



Seafood consumption and Nutritional inquisitiveness among Fisher folk of Thoothukudi coastal regions-An Analysis

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Abstract

For people with food and nutrition insecurity, fish represents a rich source of protein, micronutrients, and essential fatty acids. For the present study, fisher folk living in villages along the coastline of the Bay of Bengal in the Tuticorin district of Tamilnadu were interviewed to study their inquisitiveness for fish/seafood consumption. The respondent's data was statistical using the IBM-SPSS version. The present study aimed to sensitize the people to understand the nutritional and health benefit and shows that educational level helps the people to understand the importance of fish consumption. About 61.3% of respondents having a literacy rate above the primary level of education are aware of the importance of fish/seafood. The females are more aware of fish nutrition and its food security value in the study area. When compared with males, 72.5 % of females are aware of seafood and its influence on human health. The study reveals a relationship between fish food intake and different health parameters. The prevalence of hypertension, asthma, diabetic Mellitus, cancer, skin disorder, vision problem, dental, arthritis, gastric, and several other health issues are more seen in non-fish/seafood consumers than others. It is reported that seafood consumption protects against lifestyle-related diseases like hypertension, obesity, diabetes etc.

Key words: Nutrition insecurity, Fish protein, Ichthyomedicine

INTRODUCTION:

Fish is good for health compared to other non-vegetarian sources because it contains nutrients like protein, omega 3 fatty acid, vitamin D, iodine, selenium, and taurine. Fish consumption reduces the risks of dementia and other cognitive disorders in older people(1) Fish is considered one of the best foods for all age groups and convalescents due to micronutrients and vitamins. Vitamin D in fish liver and oils helps develop and maintain bone (2)(3). Fish also contains several B-vitamins, including vitamins B12 (which serves as a cofactor for many enzymes), B6 (involved in energy-yielding metabolism), and niacin (engaged in the normal functioning of the nervous system). The fresh fish also contains a small amount of Vitamin C,

essential for proper healing of wounds and normal health of the body. Zinc (Zn), in combination with proteins and enzymes needed for metabolism, is 'high in' oysters(4). Iodine (I) is an essential component of the thyroid hormones and is present in the fish mackerel, haddock, etc. Selenium (Se), which protects the body against oxidative damage, is richly present in the fish Tuna, salmon, sardines, cod, prawns, etc.(5)(6). These food is enriched with omega-3, good for joints, eyesight, and skin, and boosts brainpower (1)(7)(8)(9)(10)(11)Fish, particularly seafood, is a rich source of proteins and other nutrients. India's average per capita fish consumption is 9 kilograms (kg) per annum against the global per capita fish consumption of 16kg. The world health Organization (WHO) recommends consuming 12kg of fish in a year(12)(13).

For people with food and nutrition insecurity, fish represents a rich source of protein, micronutrients, and essential fatty acids(14)(9). The contribution of fish to household food and nutrition security depends upon availability, access, and cultural and personal preferences(15). Access is primarily determined by location, seasonality, and price, but at the individual level, it also depends upon a person's physiological and health status and how fish is prepared, cooked, and shared among household members(16,17). Recognizing that eating fish is beneficial and encouraging people to do so is insufficient to overcome under nutrition; food availability, food access, and food utilization must also be addressed(15,18,19). The nutritional value and health benefits of the fish are unrecognized and undervalued. Despite many benefits in the health of humans, people are still unaware of those benefits. So, people should be aware of the nutritional benefits of consuming fish(20–23).

Although seafood is an immunity booster, micronutrients and vitamin sources, antioxidants supplementary source, etc., people's awareness of regular seafood consumption varies even among the fisher folk of coastal zones in the Tuticorin district of Tamil Nadu(24,25). Recognizing that eating fish is beneficial and encouraging people to do so is insufficient to overcome under nutrition; food availability, food access, and food utilization must also be addressed. In order to boost the dietary fish and fishery products consumption, it is needed to analyse the existing consumption pattern and identify the lacunae present, if any(26). With this intention, the present study is designed to collect data from fisher folk families involved in fishing and assess their health status in seafood consumption.

METHODOLOGY.

