

Fish Consumption Pattern and Determinants at House Hold Level in Asella Town: South Central Ethiopia

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Abstract

Background: Growth and development are the most obviously evident forms of the human body changing. Protein plays a crucial role in body building and replacement of damaged and or dead cells and thus it is the most important. Fish provide not only high-value protein but also an important source of a wide range of essential micronutrients, minerals and fatty acid. The protein in fish contains essential amino acids in a well balanced ratio and, ease for digestibility. Fish plays important role in the food and nutrition security. Fish consumption has undergone major changes but eating at least twice a week are not met by large groups of the population.

Methods and Material: A Community based Cross-sectional study design used & multi stage sampling technique applied to take sample size of 845 HHs. Sample size proportion determined by $n_i = N_j * n / N$. pre-tested questionnaire was used to collect data. 24 hour recall period was used to minimize recall bias. Data entered by epi info 3.5.4 and transferred to SPSS Version 21 for analysis. Logistic regression Model used in multi variate analysis and to adjust confounders. Hosmer & lamsheuw model fitness was checked. P-Value was significant at < 0.05 .

Result: 40% Of HHs Consume Fish (95% CI).but only 11% of HHs Consume Fish Monthly and No HH Consume Fish Twice a week or weekly. Being Educated were (AOR 3.29 (95%CI) (1.58, 6.85) p-value 0.002, family size ≤ 5 were (AOR 4.84 (95%CI) (1.07, 21.95) p-value 0.04 and knowing that fish consumption can prevent iodine deficiency were (AOR 2.80 (95%CI) (1.01, 7.81) p-value 0.04 times more likely associated with Fish consumption.

Conclusion and Recommendation: majority of HHs do not consume fish. And thus recommendation of eating fish at least twice a week are not met Education, Family Size, knowing the benefit of fish consuming a were significantly have positive influence on Fish Consumption. Advocacy, and awareness creation activity on Food and Nutrition benefit of fish is required.

Keywords: *Fish Consumption; Household; Asella*

Abbreviations

CSA: Central Statistics Authority; CVDs: Cardio Vascular Diseases; ETB: Ethiopian Birr; FAO: Food Agriculture Organization; HHs: Households; PUFA: Poly Unsaturated Fatty Acid; SSA: Sub Sahara African Countries; WHO: World Health Organization

Introduction

Growth and development are the most obviously evident forms of the human body changing. In this process of human body continuous changing, protein plays a crucial role in body building and replacement of damaged and or dead cells and thus proteins are the most important with regard to growth and development. According to WHO the minimum recommended protein is 70 gram for person per day and of which 49 gram should be animal oriented [1]. These protein are made up of multiple amino acids linked together. There are

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20 amino acids required for the human body to grow. Protein for human consumption usually comes from plants and animals. Sources of protein includes Meats, Milk and Milk products, poultry, Egg, Fish and plants. Plant proteins are deficient in certain amino acids notably methionine, tryptophan and lysine which are necessary for proper healthy growth [1]. About 20% of the world's population derives at least one-fifth of its animal protein intake, fish and some small islands states depend almost exclusively on fish. Fish is nutritious, contribute to food security. Fish provide not only high-value protein but also represents an important source of a wide range of essential micro-nutrients, minerals and fatty acid [2]. Amino acids are classified as essential and non-essential. The human body is able to manufacture 11 out of 20 amino acids and these referred to as non essential amino acids. The remaining amino acids are called essential amino acid as the body needs to be provided because it cannot manufacture them. Animal food sources are complete protein, therefore human consumption of animal protein is particularly important in order to provide the body with the needed essential amino acid [3].

Aquatic animals in general do contain a high level of protein (17-29%) with an amino-acid profile, similar to that of the meat of land animals. The protein in fish contains essential amino acids in a well balanced ration. It has low cholesterol compared with red meat and because of its ease of digestibility and soft tissue and due to its lack of connective tissue [2]. The Average fish consumption in Africa and South America is somewhat equal while it was lower in developing countries compared to Global average consumption [4]. The health benefit is preventing CVDs of fish intake is due to its omega 3 [5]. The fact that its high nutritional value, relatively cheap compared with meat, beef, mutton, poultry, which also contain protein of high biological value tends to make it preferred to other sources of animal protein [6].

