

# Health status and prevalence of diseases among fish eaters and non-fish eaters in Tuticorin

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## **Abstract**

The research was undertaken to assess the health status of the fish eaters and non-fish eaters and assess the prevalence of nutritional and life style diseases among them. Totally 340 subjects, 173 fish eaters and 167 non fish eaters, in the age group of 20 to 40 years, both male and female subjects were selected. A sub sample of 10 fish eaters and 10 non - fish eaters were selected for the estimation of blood lipid profile. The demographic details, nutritional status, prevalence of nutritional and life style diseases and health status were evaluated. The results brought out the beneficial effects of consuming fish. Fish eaters had good nutritional status, normal blood lipid values and anthropometric measurements which were in the normal range. It was alarming to note that the total cholesterol, low density lipoprotein and very low density lipoprotein were more than the recommended values for the non-fish eating group. Prevalence of non communicable diseases showed that fish eaters had fewer incidences of these diseases while the prevalence of non communicable diseases was more among non-fish eaters. Consumption of fish was beneficial in protecting health and preventing degenerative diseases. The study brought out the beneficial effect of fish consumption.

## **Introduction**

Good health is a crucial element, for better educational attainment and essential to national economic productivity. The world to-day witnesses increased incidence of non-communicable diseases namely obesity, diabetes mellitus, hypertension, cardio-vascular diseases and cancer. The prevalence of abdominal obesity among men is 22.4 percent and among women 35.3 percent in Chennai, India, that converts to about 50 lakh men and 76 lakh women. In India 86 percent with type II diabetes were overweight or obese, 52 percent were obese and 81 percent of adult had morbid obesity.

The prevalence of diabetes for all age-groups world wide was estimated to be 2.8 percent in 2000 and 4.4 percent in 2030. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030. The prevalence of diabetes is higher in men than women. Hypertension and high cholesterol prevalence are actually higher in India with the former at 27.8 percent

and the later at 20.1 percent. Approximately 1.2 crore people have high blood pressure, and about 86 lakh people have high cholesterol.

The prevalence rate of cancer was >50 percent in India, with the highest prevalence in head or neck cancer. There are at least five important aspects of diet which relate directly to "heart health". These are total fat content, type of fat, amount of cholesterol, sodium level and amount of fiber. Sea food relates well to all of the diet-heart-health factors mentioned. Benefits are greater for oily fish such as salmon and mackerel which are higher in omega -3 fatty acids. Two servings of fish a week can cut the risk of death from heart disease. Seafood is an excellent source of protein with high biological value. It also has to its credit appreciable amounts of fats and water soluble vitamins, calcium and iron.

In men who consume fish at least once a week, risk of sudden death was 0.48 compared with men who consumed fish less than once a month. Fish has got its

newly recognized value and antithrobogetic effects because of its n-3 poly unsaturated fatty acid content; which acts directly upon lipid metabolism by preventing accumulation of fats and cholesterol.

Fish consumption decreases malnutrition and improves the health of the sick. Omega-3 fatty acid found in fish promotes healthy vision and brain development in infants whose mothers consumed fish or seafood during pregnancy. Fish oil with docosahexaenoic acid helps to stop the conversion of pre-fat cells thus reducing over all accumulation of fat. Omega-3 in fish has been found to prevent three of the most common forms of cancer-breast, colon and prostate. Fish oil supplements can also be helpful to patients suffering from cancer related to hyperlipidemia. Fish are good for prostate. People who eat meat has more risk of prostate cancer, but people who eat fish weekly twice or thrice has less risk of prostate cancer. Consumption of a diet rich in n-3 fatty acids from marine source is beneficial against the deleterious effects of gram negative bacterial infection.

It is evident from the foregoing literature that regular consumption of fish and offers several health benefits. The present study was undertaken to find out the health status of adults living in the coastal fishing areas of Tuticorin. The health status of the selected fish eating and non-fish eating adults have been evaluated and compared.

### **Materials and Methods**

This study was carried out in Tuticorin. Tuticorin is a port city and main centre for deep sea fishing. About 5,428 fishermen families live in this region. The subjects who regularly consume fish were selected from five areas namely Palayakayal Punnakayal, Therespuram, Thalamuthu Nagar and Antonyiar Puram. These are the main fishing areas and all the families consume fish daily. Non-fish eaters live in a separate area. Non-fish eaters required for the study were selected from Muthammal colony, Bryant Nagar,

Ganesh Nagar, Millepuram and Teachers Colony.

