HOUSEHOLD CHARACTERISTICS INFLUENCING FISH CONSUMPTION IN VAN PROVINCE, TURKEY

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ABSTRACT

This study investigates the relationship between households' fish consumption frequency and their socio-demographic characteristics and attitudes. Using Chi-square test of independence, the study compares households' fish consumption frequencies of never, once a month, twice a month, once a week and more than once a week. The empirical model was estimated using an ordered probit model to obtain the coefficients applied to the calculation of marginal effects and probabilities. The results indicate that, households' income, children per households, working households' head, households' consumption of aquaculture products other than fish and the surveyed being households' head significantly influence the frequency of fish consumption.

Keywords: fish consumption, socio-demographic characteristics, ordered probit model, Turkey

1. INTRODUCTION

In recent years, healthy nutrition has increasingly been encouraged, as a result, different healthy food consumption tendencies are emerged (GILBERT, 2000; LEEK *et al.*, 2000). Sea food is an important part of healthy nutrition (TRONDSEN *et al.*, 2003). Regular fish consumption reduces the likelihood of many chronic diseases including cardiovascular disease (KORNITZER, 2001; PLEADIN *et al.*, 2017) and contributes significantly to healthy living (VERBEKE and VACKIER, 2005).

Sea food is regarded as one of the most valuable nutrients in terms of the nutrients it contains. Sea food products contribute greatly to human nutrition because of high protein ratio, richness in omega-3 fatty acids, and minerals and vitamins they contain (GÜLYAVUZ and ÜNLÜSAYIN, 1999). Especially, fish has many benefits to human nutrition. Fish meat is easy to digest, contains high protein and is excellent in fat content. In addition, the vitamins and minerals and the low energy of the dietary supplement increase its importance (TATAR, 1995; TURAN *et al.*, 2006; SAYGI *et al.*, 2015). These factors are main causes that led consumers to change their consumption preferences from red meat to chicken meat and fish meat (RICKERTSEN, 1996; MANGEN and BURRELL, 2001).

Aquaculture plays an important role in ensuring nutritional needs and global food security in both developed and developing countries. In the past 50 years, global average supply of fishery products has increased by 3.2% per year on average, and world population has increased by 1.6%, resulting in an increase in average per capita consumption of aquatic products. In the world, the average per capita annual consumption of aquatic products is estimated to be 20.5 kg in 2017, while it was 9.0 kg, 17.0 kg and 20.2 kg in 1961, 2000 and 2015, respectively. This impressive increase in average fish consumption per capita was mainly due to the increase in production, income, population and urbanization, as well as the development of modern distribution channels (FAO, 2018).

As a country surrounded by sea, Turkey has a significant potential for aquatic products with its lakes, dams, streams and spring waters. Fishing in Turkey is an important field of activity in terms of being one of the basic livelihood resources in the coastal regions and human nutrition (ANONYMOUS, 2014). Aquaculture production in Turkey has shown significant fluctuations over the years. In 2017, the production of aquaculture products in Turkey increased by 7.15% to 630 thousand tons compared to the previous year. Out of this production 354 thousand tones (56.2%) was obtained through hunting, and 276 thousand tones (43.8%) were obtained through aquaculture. Van Province with the biggest Lake (Van Lake) accounts for 23.0% (8310 tons) of inland water fish production in Turkey with its *Pearl Mullet* (Tarek) fish unique for Van Lake (TURKSTAT, 2018). In addition, there are 24 trout farms in the province and approximately 200 tons of trout is produced yearly (GÜNGÖR, 2014).