The consumption of fish may be protective against cancer and thus the prevalence of cancer was low in high fish consumption people [3,6]. It Prevent chronic degenerative diseases and CVDs, lowerth risk of coronary heart disease, anti-arrhythmic, anti-thrombotic and anti-inflammatory and sudden death. Fish oil are probably acting to reduce blood clotting which is part of heart attack process. These is particularly due to its omega-3 PUFA content [3,5]. In New Zealand there is positive association between fish consumption and mental health [7]. Fish consumption has undergone major changes in the past four decades. World per capita fish consumption has been increasing steadily, from an average of 9.9 kg in the 1960s to 11.5 kg in the 1970s, 12.5 kg in the 1980s, 14.4 kg in the 1990s and reaching 16.4 kg in 2005 [8]. Developing countries per capita fish consumption is much lower at 9.4 kg, but developed countries per capita fish consumption reached 26.1 kg in 1990 [6]. According to the 1999/2000 HH Income and Expenditure Survey conducted by CSA, the annual per capita HH consumption of fish in Ethiopia is estimated at 476 grammes. And the countries fish demand 6,810tonnes per year. People consume large amount of fish in fasting days, in big cities and towns, especially in Zeway, Arbaminch, and in Baher Dar and Addis Ababa. Outside these areas, however, the domestic market for fish is small. Fresh fish is produced in the Great Rift Valley lakes and in some other northern parts of the country .With increased marketing efforts and increase in supply, the demand for the product could be tremendously increased from the current level [9].

Significance of the study

Malnutrition, which is mostly due to inadequate food supply, is a major public health problem in Ethiopia. Increasing protein intake to combat protein energy malnutrition is crucial and one way can be increasing consumption of fish. According to world bank study in 2012 rapid urbanization which the remarkable characteristics of SSA with 3.7% per year and raising food prices have an impact on food security in many Countries of the region . Here in Asella also high cost of Animal meat And Fish plays important role in the food and nutrition security. Little or not known on fish consumption pattern in Asella. Understanding the Fish Consumption pattern to address the gap in consumption is very important .This study result expected to give snap shot on fish consumption habit of Asella town residents and determinant factors and inform the decision making body to establish their plan to make up the Fish consumption pattern. It could support as reference for further investigation on fish consumption pattern.

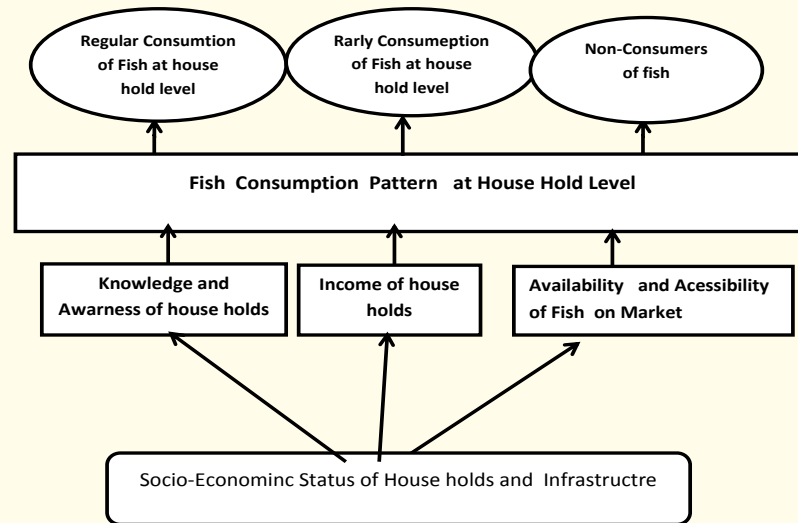


Figure 1: Conceptual framework Determinants on Fish Consumption at house hold level.

