



FISH CONSUMPTION AND ITS EFFECTS ON CARDIOVASCULAR DISEASE IN MALAKAND DIVISION, PAKISTAN

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ABSTRACT

Present study was conducted to evaluate the fish consumption in relation to district, gender, age, qualification and duration wise and its effects on cardiovascular disease. The spectrum of this survey was Malakand Division, Khyber Pakhtunkhwa, Pakistan, from October 2019 to February 2020. The results obtained were 1) The Fish consumption is higher in Malakand District as compare to other districts. 2) The fish consumption in male is 100% as compared to female which was 94%. 3) The fish consumption in male in district Buner is 98% in male and 100% in female. 4) Per capita consumption in Buner is highest 0.91kg and lowest in Dir upper is 0.43kg while intermediate in Shangla, Dir lower, Swat, and Malakand. 5) People having age group more than 45 years consumed more fish as compared to young. 6) Literacy have great impacts on fish consumption may be awareness regarding benefit of fish meat as healthy diet. 7) The percentage of people who consume fish once a week was highest 33.9% in Shangla and lowest 8% in Dir upper. 10) The daily fish consumption was highest (2.7%) in swat that is 2.7% as compared to other districts. 11) On the base statistical data it was concluded that the people consumed fish occasionally (Once in month) were greatly suffered from Hypertension, High Blood pressure and Other Heart problem (35, 28, 23), while those who used fish on daily basis were rarely suffered from these cardiovascular disease. The consumption of fish in Pakistan is 2Kg per annum per person while in Malakand division per capita consumption of fish is less than 1Kg. The daily intake of fish reduces the risk of cardiovascular disease and hypertension.

Keywords: Fish Consumption, omega 3 fatty acid, cardiovascular disease, healthy diet.

1. INTRODUCTION

Fish is the best source of human food having white meat. The white meat of fish has essential amino acids and unsaturated fatty acid which are considered as healthy diet. In addition, fish as diet can be steadily and gradually resolve the intimidating crisis of malnutrition. Fish provide animal

protein to more than one billion poor people globally. More than 250 million people depend directly on fisheries and aquaculture for their livelihood. The increasing productivity of fisheries and aquaculture reduce hunger and poverty for millions of people.

In the developing countries world fish one of the high producing food site with annual growth rate of 5.8% during 2000-2016 and producing approximately 80 million tons of food fish in 2016 (FAO, 2018). It covers the major portion of human diet globally. Pakistan is a developing country and fisheries play a great role in their economy. The Per capita consumption of fish in Pakistan is very low 1.9kg in 2013 (FAO). Pakistan has 79,200-kilometer square area of inland water and 999 kilometer square with coast that cover 290,270 kilometer square. Fisheries in Pakistan directly provides job to 400,000 people while about 600,000 people are indirectly concerned with fisheries. Fish production in Pakistan is about 0.6 mmt, about 63% are marine while 37% are inland.

Fisheries sector not only play its role in term of food but also in economy, employment to public. According to the FAO aquaculture and fisheries intensive aquaculture is one of the best among all to fulfill the nutritive need of the global population and can balance the demand and supply of nutrition. (FAO, 2009).

Fish meat is very significant and have important dietary constituent providing protein, fatty acid and vitamins. (Copat et al., 2013; Hajeb et al., 2009). Fish play an importance role in human diet ((Mozaffarian & Rimm, 2006, Sioen et al., 2007). Fish and other sea food are an important source of omega-3 fatty acids. Fish meat also contain comparatively high amounts of vitamin D, little number of saturated fat and iodine and selenium. (Etherton et al, 2002; Bhatnager et al 2003) (Etherton et al 2003). Potential mechanisms for the cardio protective effect of omega-3 fatty acids include anti-arrhythmic effects, anti-thrombotic effects, anti-inflammatory effects, lowered blood pressure, improved endothelial function, hypotriglyceridemic effects in hyper triglyceridemic individuals and retarded growth of atherosclerotic plaque.