In Turkey, per capita consumption of aquatic products has ranged from 6.3 to 8.6 kg/year in the last 18 years and has been 5.5 kg/year as of 2017 (TURKSTAT, 2018). The amount of consumption of aquatic products per capita differs significantly between regions in Turkey. While per capita consumption was high at regions by seas in Giresun and Trabzon 28.08 kg/year (AYDIN and KARADURMUŞ, 2013), in Mersin 25.8 kg/year (ŞEN, 2011) in Hatay 21.5 kg/year (DEMIRTAŞ *et al.*, 2014) and in İzmir 15 kg/year (ÇAYLAK, 2013), domestic, Eastern and Southeastern regions were below the world average being 13 kg/year in Tokat (ERDAL and ESENGÜN, 2008), 12.4 kg/year in Isparta (HATIRLI *et al.*, 2004), 6.5 kg/year in Erzurum (UZUNDUMLU, 2017), 4.13 kg/year in Kahramanmaraş (ERCAN and ŞAHIN, 2016), 3.8 kg/year in Niğde (BASHIMOV, 2017) and 3.4 kg/year in Ankara (GÜL YAVUZ *et al.*, 2015).

There are many factors affecting fish consumption, including socioeconomic structure, general food consumption structure, personal health status and maritime nature of the living area (MYRLAND *et al.*, 2000; TRONDSEN *et al.*, 2004; VERBEKE and VACKIER, 2005). But, the most determining factor for purchasing fish is nutrition (ADELI *et al.*, 2011). The aim of the study in this context was to determine the socio demographic and behavioral characteristics that affect the frequency of fish consumption of households in urban areas in Van.

2. MATERIAL AND METHODS

The main material of the study is the original data collected through questionnaires from 260 households living in the urban area of Van. Survey was conducted between December 2015 and January 2016. The sample size was determined by ungrouped one stage random likelihood sampling method based on households (COLLINS, 1986; AKBAY *et al.*, 2007).

$$n = t\text{^}2\ [1 + (0.02)(b - 1)] * pq/E\text{^}2 \qquad (1)$$

The statistical relationship between the frequency of fish consumption of households and their socio-demographic and behavioral characteristics was estimated using the Chi square test. On the other hand, the effects of the socio-demographic and behavioral characteristics of the habits on the fish consumption frequency was estimated using "Ordered Probit Model" method. Statistical Package for Social Science (SPPSS 17.0) and LIMDEP 10 programs were used in the analysis of the data.
The ordered probit model is based on the McFadden (1973) utility maximization theory. The utility function in the research indicates the utility of the consumer in terms of the frequency of fish consumption. However, the level of utility provided here cannot be observed. Behind the observable, intermittent and ordered categories (y) in the ordered probit model is assumed to be a continuous, but unobservable, hidden dependent variable. The unobserved, latent dependent variable (y*) is explained by the vector of explanatory variables and the error term. The term error is assumed to have normal distribution (GREENE, 2012).

$$Y^* = x'\beta + \varepsilon \quad \varepsilon \sim N\ [0, 1] \qquad (2)$$

In the study, households chose one of the five alternatives for fish consumption, the dependent variable was classified according to its size (y = 0, 1, 2, 3, 4). Thus, the relationship between the model dependent variable (y) and the unobserved dependent variable (y*) is as follows (CHEN *et al.*, 2002; GREENE, 2012).

$$\begin{array}{ll} \textit{if } y^* \le 0, & y=0 \\ \textit{if } 0 < y^* \le \mu_1, & y=1 \\ \textit{if } \mu_1 < y^* \le \mu_2 & y=2 \\ \textit{if } \mu_2 < y^* \le \mu_3 & y=3 \\ \textit{if } \mu_3 \le y^* & y=4 \end{array}$$

The dependent variable used in the model is one of the following categories: *"y=0"*, *"y=1"*, *"y=2"*, *"y=3"* and *"y=4"* which represents households' non-fish consumers, households consumes fish once per month, households consume fish once per fifteen days,

households consumes fish per week and households consumes fish more than once per week, respectively. In the ordered probit model, the likelihood of the producers selecting one of five alternatives is as follows (GREENE, 2012).