Methodology

Study Area and period: The study was conducted in Asella town, Arsi zone. Asella is the capital of Arsi Zone located at 175 kilometers from Addis Ababa in south-central Ethiopia. The town got its start before the Second Italian-Abyssinian War. In 1946 a Swedish Mission laid the foundations for a hospital and a school in Asella. In 1960 Asella had one of the ten municipal slaughter houses in Ethiopia; it lies west of Mount Chilalo on a high plateau overlooking Lake Ziway in the Great Rift Valley. An all-weather road connects it with Nazret/Adama to the north. The city has a latitude and longitude of 7°57'N39°7'E7.950°N 39.117°E, with an elevation of 2,430 meters (7,970ft). Asella is categorised as having a subtropical highland climate and Monthly temperature variation is low, due to its elevation and closeness to the equator. The 2007 national census reported a total population for Asella of 67,269, of whom 33,826 were men and 33,443 were women. The majority of the inhabitants said they practiced Ethiopian Orthodox Christianity, with 67.43% of the population reporting they observed this belief, while 22.65% of the population were Muslim, and 8.75% of the population were Protestant [26]. According to data obtained from projection, 93,729 and the town has 8 administrative areas (sub Cities) and 57 ketena (structure next to Subcities) [27]. Asella has been the home of many Ethiopian track athletes, including Haile Gebrselassie, KenenisaBekele, Tirunesh Dibaba, and Derartu Tulu. The Arsi University was established in Asella in 2015. Lake Ziway, known in the local language of Oromifa as Hara Dembel, is the largest lake in Ethiopia's Central Great Rift Valley and is home to thriving bird populations, shy hippos, and tilapia fish – delicious served grilled with lime. Five volcanic islands dot Lake Ziway's surface, with hiking trails, forests, and ancient monasteries to discover [28].

Study design: Community based cross-sectional study.

Source population: Population of Asella town: South Central Ethiopia

Study population: Households in selected administrative areas (Sub cites) 50% of the town.

Inclusion criteria: Household member mostly participate in food item purchasing and preparation.

Study variables

Dependent variables- Fish Consumption Pattern

Independent variables- Age, Sex, Education, Income, Knowledge, Awareness, family Size,

Sample size determination: For each specific objectives sample size was calculated in the following assumptions; a) Sample Size calculation ;Assumption P = 50% , Confidence Interval 95%, precision 4%, and since multi stage sampling used, design effect was 2 and calculated by (single population proportion formula.) and refusal /absentee rate 10% added to sample size.

$$n = z\alpha/2^2 * P(1-P)$$

$d^2Z\alpha/2$ at 95% C.I =1.96, P=50 , 1-P= 50 , d=0.04

$$n = \frac{1.96^2 * .49.5 * 50.5}{0.05^2}$$

$n = 384 * 2(\text{design effect}) = 768 + 10\% = 845$

Therefore; Sample Size for objective one = 845

Sampling Procedure: Multistage Sampling procedure was used; From the total 8 administrative area of the town, 4 (50%) kebele selected by simple random sampling (lottery System) and then sample allocation in proportion to the house hold size of each Administrative area (kebele) of the study. In the same way from 29, 14 ketenas/Subcities selected randomly with simple random sampling from each kebele and equal number of sample size allocated to selected ketenas using systematic random sampling $N/n = \text{interval}$ determined, and the first house hold of sample (K^{th}) From each selected administrative area identified by simple random sampling, and sample households selected randomly based on the interval.

Proportion of sample size from 4 (50%) administrative areas selected by lottery system;

Sample size proportion determined by $n_i = N_j * n / N$; In which n_j = Required households sample size of i^{th} stratum, N_j = Total households of the stratum, N = Total number of households in all stratum, n = Total sample size, n/N = Sampling fraction. $n = 845$, $N_i = 1892, 3052, 2223, 2485$, $N = \text{Sum of } N_i (1892 + 3052 + 2223 + 2485) = 9652$, $n_i = N_i * n / N$, $n_i = 1892 * 845 / 9652 = 166$ $n_i = 166$, and proportion sample size for each selected kebele is 166, 267, 195, 217 (Figure 2).

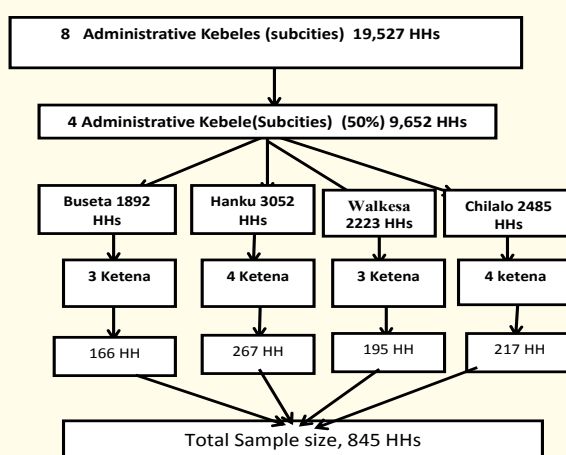


Figure 2: Sampling procedure for Fish Consumption pattern at house hold level.