Totally 340 subjects in the age group of 20 to 40 years consisting of both male and female were selected. Out of the 340 subjects 173 were fish eaters and 167 were non-fish eaters. As the selected area is a fishing area, there were more fish eaters than non-fish eaters. All the subjects were selected through random sampling method.

A sub-sample of 10 fish eaters and 10 non-fish eaters were selected for the estimation of blood lipid profile. Assessment of the nutritional status was done for assessing the health status of the subject. An interview Schedule was developed for collecting information about the sex, age, socio-economic status, family background, anthropometric measurement, clinical status dietary pattern (24 recall method), medical history, life style pattern and health status of the subject. Diet surveys constitute an essential part of any complete study of nutritional status of individuals or groups, providing essential information on nutrient intake levels, sources of nutrients, food habits and attitudes. Under conditions, where frank signs of malnutrition do not exist, a survey of intake of nutrients may give an indication of the adequacy of the diet for promoting optimal nutrition of individuals or groups. A dietary survey using 24 hour diet recall method was utilized to find out the quantity of food consumed by the selected subjects. The raw equivalents were calculated and the nutrient intake of the subjects were computed using food composition table of ICMR (2010).

### **Results and Discussion**

Out of the 340 subjects selected 57 percent were fish eaters and 43 percent were non fish eaters, in the age range of 20 to 30 and 30 to 40 years. There were only 13 percent who were above 40 years of age. In the case of female also same trend was seen. With regard to non-fish eaters there were more number of subjects in the 20 to 30 age group.

The fish eaters included in the present were illiterate. Hence none of them were

holding a professional career or appointed in white collar. They were all fishermen and labourers. Fishing was their main occupation. Along with selling fish in carts and bicycles they were holding shops in fish market. Contrary to this none of the non-fish eaters were fishermen or labourers. They were all well educated and employed as engineers, teachers and officials in banks. With regard to female subjects none of the female in the fish eating group had proper education. Eighty nine percent of the females in the fish eating group were house wives and rest eleven percent were labourers. In the case of females in non-fish eating groups forty one percent were working either in bank or in schools as teachers. Only fifty nine percent were housewives. Seventy eight percent of the selected subjects belonged to nuclear family while 22

percent were in joint family system. Thirty five percent of male and 39 percent of female subjects were vegetarians and 49 percent of male and 51 percent of female were non-vegetarian. All the fish eaters were consuming eggs, but in non-fish eaters some subjects were consuming eggs. So they have been separated and they were totally 37 subjects (10%). The meal pattern of the selected subjects was three meal patterns. Apart from this tea was consumed in between meals by the fish eating group. This group consumed apart from fish other non-vegetarian foods such as mutton, chicken, beef, egg and pork. Pork was consumed only by Muslims. Non-fish eater had snacks along with coffee or tea in the evening apart from the three meals. Table I presents the type of fish consumed.

TABLE I

TYPES OF FISH CONSUMED BY THE SELECTED FISH EATERS

Types of fish	N	%
Sardine	66	38
Barracuda	48	28
Prawn	24	14
Chela	10	6
Chela dried	9	5
Seer fish	9	5
Crab	7	4
Total	173	100

As shown in Table I the type of fish consumed by the subjects were sardine, Barracuda, prawn, and fish which were available at low cost. Fish such as pomfret, snapper, sea bass, catla and mullet which are very costly were caught by the fishermen, but the families did not consume these fishes as they were sold for high rate. The varieties which fetched low cost and which were not sold were mainly consumed by the fish eating population in the selected areas.

The collected data indicated that on an average adults in the age range of 20 to 40 years consumed 300-350 grams of fish per day, while those who were above 40 years consumed from 150 to 200 grams. Studies by Reddy (2002) indicated that consumption of fish daily protect from heart disease and give immunity. Boiling, shallow fat frying, and deep fat frying were employed in cooking fish. Due to escalating price of oil more than 50 percent of the selected families cooked fish using shallow fat frying with less oil followed by preparation of fish sauce using boiling method. Deep fat frying was used by a maximum of 24 percent of the families.