$$\text{Prob}\,(y = 0 \mid \mathbf{x}) = \Phi\,(-\mathbf{x}\beta), \quad (3)$$
$$\text{Prob}\,(y = 1 \mid \mathbf{x}) = \Phi\,(\mu_1 - \mathbf{x}\beta) - \Phi\,(-\mathbf{x}\beta), \quad (4)$$
$$\text{Prob}\,(y = 2 \mid \mathbf{x}) = \Phi\,(\mu_2 - \mathbf{x}\beta) - \Phi\,(\mu_1 - \mathbf{x}\beta), \quad (5)$$
$$\text{Prob}\,(y = 3 \mid \mathbf{x}) = \Phi\,(\mu_3 - \mathbf{x}\beta) - \Phi\,(\mu_2 - \mathbf{x}\beta), \quad (6)$$
$$\text{Prob}\,(y = 4 \mid \mathbf{x}) = 1 - \Phi\,(\mu_3 - \mathbf{x}\beta) \quad (7)$$

For all probabilities to be positive, $0<\mu 1<\mu 2<...<\mu j\text{-}1$ Φ shows the cumulative normal distribution function. The solution of the model can be realized by "logarithmic maximum likelihood" method. The marginal effects of the variables are calculated as follows for each probability (GREENE, 2012).

$$(\partial Prob(y = 0|\boldsymbol{x}))/\partial \boldsymbol{x} = -\emptyset(\boldsymbol{x}\text{^}'\,\beta)\beta, \quad (8)$$
$$(\partial Prob(y = 1|\boldsymbol{x}))/\partial \boldsymbol{x} = [\emptyset(-\boldsymbol{x}\text{^}'\,\beta) - \emptyset(\mu 1 - \boldsymbol{x}\text{^}'\,\beta)]\beta, \quad (9)$$
$$(\partial Prob(y = 2|\boldsymbol{x}))/\partial \boldsymbol{x} = [\emptyset(\mu 1 - \boldsymbol{x}\text{^}'\,\beta) - \emptyset(\mu 2 - \boldsymbol{x}\text{^}'\,\beta)]\beta, \quad (10)$$
$$(\partial Prob(y = 3|\boldsymbol{x}))/\partial \boldsymbol{x} = [\emptyset(\mu 2 - \boldsymbol{x}\text{^}'\,\beta) - \emptyset(\mu 3 - \boldsymbol{x}\text{^}'\,\beta)]\beta, \quad (11)$$
$$(\partial Prob(y = 4|\boldsymbol{x}))/\partial \boldsymbol{x} = \emptyset(\mu 3 - \boldsymbol{x}\text{^}'\,\beta)]\beta \quad (12)$$

3. RESULTS AND DISCUSSION

Out of households surveyed 89.2% consumed fish while the remaining 10.8% did not consume fish. In similar studies conducted in Van province, 88.2% and 78.53% of the consumers consumed fish, respectively (SARI *et al.*, 2000, CEYLAN, 2006). In some other studies, the fish consumption rate of consumers was 95.8% (GÜRGÜN, 2006), 88.3% (ORHAN and YÜKSEL, 2010), 90.6% (BALIK *et al.*, 2013), 98.8% (ONURLUBAŞ, 2013), 84.0% (OLGUNOGLU *et al.*, 2014), 95.0% (CICEK *et al.*, 2014) and 96.52% (DJORDJEVIC *et al.*, 2015). Out of the households who didn't consume fish 35.7% stated the reason as fish odor followed by dislike fish, having no habit of fish consumption, and insufficient purchasing power with 25.0 21.4 and 17.9%, respectively. ORHAN and YÜKSEL (2010) stated that 60.50% of consumers didn't consume fish due to odor followed by 12.12% having no habit of fish consumption in Burdur Province, Turkey.