For the present study, five fisher folk villages along the coastline of the Bay of Bengal in the Tuticorin district of Tamilnadu. Data were collected by participatory study comprising 1157 randomly selected respondents above 15 years. The inquisitiveness of respondents for fish/seafood consumption was estimated with a questionnaire following the protocol of Marushka et al. The respondent's data was statistical using the IBM-SPSS version.

RESULT:

The nutritional efficacy of consuming seafood products was collected from people with different literacy levels [Table1].

Table 1: Awareness of health benefits of fish based on Educational status

Literacy rate	Awareness Percentage	
	Positive	Negative
Illiterate	4.3	4.1
Primary School	42.7	20.6
High School	11.9	6.6
University	6.7	3.1

Among the 1157 respondents of both gender above the age of 15 years were studied. Among them, 4.1% of the respondents without a primary education were unaware of the benefits of dietary seafood [Table 1]. Almost the same percentage [4.3%] of illiterate samples has understood the benefits of seafood consumption. Among the people with primary education, 42.7% were aware of the nutritional importance of seafood, and 20.6 % did not realize the importance. Even among the people with university-level education, 3.1% did not understand seafood's nutritional and health-providing role. Overall, 35.0 % of the people in the fishing occupation consume fish without knowing the importance of seafood.

Table 2: Awareness of health benefits of fish and gender of the sample

Gender	Awareness Percentage	
	Positive	Negative
Males	61.1 [241]	38.9
Females	72.5[504]	27.5.

Among the 824 women interviewed, 61.1% were aware of the nutritional importance of seafood consumption, and among the 331 males interviewed, 72.5% males were familiar with the nutritional role played by the seafood [Table 2].

Table 3: Awareness of health benefits of seafood and Occupation of the respondents

Occupation	Awareness Percentage	
	Positive	Negative
Students	1.3	21.4
Homemaker	37.4	4.0
Unemployed	0.7	4.8
Farming	0.9	32.5
Senior citizens	3.9	11.1
Fishing	43.9	32.5
Others	11.9	26.2

The nutritional importance of seafood in the occupation of the respondents showed that among the total of 745 respondents who were aware of its importance, 1.3% were students, 37.45% were homemakers, and 43.9% were involved in fishing-related activities [Table 3]. The respondents in other occupations include unemployed 0.7%, farming 0.9%, and senior citizens 3.9%. Among the 412 respondents with poor

understanding about the nutritional importance of seafood includes, students [21.4%], farmers [32.5%], fishing people [32.5%] and others [26.2%].

Table 4: Respondents' awareness of the association between seafood and health indicators in the human system

S.No	Health Indicators	Awareness of the health benefits of fish and the health status of respondents[%]	
		With issues	Without issues
1	Heart	16.6	83.4
2	Neural	6.7	93.3
3	Immune system	12.2	87.8
4	Digestible function	2.2	97.8

For the present study, four health indicators, viz., Heart, Brain, Immune system, and Digestible function, were chosen to determine the relationship between seafood consumption and health issues. Among the 745 people sensitized to the importance of seafood and nutritional status, 16.6% of respondents have identified with heart-related health issues and knowing that fish consumption benefits their ailments. Similarly, among the respondents with neural problems, only 6.7% suffer from neural problems and know that seafood consumption is suitable for their health. Also, 12.2% of respondents with immunity problems and 2.2% with digestive problems understood the importance of seafood [Table 4]. The majority of the respondents are aware of fish food consumption [above 83%], and they do not have any significant health issues.

Table 5: Relationship between the culinary fish products and consumers' preference

Seafood cuisine	Preference percentage of respondents	
	Positive respondents	Negative respondents
Fish Curry	16.0	18.3
Fish Fry	1.6	1.6
Fish Curry & Fry	81.1	31.7
Other preparations	1.4	48.4

Fish culinary products play a role among the respondents aware of fish food. The method of preparation gives value addition and taste to attract the consumers. Among the respondents who were aware of the importance of seafood, 81.1% are fond of fish curry and fry preparation; similarly, among the respondents who were not aware of the benefits of fish food like fish curry and fry preparations [31.7%]. Also, 48.4% prefer multivariate cuisine [Table 5].