Consumption of vegetables was very low, since they preferred to consume fish daily. The vegetable that were consumed in these families included roots and tubers such as onions and potatoes. Apart from this they consumed tomatoes and other vegetables such as brinjal and drumstick. Consumption of green leafy vegetables was very low in these families. Most of the vegetables were not available in the seashore. Fruit consumption was up to the recommended dietary allowance by both fish eaters and non fish eaters.

TABLE II  
 MEAN NUTRIENT OF FISH EATER AND NON FISH EATERS

N=340

Particulars	Fish eaters	Non-fish eaters	RDA
Energy	1997	1968	3800
Protein	62	56	60
Carbohydrate	340	296	845
Fat	28	37	20
Fiber	36	52	40
Calcium	540	597	400
Iron	29	30	28
Vitamin A	900	456	2400
Vitamin C	84	66	40

From Table II it is revealed that there is a decreased intake of nutrients namely energy, protein, carbohydrate and vitamin C in non fish eaters than fish eaters. The protein intake of fish eaters was more than the non-fish eaters. Similarly the fiber intake of fish eaters was also more. It is evident from the data that the consumption of vegetables was less in the case of fish eaters. The same was high for non fish eaters. Vitamin C intake was high for fish eaters compared to non fish eaters.

TABLE III  
 PREVALENCE OF NON COMMUNICABLE DISEASE AMONG THE SELECTED SUBJECTS

Health problems	Fish eaters				Non fish eaters			
	Male		Female		Male		Female	
	N	%	N	%	N	%	N	%
Diabetes mellitus	20	56	13	34	23	40	12	20
Hypertension	9	25	16	38	12	21	32	53
Cardio vascular disease	7	19	10	24	22	39	12	20
Cancer	-	-	2	4	-	-	4	7
Total	36	100	41	100	57	100	60	100

Prevalence of Non-communicable diseases shown in Table III reveals an interesting pattern. As indicated in literature prevalence of diseases was very low among fish eaters while prevalence of diabetes mellitus, hypertension and cardio vascular diseases was high among the non fish eaters, the fat related diseases namely cardio vascular disease was found to be 5 times high among the non-fish eaters compared to fish eaters. Hypertension was more

than two times prevalent among non-fish eaters. Cancer prevalence was also double time more among non fish eaters.

TABLE IV  
 MEAN VALUES OF ANTHROPOMETRIC DATA

Criteria	Fish eaters	Non Fish eaters	Standard values	
	Mean $\pm$ S.D	Mean $\pm$ S.D	Male	Female
Height (cms)	158.86 $\pm$ 5.299	159.27 $\pm$ 5.81	165	160
Weight (kg)	60.77 $\pm$ 10.25	61.32 $\pm$ 10.66	62-67	57-63
Body Mass Index	23.82 $\pm$ 3.05	23.97 $\pm$ 2.77	23.5	23.5
Waist circumference	33.38 $\pm$ 4.62	33.51 $\pm$ 4.55	38	32
Hip circumference	37.68 $\pm$ 4.88	37.71 $\pm$ 4.83	24	22.5
Waist Hip ratio	0.82 $\pm$ 0.45	0.82 $\pm$ 0.0451	1.0	0.8

The results depicted in Table IV bring out that the height and weight of the selected subjects were normal for both fish eaters and non-fish eaters and equal to the standard values recommended by ICMR (2010). In the same way the waist and hip circumferences and waist hip ratio were within normal values.

TABLE V

RESULTS OF CORRELATION ANALYSIS OF ANTHROPOMETRIC DATA (FISH EATERS)

(PEARSON'S CORRELETION CO-EFFICIENT)

N=173

CRITERIA	Height	Weight	BMI	Waist	Hip	WHR
Height	1	.231(**) 0.002	-.198(*) .012	.034Ns .655	.044Ns .567	-.35Ns .651
Weight	.231(**) 0.002	1	.512(**) .000	.468(**) .000	.453(**) .000	.348(**) .000
BMI	-.192 (*) .001	.512 (**) .000	1	.754(**) .000	.748(**) .000	.629(**) .000
Waist	0.034Ns 0.735	.466(**) .000	.695(**) .000	1	.973(**) .000	.765(**) .000
Hip	0.08Ns 0.655	.468(**) .000	.754(**) .000	.969(**) .000	1	.777(**) .000
WHR	-.35Ns .651	.348 (**) .000	.629(**) .000	.736(**) .000	.777(**) .000	1

\* Significant at 0.05 level (2-tailed).