Out of surveyed households 10.8% didn't consume fish at all. On the other hand, 27.3% of households consumed fish once per two months followed by once per week, once per month and more than once per week with 26.9, 22.7 and 12.3%, respectively (Table 1). In the study conducted by GÜNGÖR (2014), 36.2% of the consumers consumed fish once a month, followed by those who consumed fish once per fifteen days and once per week with 23.0 and 17.8%, respectively. CICEK *et al.* (2014) stated that 28.0% of consumers consumed fish once per fifteen days followed by those who consumed fish once per week and once per month with 25.0 and 23.0%, respectively in Elazığ Province, Turkey. SAYGI *et al.* (2015) pointed out that 25% of consumers in İzmir, Turkey consumed fish once per week while consumers in Ankara generally consumed fish once per fifteen days. In a study conducted in Serbia more than half of consumer at school age consumed fish once per week (52.24%) and 34.33% once per month (DJORDJEVIC *et al.*, 2015). In Mexico one third of consumers (32.51%) consumed fish more than once per week followed by 25.62% once per week, 25.62% once per week, 24.24% once per fifteen days and 17.63% once per month (PEREZ-RAMIREZ *et al.*, 2015). HICKS *et al.* (2008) pointed out in American 22.0% of consumers consumed fish more than once, 24.0% of consumers consumed fish once per

week, 29.02% of consumers consumed fish once per two-three months and 12.0% of consumers consumed fish once per month.
The average monthly income of the households varied between TL 750 and TL 7500 and the monthly average household income was TL 2776.77. While the average monthly income of 7.7% of households was less than 1000 TL, 66.9% of households had a monthly income varied between TL 1001 and TL 3000 and 25.4% of consumers had income above TL 3001. In a study conducted in Van Province, 14.9% of the households had monthly income between TL 0-1000, 43.8% between TL 1001-3000 and 41.3% had income above TL 3001 (GÜNGÖR, 2014).
The average number of children per household was 2.61 (Table 1). Out of surveyed households, 26.9% had one child followed by 23.8, 16.9, 12.0 and 11.9% of households with three, one, five and four child, respectively. In a study conducted by CEYLAN (2006), 55.21% of households in Van, Turkey had more than one child, 12.5% had one child and 2.08% had no child. GÜRGÜN (2006) pointed out that 7.3% of households had no child, 14.6% of households had two and 5.0% had one child in Bitlis, Turkey. In a study by VERBEKE and VACKIER (2005) in Belgium, it was found that 57.3% of the households consisted of families with children.

Table 1. Descriptive statistics of the sample.

Variables		Values
Dependent variable		
Fish consumption frequency		
Never	Y= 0	%10.8
Once a month	Y= 1	%22.7
Twice a month	Y= 2	%27.3
Once a week	Y= 3	%26.9
More than once a week	Y= 4	%12.3
Continuous explanatory variables		**Means**
Income (TL/month)		2776.77 (1453.18)
Child number		2.61 (1.29)
Binary explanatory variables		**Values**
Household head (if 1; otherwise 0)		%75.8
Household head woman (if 1; otherwise 0)		%19.6
House wife working (if 1; otherwise 0)		%13.8
Consumption other seafood except fish (if 1; otherwise 0)		%9.6
Resides in rental house (if 1; otherwise 0)		%33.1
Fish prices high (if 1; otherwise 0)		%62.3
Public spots effect fish consume. positive (if 1; otherwise 0)		%65.0
Household head working (if 1; otherwise 0)		%94.6

Standard deviations are given in brackets.

The average monthly fish consumption quantity per household and per capita was 6.3 kg and 1.4 kg, respectively. Average yearly fish consumption quantity per capita in Turkey is 7 kg (TURKSTAT, 2018). In this case, yearly fish consumption quantity per capita in Van province is more than that of Turkey. Pearl mullet (only caught from Van Lake) consisted 30.0% of the Turkey's inland fish production in 2017 (TURKSTAT, 2018). Considering

factors such as the price of pearl mullet, which is cheaper than the other fish types and being suitable for the taste of the local people, it is expected that the quantity of fish consumption per capita in the province of Van is relatively high. This is also confirmed by the research results.