Table 6: Prevalence of different health indicators among fish product Consumers and non-consumers

S.No	Health Indicators	Disease prevalence in percentage	
		Fish consumers	Non-consumers
1	Hypertension	41.2	54.3
2	Asthma	21.8	26.8
3	Diabetic	24.8	25.1
4	Cancer	5.5	21.6
5	Skin disorder	8.4	9.2

6	Vision	5.9	34.5
7	Dental	5.5	6.3
8	Arthritis	45.8	61.4
9	Gastric	31,3	39.8
10	Other	34.2	35.4

The prevalence of different ailments in people consuming fish products and abstaining from fish food was analysed. The data collected shows that regular fish product consumers are less prone to hypertension [41.2%] than non-consumers [54.3%]. The prevalence of asthma, diabetes and cancer among the fish product consumers was 21.8, 24.8, and 5.5 percent. However, among the non-consumers of fish products, the prevalence of asthma, diabetes, and cancer was 26.8, 25.2, and 21.6 percent, respectively. The prevalence of Skin disease, vision problems, dental problems, arthritis, gastric and other problems were also relatively significant among non-fish consumers—[Table 6].

DISCUSSION:

Fish is an essential nutritious food with high protein value. The FAO estimates that about one billion people worldwide rely on fish as their primary source of animal protein (21). Fish/seafood help to fight hunger, malnutrition, and micronutrient deficiency, ultimately contributing to food and nutritional security (27,28). So food security and nutritional programs should recognize the potential of fish in providing essential micronutrients from the aspects of improved dietary quality, nutritional status, and general wellbeing of the region's fast-growing population. Fish is rich in macronutrients: proteins, lipids, and ash, and micronutrients: vitamins and minerals (3,7,9,17,19,22,29). Proteins in the fish have immunoglobulins that act as a defence mechanism against viral and bacterial infections and prevent protein-calorie malnutrition. So assessment of the nutritional values of fish, and also domains to channels to understand fish demand and supply beyond 2030, need to be addressed (30). The nutritional benefits of fish consumption, and drivers of consumer taste and preferences, are reflected in fish consumption, especially in areas where fish has not been traditionally consumed. So studies should focus on the types of fish consumed, the nutritional effects of different fish-processing methods, and the socioeconomic and cultural issues influencing fish consumption options (31–33). So the present study aimed to sensitize the people to understand the nutritional and health benefit and shows that educational level helps the people to understand the importance of fish consumption. About 61.3% of respondents having a literacy rate above the primary level of education are aware of the importance of fish/seafood. It is reported that the increased fish consumption awareness is related to the increase in children's knowledge and attitude towards consuming fish. A significant correlation between jobs, the incomes and education levels of samples, and the average fish consumption was reported.

The females are more aware of fish nutrition and its food security value in the study area. When compared with males, 72.5 % of females are aware of seafood and its influence on human health; it is reported that in Fiji, women are the key players throughout the fisheries value chain from extraction through consumption and represent 47% of the fisheries workforce. As women are more aware of the health benefits of fish and

fishery products via social media and understand the need for fish containing omega3 during pregnancy are aware of seafood, as reported(34). The World Health Organization has mentioned that consuming fish at least twice a week is one of the influential factors in preventing cardiovascular disease, stroke, and sudden death due to heart attacks(8,12,19).

Fish consumption is associated with reduced childhood stunting due to higher concentrations and bioavailability of key micronutrients than plant-sourced foods. Additionally, fish with high essential fatty acids can reduce risks for cardiovascular disease. Thus, fish nutrients can alleviate conditions related to under nutrition and non-communicable disease risk.

It is suggested that the food security and nutritional programs should recognize the potential of fish in providing essential micronutrients from the aspects of improved dietary quality, nutritional status, and general wellbeing of the region's fast-growing population. In the present study, it is observed that there is a correlation between fish consumption awareness and occupation, education, and income. Homemakers and fisherfolk are well aware of fish food and nutrition, as Vimverbeke et al. (35) reported. Ziegenfuss et al. observed a significant correlation between jobs, samples incomes and education levels, and the average fish consumption(36). The improvement of people's attitudes towards the benefits of fish consumption, the continual encouragement of people to fish consumption by the media and critical individuals, and the familiarization of families with the benefits of fish consumption play a role in raising fish consumption protein products.