Data Collection tools, procedure and technique: Field work consists completing questionnaire on socio-demographic characteristics, knowledge, Attitude and practices Fish Consumption. Structured questionnaire which was used for recording the responses of interview. The questionnaire developed in English and then translated to Amharic and Afan Oromo for data collection and finally retranslated to English. Data collectors started with brief introduction and information given to the respondent. After consent obtained from participants, questionnaire completed by face to face interview in language of respondent and salt tested for its iodine content. One extra visit was made to absentees HHs, before substitution to the right or left to the initial Sample HH. To assess practices and minimize recall bias data collectors used 24 hour recall period.

Data Collectors were 6 diploma graduates Nurses and 2 Bsc Environmental Health professional for supervisory activity and Face to face interview technique was used. The selection of data collectors and supervisors was based education back ground, experience and interest and to participate on the study. In addition both data collectors and supervisors language proficiency for both local (Afan Oromo and Amharic) and English was a required criteria. Prior to the field work, training was given for two days. The training was focused on communication and technical issues how to collect data, interview technique, and recording, time management, and ethical issues and supervisors trained on how to supervise. Methods used include lecture, role play, and practical exercise in class room and field test. Before actual data collection Questions was piloted and tested for completeness, consistency, and timeliness on similar kebele but not included in the study subject. Supervisors were checked filled questionnaire and contacted at least 3% of the respondents to verify that the correct procedures has been followed in data collection. Field work period was in between January 11-16/2015.

Data Quality management and Analysis

After completion of data collection from sample households, each questionnaire were checked and screened for completeness and consistency. Omissions, errors, completeness, were checked by principal investigator after the filled questionnaire was returned. Data was cleaned, edited, and coded and before entry. Data entry was by Epi info version 3.5.4 software and transferred to SPSS version 21 for analysis.

Before Analysis data were prepared using transform menu. Activities like Computing, count, and recoding were performed. Univariate and Bivariate was used to summarize the study sample results of categorical variables and examined for distribution of certain variables frequency distribution, central tendency, and desparation to describe the shape of variable distribution and for subsequent analysis. The relationship or association between variables and the strength of the relationship described and examined by cross tabulation. Participants who score above mean for knowledge questions were considered having good knowledge on Fish consumption.

Logistic regression model used for data analysis to measure associated factors and provide information about the strength of the association between variables and simultaneously controlling confounders. The Model fitness for Logistic regression was tested using Hosmer-Leme show goodness of fit test at P-Value > 0.05. Chi-Square to detect the association in between independent and dependent variables with p-Value < 0.2 was interred to logistic regression model to detect the strength of the association. Odds ratio with confidence interval of 95% was used to show the significance of associations of independent variable and Outcome of interest. P-Value < 0.05 of finding had significant result in multivariate analysis. Controlling of known and potential confounding factors with Fish consumption pattern at house hold level was assessed by multivariate analysis.

Study variables: Variables includes both qualitative and quantitative and categorized as dependant and independent variables.

Dependent variable of the study - Fish Consumption Pattern

Independent variables- of the study: Age, Sex, Religion, Ethnicity, Marital Status, Education, Income, Knowledge, Awareness, family Size.

Operational definition

1. Regular Fish consumer: households Consume fish twice a week or less considered to be regular Fish consumer.

2. Rarely Fish Consumers: Households consume for more than a month.
3. Good Knowledge: respondents answer the knowledge question on benefit of fish consumption.