A survey conducted over 36 countries across the world on fish intake show beneficial effect in heart disease and stroke mortality (Zhang et al 1999). Consumption of fish and other seafood (including plants) decreased in acute heart diseases stroke (FAO/ WHO, 2011; He, 2009), help in diabetes (Wallin et al. 2012), decreases the risk of thyroid cancer (Michikawa et al. 2012) an help in development of gestation period (FAO/ WHO, 2011). Due to the high importance of fatty acid the American Heart Association (AHA) suggest to take fish of 2 or 3 time fish per week (Kris-Etherton et al 2002).

Fish consumption has undergone major changes in past decades. Consumption per person per year has been increasing from an average 9.9 kg in the 1960s to 16.4 kg in 2005. Fish and seafood consumption are varied from 1kg to 100kg in different region of the world. In Pakistan the consumption of fish is started mostly when the winter season started. Per capita consumption of fish in Pakistan is 2Kg per year which is the lowest. (Haq et al 2014). According to the available data most of the fish consumed in Pakistan is from marine source.

Pakistan has approximately 800 marine fish species and 193 freshwater fish species. Fish per capita consumption is about 1.9 kg which is lowest globally (Laghari, 2018). Pakistan have about 8, 563,820-kilometer square area in the form of ponds, lakes, rivers and water lodging area (Jarwar 2008). Unfortunately, Pakistan has no marine aquaculture system so totally dependent upon natural availability. Hence total aquaculture production in Pakistan are about 179,900 metric tons and 600,000 metric tons (Minfal, 2012) and their Gross domestic product (GDP) is about 1% (Nazir et al., 2016). Pakistan has 200 nautical mile Exclusive economic zones (EEZ) which provide about 196.600-kilometer square area for fishing. Pakistan is almost dependent on agriculture therefore having wide range of irrigation network which includes lakes, rivers, and canal system. The natural lakes cover about 109,780 hectares (Akhtar & Rosette 1995).

Different lakes in Pakistan, some are of high-altitude, Saif ul Mulook in Khyber Pakhtunkhwa and Hanna in Baluchistan Province are of high altitude suitable for cold water fish. River Indus and its Tributaries are major sources of the country for freshwater fisheries. River Indus flow from Northern areas of KP and the Punjab through Sindh and finally flowing into the Arabian Sea. About

80,613 hectares are covered by Mangla, Tarbela, Warsak, Chashma, Khanpur and Hub which are huge reservoirs of water and play vital role in freshwater fisheries.

Malakand Division is an administrative division of the Khyber Pakhtunkhwa province of Pakistan. It contains Buner District, Chitral District, Lower Dir District, Upper Dir District, Malakand District, Shangla District and Swat District. Malakand Division is situated between Latitude: 35.5000 Longitude: 72.0000 of Khyber Pakhtunkhwa, Pakistan.

As fish production in this region is low as compare to other part of Pakistan and the trend of fish consumption has considered less according to nutritional experts. But no work has been carried out to examine the fish consumption, reason for non-user and awareness of fish benefit in this region. Therefore, this study planned to know the fish consumption of in different districts of Malakand Division, impact of literacy rate on fish consumption and effects of fish consumption on human health especially cardiovascular disease.

2. MATERIALS AND METHODS

2.1 Nature of research

In order to get information about the fish consumption and effect of fish on human health, the survey was conducted at Malakand division KP from October 2019 to February 2020. For this purpose, a questionnaire was designed and face to face interview and also interviewed the local fisherman of Malakand division.