Increasing fish consumption is recommended for the intake of omega-3 (*n*-3) fatty acids and confers benefits for the risk reduction of cardiovascular disease (CVD). Fish consumption is inversely associated with fatal ischemic heart disease (IHD) and arrhythmic death, consistent with preventing fatal arrhythmias by long-chain *n*-3 polyunsaturated fatty acids (PUFAs) in fish(37). However, if cardiac effects of fish consumption are primarily related to the effects of *n*-3 PUFAs, then associations may vary depending on the type of fish meal consumed. Higher fish consumption was significantly associated with a lower Coronary heart disease incidence. Fish consumption may be associated with a slower cognitive decline with age(19,38–41). Further study is needed to determine whether a fat composition is the relevant dietary constituent. The associations between fish consumption and reduced risk of central nervous system demyelination, a common precursor to multiple sclerosis

Fish as food is rich in compounds with immune regulatory properties, including omega-3 fatty acids, melatonin, tryptophan, taurine, and polyamines. In addition, regular fish consumption favours' the proliferation of beneficial members of the intestinal micro biota, like short-chain fatty acid-producing bacteria(42). Regular fish consumption positively impacts thyroid homeostasis, facilitates maintaining healthy body weight, reduces the magnitude of age-associated increases in blood pressure, improves glucose

homeostasis, helps prevent diabetes and metabolic syndrome, and positively impacts mass muscle preservation among the elderly(18,40,43).

In order to understand the basis on which consumers classify various foods, taste, nutrition, and the occasion or frequency of consumption are the critical dimensions. Basic fish preparations were found to be similar across income groups. Taste is the overriding Fish curry and fry are the most common dishes across all groups: Fish curry is made with tamarind puree and masala; tomatoes and Onions. Fish is fried after marinating in the masala for about half an hour. While low-income consumers make on\ rice and rasam when fish is cooked, middle and upper-income consumers cook vegetable dishes.

Consumer characteristics of culinary fish products

The study reveals a relationship between fish food intake and different health parameters. The prevalence of hypertension, asthma, diabetic Mellitus, cancer, skin disorder, vision problem, dental, arthritis, gastric, and several other health issues are more seen in non-fish/seafood consumers than others. It is reported that seafood consumption protects against lifestyle-related diseases like hypertension, obesity, diabetes etc.(40,44). The Japanese have a higher intake of fish and a lower incidence of asthma than occupants of western countries(45). The present study also showed the relationship between dietary fish intake and the prevalence of asthma. The incidence of cancer is less in respondents using fish food as reported. In Europe and North America, prostate cancer incidence is less in people taking fish food once per week (46).In the present study, fish is found to be good for skin health. Nutrition and its reflection on the skin have always been an exciting topic for scientists and physicians worldwide. Vitamins, carotenoids, tocopherols, flavonoids, and various plant extracts have been reported to possess potent antioxidant properties. They have been widely used in the skincare industry either as topically applied agents or oral supplements to prolong youthful skin appearance.

People who eat at least two servings of fish per week are less likely to develop age-related macular degeneration (AMD) - a common cause of blindness(47). In tune with these findings in the present study, fish food consumers were also less susceptible to vision disorders. Dental problems are found less in fish consumers because fatty fish like wild salmon, tuna, Atlantic herring, and mackerel are great sources of Omega 3 fish oils and Vitamin D(3,29). They prevent gum disease and tooth decay and protect against heart disease. It is reported that fish consumption reduces rheumatoid arthritis, as observed in the present study.

CONCLUSION:

The health benefit of fish awareness among fishers' communities depends on the level of education. Being professional fish catchers, the lack of knowledge in the health benefits of seafood is because of their illiteracy. The regular consumption of seafood, knowingly or unknowingly, of its nutritive, antioxidant, omega 3, and vitamin D content provides good health compared to others. Their family members were also less prone to sickness or chronic illness, including heart, vision, skin disorder, and hypertension. So to promote good health awareness in terms of a balanced diet with seafood, steps must be taken for all communities.

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