Result

Socio Demographic Characteristics

From the total sample studies 828 was participated and the response rate was 98 % and From the total 828 study participants 798 [96.4%] were female in Sex and the majority of ethnic grouped were Oromo and Amhara which accounts 424 (51.2%), and 277 (33.5%) respectively. More than half 516 (62.3%) of respondents were Orthodox Christian in Religion. 593 (71.6%) were married and the mean age of respondents was 33.5 year with SD \pm 11.8.531 (64%) were completed secondary level and above, 65 (7.9%) read and write only and non-educated accounts 60 (7.2%). From the total study participants 100 (12.1%) was Government employees, 406 (49%) of participants occupation was house wife. The majority 250 (30.2%) have monthly income in between 1000 - 1999 ETB and only 29 (3.5%) have monthly income of \geq 5000ETB. Majority of households 656 (79.2%) had family size with \leq five.

Knowledge on Fish Consumption at house hold level in Asella town: South Central Ethiopia

From the total participants only 22 (6.6%) knows that consuming fish can prevent iodine deficiency disorder. The main source of information for households was Television (58.1).

Variable	Frequency	Percentage (%)
Sex : Male	30	3.6
Female	798	96.4
Age: 17 - 24 Year	186	22.5
25 - 29 Year	156	18.8
30 - 39 Year	282	34.1
40 - 49 Year	114	13.8
50 - 59 Year	53	6.4
\geq 60 Year	37	4.5
Ethnicity: Oromo	424	51.2
Amhara	277	33.5
Other	127	15.3
Religion: Orthodox Christian	516	62.3
Muslim	216	26.1
Protestant	92	11.1
Others	4	0.5
Marital Status: Single	135	16.3
Married	593	71.6
Others	100	12.1
Education: Secondary and above	531	64.1
Primary (1 - 8)	172	20.8
Read and Write only	65	7.9
Non-educated	60	7.2

Occupation: Government Employee	100	12.1
Business man	113	13.6
House wife	406	49.0
Unemployed	78	8.7
Other	137	16.5
Monthly Income : < 500 ETB	204	24.6
500 - 999 ETB	184	22.2
1000 - 1999 ETB	250	30.2
2000 - 4999 ETB	161	19.4
≥ 5000 ETB	29	3.5
Family Size: ≤ 5	656	79.2
> 5	172	20.8

Table 1: Socio demographic characteristics of 828 Respondants in Asella town: January 2015.

Fish Consumption pattern at house hold level in Asella town: South Central Ethiopia

In this study 60% of HHs do not consume fish. From those who responded that they consume Fish, majority of HHs (89%) consume very rarely. This study result indicated that there is no HHs responded that consume Fish twice a week or weekly.

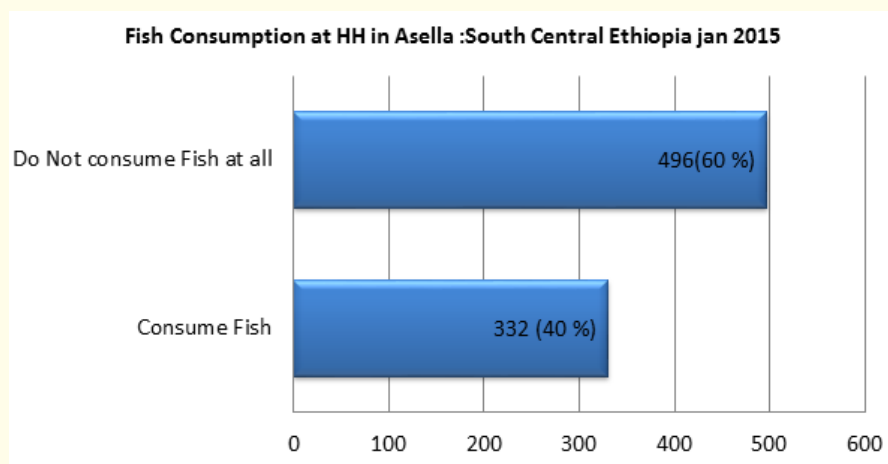


Figure 3: Fish Consumption of household in Asella town: January 2015.