2.2 Selection of site

University campus, hotel, Parks, Markets, and others open access are visited on regularly, on weekday and weekend at all time of the day. The target population of current studies consisted of University & college students, worker and local people at Malakand division. (Fig, 1)

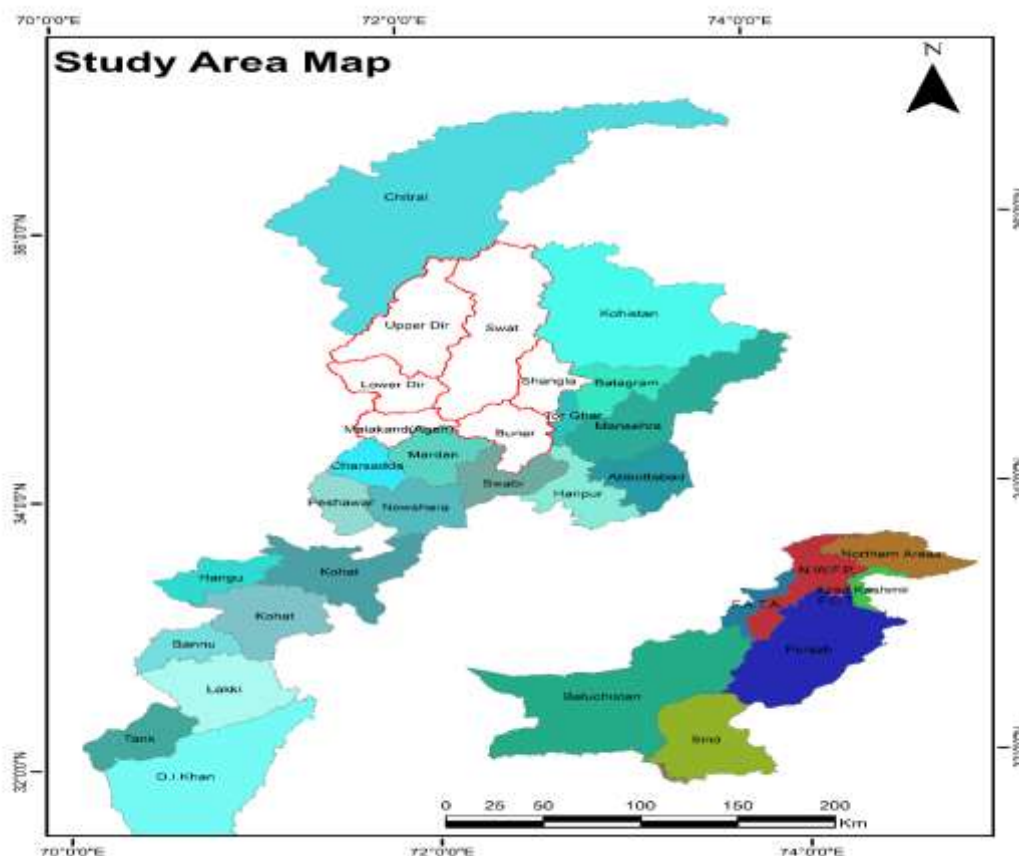


Figure 1, Map of the study area Malakand Division KPK Pakistan.

2.3 Data Collection

Stratified random sampling was done and questionnaires were distributed and filled from different strata of community. The data analysis was conducted in order to examine the difference in the consumption of fish in subgroups of consumers, after collection of samples and interviews from the selected area, data was tabulated and analyzed.

3. RESULTS AND DISCUSSION

3.1 Fish consumption district wise

According to the present study Fish consumptions were considerably higher in Malakand district (100% in male, 94% in female) as compare to other Districts like Dir lower, Dir upper, Shangla and Swat. But the Fish consumption in Malakand district was not advocate to fulfill the international standard which varied from 2kg to 100kg (Haq et al 2014). Fish and fish product per capita consumption in China was reported higher (12.6 to 10.0) than that of revealed in our study (Zhang and Kanbur, 2009). It was also noted that most of the people avoid to use fish due to spines (Baset, 2020).

Low consumption of the fish in this region is due to export outside (Alam, 2012). As are is less developed and some people also avoid fish due to high price (Baset, 2020). Similar results were also noted by Inam ul haq et al, 2014 in District Charsada, where the fish consumptions were estimated ranged from 0.40 to 0.94 kg. In this research the consumption in male was 100 while in female was 94% these findings showed that the gender wise fish consumptions were not parallel with the results of Inam ul haq et al, 2014. Low fish consumption in female may be due to the difference in culture where in Malakand district the female avoid to visits hotel frequently.

