cultural characteristics. Haq et al. (2014) reported that about 11.3% of peoples avoid fish consumption due to its smell and 22.64% of people avoid fish consumption due to minute spines in them. About 7.92% of people avoid fish due to fear of leucoderma.

Pieniak et al. (2008) reported the important factors affecting fish consumption is fish bones, smells, and tastes. Verbeke and Vackier (2005) stated the consumers' sensitivity towards the fish smells, bones, and price is negative as their perception of its health benefits. Can et al. (2015) also described that fish bones reduced consumption frequency, and cause difficulties in cooking

and preparation.

Erdal and Esengun (2008) find out that the season and frequency of fish consumption are other important issues. Fifty-one percent (51%) of the consumers in the study consume fish throughout the year. Can et al. (2015) reported that consuming fish throughout the year is better for a balanced and healthy diet, 58 percent of the participants in a study stated that they consume fish once a month and 27 percent said they consume fish once a week. Colakoglu et al. (2006) reported that the ratio of participants who consume fish more than once a week is only 3%. An additional study in Turkey revealed that 46% consume fish once a week (Aydin et al., 2011). Pieniak et al. (2008) stated that 25% consume fish in Belgium, Denmark, and the Netherlands, while 75% in Spain consume fish twice a week.

However, the fish consumption in the Dir Lower was greater among illiterate people because they locally catch fishes by using nets i.e. cast nets and drag nets and also use hooks, drugs, and electric currents for catching of fish from the Panjkora and Swat rivers and local streams. There are many picnic and tourist spots on the bank of these rivers and green mountains which attract people fishes. Most of the people come to these picnic spots with their families. The local fish markets and fish farmers offered fresh fishes from local rivers to customers at an affordable rate which are very tasty.

Conclusion

Consumption and production of Mahasheer are much higher than the rest of the species. In this survey, it was observed that more females prefer fish as compared to males. It was also established that per head consumption was greater for the lower class followed by the middle and upper class. It was also observed that most people of the district Lower Dir consumed fish once a month while few people consumed fish occasionally. The findings also revealed that fish consumption has no relation with educational level because illiterate people consume more fish than educated people.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

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