\*\* Significant at 0.01 level (2-tailed).

NS- Not Significant

The Table depicts the degree of relationship between the variables height, weight, BMI, waist, Hip, WHR among fish eaters. Hence correlation analysis (2-tailed) was done to determine the cause and effect relation. Here height-weight, weight-BMI, weight- waist, weight-hip, weight-WHR WHR-BMI are significantly associated at 0.01 level. Similarly height-BMI was significantly associated with each other at 0.05 levels.

TABLE VI

RESULTS OF CORRELATION ANALYSIS OF ANTHROPOMETRIC DATA (NON-FISH EATERS)

(PEARSON'S CORRELATION CO-EFFICIENT)

N=167

Criteria	Height	Weight	BMI	Waist	Hip	WHR
Height	1	.216(**) 0.005	248(**) .0001	.026Ns .735	.038Ns .622	-114Ns .142
Weight	.216(**) 0.005	1	.544(**) .000	.466(**) .000	.462(**) .000	.274(**) .000
BMI	248(**) .0001	.544(**) .000	1	.695(**) .000	.700(**) .000	.627(**) .000
Waist	0.026Ns 0.735	.466(**) .000	.695(**) .000	1	.973(**) .000	.765(**) .000
Hip	0.08Ns 0.622	.462(**) .000	.700(**) .000	.973(**) .000	1	.795(**) .000
WHR	-112Ns 0.142	.274(**) .000	.627(**) .000	.765(**) .000	.795(**) .000	1

\*\*Significant at the 0.01 level (2-tailed).

NS- Not significant



Table VI reveals the existence of relationship between the variables height, weight, BMI among non-fish eaters. Correlation (2-tailed) is applied and statistically concluded that the variables height –weight, height-BMI, weight-BMI, weight-waist, weight –hip, weight-WHR are significantly associated with each other at 0.01 level.

TABLE VII  
 LIPID PROFILE OF THE SELECTED SUBJECTS

Particulars	Fish eaters		Non fish eaters		Standard values
	Male	Female	Male	Female	
	Mean±S.D	Mean± S.D	Mean±S.D	Mean ±S.D	
Total cholesterol	188.2±10.7	184±9.3	243.4±25.5	229.4 ±13.1	150-200
High density lipoprotein	46.4±5.4	42.4±8.5	48.4±4.7	32.6±8.7	40-70
low density lipoprotein	114.8±14.4	114.6±8.8	158.2±22.7	161±6.4	<150
Very low density lipoprotein	27.0±3.3	22.2±3.0	36.4±8.5	35.8±4.9	40
Triglyceride	134.8±15	134±13	183.2±41.5	179.6±24.4	200

The lipid profile values present in Table VII bring out the beneficial effect of consuming fish on blood lipid profile. Each fraction of fat namely triglyceride, total cholesterol, low density lipo protein, very low density lipo protein and high density lipo protein were within the normal values suggested in the literature by various scientific groups. In the case of non-fish eaters all the values were more than the recommended values except the high density lipo protein value of male subjects. Fish eaters performed moderate to heavy activity and also had a brisk life style. Non-fish eaters had less physical activity and they did not have the beneficial effect of fish.

### Summary and Conclusion

The results of the present study stand testimony to the beneficial effect of consuming fish. Fish eaters had good nutritional status, good physique with normal anthropometric and normal blood lipid values. In non-fish eaters diseases prevalence, anthropometric values and blood lipid profile were significantly high so the study recommends that 100 to 150 grams of fish should be consumed atleast twice a week to prevent incidence of non communicable diseases. Consumption of fish was beneficial in protecting health and preventing degenerative diseases.

### References

- Albanese and Jacob (2007), "Dietary fish and meat intake and dermentia", **American Journal of Nutrition**, volume-56, no7-12, P.337.
- Bose, Chakrabarty (2005), "Nutritional status of adult's men in Orissa", **Nutrition Abstract and Reviews**, Volume-82, No-1-5, P.133.
- Galan (2006), "Role of fish in human nutrition", **Nutrition Abstract and Reviews**, Volume-76, no-1-4, pg-163.
- Gandham, Reddy (2002), "Fish intake and blood lipids in fish eating and non fish eating communities", **Journal of Clinical Nutrition**, Volume-18, no-3, P.197.