In Buner the fish consumption was 98% in males, 100% in females. In swat fish consumption is 94.2% in males, 88% in females while in Dir upper and lower the fish consumption was 91% in males, 91% and 89.7% in females. Furthermore, in Shangla fish consumption was 90% in males and 97% in females which was lowest in all the districts. (Table 1).

According to published data most of the fish consumed in Pakistan is from marine source. Fish is an important source of proteins and healthy fats, and also of essential nutrients, including omega-

3 fatty acids. Per capita consumption in Buner was highest 0.91 and lowest in Dir upper 0.43. In the past the ratio of fish consumption was very low, due to the unavailability of fisheries resources such as hatcheries, fish ponds and transport facilities.

Table 1, Fish consumption district wise and gender percentage.

	Dir Upper		Dir Lower		Swat		Shangla		Malakand		Buner	
	Number	%	Number	%	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Consumption	0.43		0.59		0.52		0.71		0.48		0.91	
Male	55\60	91%	56\61	91%	33\35	94%	18\20	90%	56\56	100%	52\53	98%
Female	31\34	91%	61\68	89.70%	66\75	89%	71\73	97%	88\93	94%	37\37	100%
Total	85\94	90%	117\129	90.60%	100\110	91%	89\93	95%	144\149	96%	89\90	98%

3.2 Fish consumption in relation to age

In this research fish consumption in different age groups were examined it was noted that fish consumption was greater in the younger people (age group up to 25 years) and (age group more than 45 years) , (table2). This indicate that the need and interest of fish use in younger and elder are more as compare to intermediate age group (26 to 45 years) which is alarming regarding health (Petsini et al,2019) . Many scientists suggested that the animal protein may be altered with plant source or less fatty meat like fish (Hemler et al, 2019). Percentage of fish consumption in relation to age group ranged from 26 to 45 years was higher in Malakand (100%) and lowest consumption in Dir lower (83%). It is also reported that cases of cardiovascular disease is increasing frequently in this region may be due to the poor healthy diets (Afolayan et al, 2014). Similar trends of low fish consumption was also noted by Inam ul haq et al, 2014 he concluded that fish consumption is low

in young people and they use beef and chicken as animal protein. Due to this reason they were suffered from hypertension, hypotension, coronary heart diseases and diabetes and the number old hypertensive patients in Pakistan are increasing day by day.

Table 2, Fish consumption district wise and Age.

	Dir Upper		Dir Lower		Swat		Shangla		Malakand		Buner	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Upto 25 year	35\42	83.30%	105\117	89%	82\92	89%	71\73	97%	98\104	94%	34\34	100%
26-45 Year	26\27	96%	5\6	83%	12\13	92%	19\20	95%	33\33	100%	31\32	96%
Above 45 years	27\27	100%	3\3	100%	5\5	100%	8\10	80%	12\12	100%	23\23	100%

3.3 Fish Consumption in relation to qualification

In this survey, results for fish consumption in relation to educational were also estimated. Among all the groups the fish consumption was low in illiterate people and was higher in graduate people. The finding of this study was not agreed with the study of Haq et al, 2014, he concluded that illiterate people also consumed like graduate people.

It was noted that literacy rate has high impact on the fish consumption may be due to the awareness of fish meat as healthy diet. In graduate level fish consumption was highest in Buner and Dir lower is and low in Swat and Dir upper. (Table, 3). At intermediate level fish consumed were highest in Buner 100% and lowest quantity in Dir lower which is 90%.