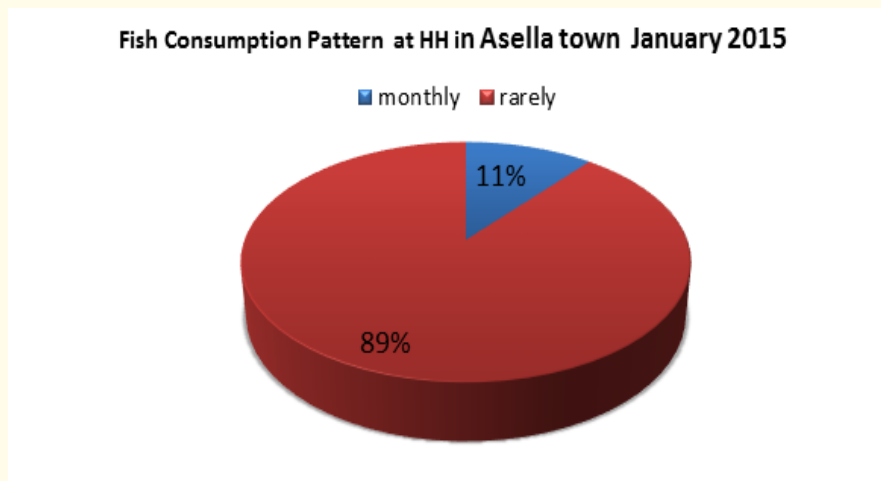


Figure 4: Fish Consumption pattern at house hold in Asella town South Central Ethiopia Jan 2015.

Factors associated with Fish Consumption at house hold level

Fish Consumption at household level was significantly associated with, Education, Religion, Family Size, and knowledge but Factors like Sex, Age, Occupation, Income and Marital status have no association with Fish consumption.

In multivariate analysis; Being Educated were (AOR 3.29 (95%CI) (1.58, 6.85) p-value 0.002 times more likely associated with Fish Consumption. Being Christian were (AOR 2.44 (95%CI) (1.14, 5.25) p-value 0.02 times more likely associated with Fish Consumption and family size ≤ 5 were (AOR 4.84 (95%CI) (1.07, 21.95) p-value 0.04 times more likely associated with Fish Consumption and also knowing that fish consumption can prevent iodine deficiency were (AOR 2.80 (95%CI) (1.01, 7.81) p-value 0.04 times more likely associated with Fish consumption (Table 2).

Variable	HH Fish Consumption		COR (at 95%CI)	AOR (at 95%CI)
	Monthly No (%)	Rarely No (%)		
Sex: Female	1(20)	4(80)	2.02(0.22,18.58)	1
Male	36(11)	291(89)		
Age(in year): 17-24	6(8.8)	62(90.2)	0.73(0.29,1.82)	1
	≥ 25	31(11.7)	233(88.3)	
Religion: Christian	30(10.9)	244(89)	0.89(0.37,12.15)	2.44(1.14,5.25)*
Muslim	7(12)	51 (88)		

Education : Educated	35(11.7)	265(88.3)	1.21 (0.18 2.36)	3.29(1.58,6.85)**
Non-Educated	2(1)	230(99)		1
Occupation: Gov't Employee and Business man	19(19)	81(81)		2.72(1.3,5.63)
House Wife				
Monthly Income: < 1000 ETB	15(8)	174(92)		1
≥1000 ETB	14 (10)	129(90)		0.78(0.39,1.58)
Marital Status : Single	23(12.2)	166 (87.8)		1
Married	5(11)	42(89)		0.94(0.35,2.55)
	32(10.2)	253(88.8)		1
Family Size : ≤5	35(12.6)	243(87.4)	0.27(0.62,1.15)	4.84(1.07,21.95)*
>5	2(3.7)	52(96.3)		1
Knows Fish can prevent ID: Yes	4(18.2)	18(81.8)	0.54(0.17,1.68)	2.80(1.01,7.81)*
No	33(99.4)	273(0.6)		
Knowledge: poor	1(4.3)	22(95.7)		1
Good	36(11.7)	273(88.3)		

Table 2: Factors associated with Fish consumption at HH: Asella town SC Ethiopia Jan 2015.

Note: * Statistically Significant P-value < 0.05, ** Strongly statistically significant P-value 0.01 to 0.005, *** Very strongly significant P-value < 0.001 in Multivariate analysis with Logistic Regression model.

Discussion

Fish is one of the known aquatic animals used for human consumption as food .It is very important diet because of their Nutritive quality and significance in improving human health. The flesh of a fish is readily digestible and immediately utilizable by the human body. Aquatic animals are also a source of minerals such as calcium, iron and phosphorus as well as trace elements and vitamins. Marine species are particularly rich in iodine [3].