The statistical relationship between the socio-demographic and behavioral characteristics of the households and the fish consumption frequency is given in Table 2. A statistically significant relationship was found between socio-demographic characteristics such as households' income, working household head, the households' consuming aquatic products other than fish, the high prices of fish, positive effect of public spots and fish consumption frequency of households. It can be said that the results obtained are in accordance with the expectations.

Table 2. Socio-demographic characteristics and several attitudes of the sample and fish consumption frequencies.

Variables	Never	Once a month	Twice a month	Once a week	More than once a week	X^2
Household Head						
Yes	10.2	20.8	26.4	27.9	14.7	5.95
No	12.7	28.6	30.2	23.8	4.8	
Household head woman						
Yes	13.7	21.6	27.5	25.5	11.8	0.61
No	10.0	23.0	27.3	27.3	12.	
House wife working						
Yes	2.8	22.2	27.8	33.3	13.9	3.21
No	12.1	22.8	27.2	25.9	12.1	
Consumption other seafood except fish						
Yes	0.0	16.0	8.0	48.0	28.0	17.40***
No	11.9	23.4	29.4	24.7	10.6	
Renter						
Yes	10.5	24.4	26.7	27.9	10.5	0.60
No	10.9	21.8	27.6	26.4	13.2	
Fish prices high						
Yes	17.3	25.3	28.4	19.8	9.3	29.87***
No	0.0	18.4	25.5	38.8	17.3	
Public spots effects fish consumption positive						
Yes	0.0	24.3	32.5	30.2	13.0	59.47***
No	30.8	19.8	17.6	20.9	11.0	
Household head working						
Yes	9.3	21.5	27.6	28.5	13.0	17.19***
No	35.7	42.9	21.4	0.0	0.0	
Income						
Less than 1000 TL	30.0	35.0	30.0	5.0	0.0	
1001-3000 TL	10.3	24.1	28.2	27.0	10.3	23.57***
3001 TL and over	6.1	15.2	24.2	33.3	21.2	

***: 0,01 significant level.

The ordered probit model results of the socio-demographic and behavioral characteristics that affect the frequency of fish consumption of the households are given in Table 3. The ordered probit model was found to be totally statistically significant using likelihood method ($p < 0.000$). The coefficients of the model were tested using z-rate and standard error. Estimated threshold values in the model indicate the numerical relationship between the utility function of the consumer and the consumption frequency (AKBAY *et al.,* 2007; GUNDUZ and EMIR, 2010). In view of MADDALA (1983), the threshold values should be positive and $\mu 1 < \mu 2 < \mu 3$. The threshold values of the model were positive and statistically significant at 0.01 level. This shows that the consumption frequency categories households are arranged appropriately and the socio-demographic and behavioral characteristics of the households are influential on fish consumption.

The marginal effects of the socio-demographic and behavioral characteristics that affect the frequency of fish consumption of the households are given in Table 4. While model results are interpreted, marginal effects and coefficients are discussed together. In the study, a positive and statistically significant relationship was found between the household income and the fish consumption frequency (Table 3). As a result, the increase in household income will increase the frequency of fish consumption of the households. A TL 1,000 increase in household income will result in reducing the likelihood of no consumption (y=0) and monthly consumption (y=1) by 2.0% and 3.6%, respectively while increase the likelihood of consuming in a weekly (y=3) and more than once a week (y=1), by 3.5% and 2.5%, respectively (Table 4). A positive relationship between household income and the frequency and amount of fish consumption has been found in previous studies (AKINBODE and DIPEOLU, 2012; CAN *et al.,* 2015; DAUDA *et al.,* 2016).

In the study, a positive and statistically significant relationship was found between the number of children of households and the frequency of fish consumption (Table 3). As a result, one more child in the households will reduce the likelihood of no-consumption (y=0) and consumption per month (y=1) by 1.08 and 1.92%, respectively, while it will increase the likelihood of consumption once per week (y=3) and consumption more than once per week (y=4) by 1.85 and 1.31%, respectively (Table 4). In a study by MYRLAND *et al.* (2000), it was found that the frequency of fish consumption increases by having children between 0-7 years and 8-12 years, having children between 0-7 age group reduce the likelihood of no-consumption and consuming per month by 1.9 and 1.4%, respectively while increasing the likelihood of consuming once per week and once per two weeks by 2.9 and 0.9%.