Table 3, fish consumption district wise (qualification)

	Dir Upper		Dir Lower		Swat		Shangla		Malakand		Buner	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Illiterate	18\20	90%	3\3	100%	5\5	100%	22\23	95.60%	19\19	100	37\38	97.3
Primary	13\13	100%	14\15	93.30%	7\8	87%	14\15	93%	8\8	100	17\17	100%
Intermediate	14\15	93%	97\107	90%	47\52	90%	45\46	97%	58\59	98%	9\9	100%
Graduate	44\49	89%	4\4	100%	40\45	89%	9\10	90%	56\62	90%	20\20	100%

3.4 Fish consumption in relation to time duration

According to this survey fish consumption once a month is highest 70% in Buner and lowest 1% in Dir upper (Table, 4). In was investigated that even now in District Dir upper some people have not consumed fish in the entire life. According to the present survey the people consume fish weekly was lowest (8%) in Dir upper and highest (33.9 %) in Shangla. This moderate intake of fish is satisfactory in the region where there is no proper awareness regarding benefit of fish as healthy food. It is internationally recognized that moderate fish intake have significantly positive effect on blood pressure (Panagiotakos et al, 2007; Petsini et al, 2019).

In the other Division of this country weekly fish consumption was reported low 13.45% from than this study (Haq et al, 2014). The daily consumption was also investigated in this study which was highest (2.7%) in Swat and zero (0%) in Buner, Malakand, Shangla, Dir lower. In these Districts the fish consumption was not very high may be due to awareness and lack of facilities like fishing hurts and transport.

Table 4, FISH CONSUMPTION (Frequency)

	Dir Upper		Dir Lower		Swat		Shangla		Malakand		Buner	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Once a month	1\97	1%	67\129	51.5	48\110	43.6	20\103	19.4	91\149	61	63\90	70
15 days	68\97	70%	22\129	16.9	21\110	19	35\103	33.9	18\149	11.4	13\90	14
per weeks	8\97	8%	33\129	25.3	24\110	21.8	35\103	33.9	25\149	16.7	12\90	13
2 in weeks	19\97	19%	5\129	3.8	14\110	12.7	113\103	12.6	11\149	8	1\90	1
Daily	1\97	1%	0\129	0	3\110	2.7	0\103	0	0\149	0	0\90	0

3.5 Impacts of fish consumption on human health

According to this study those people who consumed fish on regular bases were not suffered from hypertension, blood pressure and heart disease. (Table, 5). The finding of this study was parallel with the study of Dyerberg & Bang in 1970, he concluded that the People who consume fish on regular bases have low incidence of heart disease. The people who consume fish twice a week showed less cardiovascular disease while those who consumed fish rarely were noted suffered from hypertension, blood pressure and hearth problem. The results of this study is agreed with finding of Breslow, 2006 who revealed that moderate fish intake may reduce the chance of cardiovascular disease. Most of the scientists also recommended twice intake of fish to reduce (Skerrett et al, 2003; Petsini, et al, 2019; Parikh et al, 2005). Those people who consumed fish rarely (once a month or less) were greatly suffered from cardiovascular disease like hypertension, high blood pressure and heart problem. The findings are in agreement with the survey conducted over 36 countries across the world on fish intake show beneficial effect in heart disease and stroke mortality (Zhang et al 1999). However it is evident that omega 3 fatty acid are very important regarding health reducing the risk of cardiovascular disease (Petsini et al, 2019; Deckelbaum et al, 2012). Finally it was concluded the fish meat should be used twice for the best human health.

Count		how often do you or your family eat fish					Total
		Once a month	Once every 2 weeks	Once a week	Twice a week	Daily	
You are suffering from which of the following disease?	Hypertension	35	5	9	4	0	53
	High Blood pressure	28	9	22	7	1	67
	Other Heart problem	23	8	11	2	1	45
	None of these	263	92	103	29	0	487

4. Conclusion

The consumption of fish in Pakistan is 2Kg per annum per person while in Malakand division per capita consumption of fish is less than 1Kg which is very low. Per capita consumption of fish in Buner District is highest 0.91kg and lowest in Dir upper is 0.43kg while intermediate in Shangla, Dir lower, Swat, and Malakand. People having age group more than 45 years consumed more fish as compared to younger. Literacy rate has positive correlation with fish consumption. people consumed fish occasionally (Once in month) were greatly suffered from Hypertension, High Blood pressure and other heart problem , while those who used fish on daily basis were rarely suffered from these cardiovascular disease.

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