In Ethiopia, the demand for Fish is anticipated to grow parallel with the growth rate of the urban population [9]. but the consumption is somehow equal in Africa and south America and in general while compared to global average developing countries the consumption is lower [12]. The global food fish supply and hence consumption has been growing at a rate of 3.6% per year since 1961, while the world’s population has been expanding at 1.8% for the same period. This study shows of Fish consumption is low in Asella town, i.e only 40% of households consume fish and form this very few households consume fish once in a month which is 11% and 89% of households consume rarely .majority (60%) of HHs in the study area do not consume fish. Factors associated with Fish consumption includes Religion Family size, Education status, and knowledge on advantages of Fish consumption.

Similar study in urban south west Nigeria showed that, 57% of HHs consume fresh fish [13]. In Moritious 95% of HHs consume fish [14]. Compared to the study in Nigeria, and moritious, less percentage of HH consume fish.

People who eat fish about twice a day run a lower risk of heart attack than those people who rarely eat fish [6]. Despite the predominantly healthy image of fish ,the recommendation of eating fish at least twice a week are not met by large group of population in many countries [15]. In The study area, No Households were reported to consume fish twice a week. Similar study In Iran showed Fish Consumption at Once and twice a week was seen in 16.5% and 7.3 % respectively and only 15.8% of Families Consume fish twice a week [6].

Other Study in Australia Families shows the consumption pattern of fish for twice a week were shown in 12% [14]. In Nigeria, 30%, 25.5%, 5.5% of respondents claimed to be consuming fish Once, Twice, and three times a week respectively but 41% Claimed not consuming fish [16].

The consumption of fish is high in developed countries, Spanish consumers reported a very high total fish consumption level with about 90% of the respondents claiming to eat fish at least once a week [11]. In Moritous 33.6% of respondents eat fish at least once a week, 3.2% consume every day, and 16.9% Consume at least twice a week, 4.9% consume rarely and only 6.3% do not consume fish [14]. The study in Asella town shows No households were reported to consume fish twice or once a week, and only 11% of HHs Consume Monthly.

Fish Consumption at house hold level was significantly associated with, Education, Religion, Family Size, and knowledge but Factors like Sex, Age, Occupation, Income and Marital status have no association with Fish consumption.

In this study Education is significantly associated with Fish consumption. Similar study in Ondo, Nigeria the Education level showed a strongly positive association on fish consumption [16]. But it was observed that Education has no influence on fish consumption in Iran [19].

In this study Religion mainly Christianity was associated with Fish consumption this might be due to religious influences on consumption patterns, the demand for fish is only seasonal [9]. Family size was found another factors associated in Fish Consumption, HHs with family size less than or equal to 5 significantly associated with fish consumption. Similar study in SSAs showed significant association in Fish Consumption [8]. It was also observed that Knowledge on the benefit of Fish consumption is significantly associated with fish consumption. Similar studies showed that Attitude towards fish consumption related to motivational aspects such as health involvement, health motivation and knowledge about nutrition study showed that European consumers are convinced that eating fish is health [11]. Information level, regarding fish varieties also effective in the fish consumption choice [18]. Previous studies were shown there is low awareness about suitable diet in Iran Based on Iranian Fisheries Organization [19]. Finally it has to be noted that knowledge at practices in Fish consumption is rather low, fish is important a source of animal protein supply.

Conclusion

It was concluded that in the study area/Asella majority (60%) of households do not consume fish and only few (11%) households consume monthly and no House hold consume fish twice a week or weekly by Using 24 hour recall period. And thus recommendation of eating fish at least twice a week are not met Education, Family Size, knowing the benefit of fish consuming a were significantly have positive influence on Fish Consumption at house hold level.

Recommendations

- Advocacy, and awareness creation activity on Food and Nutrition benefit of fish is required
- Adequate Supply of Fish and Distribution Site expansion is important.

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Declaration

I, the undersigned declare that this research article is my original work and that no conflict of interest and that all resources and materials used in this research have been duly acknowledged.

Authors Contribution

SB and SL conceived the study Design and Analysis.

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