In the study, a positive and statistically significant relationship was found between the heads of households and the frequency of fish consumption (Table 3). As a result, the head of households will reduce the likelihood of no-consumption (y=0) and consumption per month(y=1) by 6.36 and 9.26%, respectively, while it will increase the likelihood of consumption once per week (y=3) and consumption more than once per week (y=4) by 9.39 and 5.68%, respectively.

A positive and statistically significant relationship was found between the consumption of other aquaculture products except fish and the frequency of fish consumption (Table 3). As a result, the households' consumption of aquaculture products except fish will reduce the likelihood of no-consumption (y=0) and consumption per month (y=1) by 5.55 and 13.58%, respectively, while it will increase the likelihood of consumption once per week (y=3) and consumption more than once per week (y=4) by 11.09 and 13.52%, respectively (Table 4). MYRLAND *et al.* (2000) pointed out that households' consumption of aquaculture products would increase the fish consumption frequency, namely would decrease the likelihood of non-consumption and consumption per month frequency by 16.2 and 23.7%, respectively while would increase the likelihood of consumption frequency of once per week and twice per week by 32.7 and 24.9%, respectively.

In the study, a positive and statistically significant relationship was found between the households' finding fish prices high and the frequency of fish consumption (Table 3). As a result, the households' considering the fish prices high will reduce the households' fish consumption frequency. The households' considering the fish prices high will increase the likelihood of no-consumption (y=0) and consumption per month (y=1) by 6.90 and 13.15%, respectively, while it will reduce the likelihood of consumption once per week (y=3) and consumption more than once per week (y=4) by 12.14 and 10.24%, respectively (Table 4).
In the study, a positive and statistically significant relationship was found between the households' thought that public spots had positive effects on fish consumption and the frequency of fish consumption (Table 3). The households' thought that public spots had positive effects on fish consumption will reduce the likelihood of no-consumption (y=0) and consumption per month (y=1) by 9.71 and 13.97%, respectively, while it will increase the likelihood of consumption once per week (y=3) and consumption more than once per week (y=4) by 14.11 and 8.97%, respectively (Table 4).
A positive and statistically significant relationship was found between the working households' head and the frequency of fish consumption (Table 3). As a result, households' head working at any place will increase fish consumption frequency. The working households' head will reduce the likelihood of no-consumption (y=0) and consumption per month (y=1) by 15.28 and 13.84%, respectively, while it will increase the likelihood of consumption once per week (y=3) and consumption more than once per week (y=4) by 16.19 and 7.31%, respectively (Table 4).

Table 3. Estimates ordered probit model for fish consumption frequencies.

Variables	Coefficient	St. Error	z-statistic	p-value
Constant	-0.2056	0.402	-0.51	0.6089
Income	0.00016	0.0000546	2.91	0.0036***
Child number	0.084	0.043	1.94	0.0528*
Household head	0.422	0.168	2.51	0.0120***
Household head woman	-0.158	0.189	-0.83	0.4040
House wife working	-0.105	0.233	-0.45	0.6518
Other seafood consumption	0.630	0.242	2.61	0.0091**
Resides in rental house	-0.147	0.153	-0.96	0.3352
Fish prices high	-0.591	0.142	-4.15	0.0000***
Public spots	0.648	0.143	4.54	0.0000***
Household head working	0.754	0.333	2.26	0.0238**
Threshold parameters				
μ (1)	1.031	0.08262	12.48	0.0000***
μ (2)	1.856	0.08267	22.45	0.0000***
μ (3)	2.879	0.11400	25.26	0.0000***
Log likelihood = -357.910		Restricted log likelihood = -400.952		
Likelihood ratio statistic (LR) = 86.084		$Chi\text{-}square_{(10;0.05)}$=18.307 LR>Chi-square=0.000		

*:0.1, **:0.05 and ***: 0,01 significant level.

Table 4. The marginal effects of factors on the probability of relative frequencies for fish consumption.

Variables	Y(0)	Y(1)	Y(2)	Y(3)	Y(4)
Income	-0.000020***	-0.000036***	-0.0000031	0.000035***	0.000025***
Child number	-0.01078*	-0.01921*	-0.00164	0.01850*	0.01313*
Household head	-0.06366**	-0.09256***	0.00552	0.09392**	0.05678***
Household head woman	0.2171	0.03566	0.00079	-0.03514	-0.02303
House wife working	0.01426	0.02384	0.00084	-0.02338	-0.01556
Other seafood consumption	-0.05501***	-0.13582***	-0.05534	0.11094***	0.13523**
Resides in rental house	0.01955	0.03337	0.00176	-0.03252	-0.02216
Fish prices high	0.06900***	0.13151***	0.02331	-0.12144***	-0.10239***
Public spots	-0.09714***	-0.13973***	0.00609	0.14111***	0.08967***
Household head working	-0.15276	-0.13839***	0.05612	0.16191**	0.07312***

*:0.1, **:0.05 and ***: 0,01 significant level.

4. CONCLUSIONS

Result of this study showed that various socio-economic and demographic factors of households and households' heads significantly influenced the likelihood of consuming fish. There was a positive relationship between the socio-economic and demographic characteristics of households such as households' income, children per households, working households' head, households' consumption of aquaculture products other than fish, households' head and the behavioral variables such as households' thought that public spots affected the fish consumption positively.
Based on the findings of the study, the following recommendations were made; public or private organization should continue to educate the households' heads (parents) on the importance of fish on their health. Price of fish should be reduced so as to increase the fish consumption in the area since it was observed that price of fish and fish consumption are inversely related. As the income of the households' increases, fish consumption also increases, therefore government should provide income opportunities by creating jobs to enhance the household's purchasing power. In this way, it is possible to provide a healthier life for the society by encouraging the households to consume more fish. Educational programs regarding healthy and balanced nutrition in the region, should intended on the development of fish consumption habits of households in the region.

REFERENCES

Adeli A., Hasangholipour T., Hossaini A., Salehi H. and Shabanpour B. 2011. Status of fish consumption per capita of Tehran citizens. Iran J. Fish Sci. 10(4):546-556.

Akbay C., Tiryaki, G.Y. and Gül A. 2007. Consumer characteristics influencing fast food consumption in Turkey. Food Control 18(8):904-913.

Akinbode S.O. and Dipeolu A.O. 2012. Double-Hurdle model of fresh fish consumption among urban households in South-West Nigeria. Current Research Journal of Social Sciences 4(6):431-439.

Anonymous 2014. Aquaculture private commission report. Publication No: 2871, Ankara.

Aydın M. and Karadurmuş U. 2013. Consumer behaviors for seafood in Giresun and Trabzon province. The Black Sea Journal of Sciences 3(9):57-71.

Balık I., Yardımcı C. and Turhan O. 2013. Comparatively investigation of fish consumption habits of people in Fatsa and Aybastı districts of Ordu province. Ordu Univ. J. Sci. Tech. 3(2):18-28

Bashimov G. 2017. Determining fish meat consumption habits in Nigde Province. Turkish Journal of Agricultural and Natural Sciences 4(2):196-204.

Can M.F., Günlü A. and Can H.Y. 2015. Fish consumption preferences and factors influencing it. Food Science and Technology 35(2):339-346.

Çaylak B. 2013. Fishery product consumption and consumer preferences survey in İzmir province Msc.Thesis, Çanakkle Onsekiz Mart University, Institute of Natural and Applied Sciences, Çanakkale, Turkey.

Ceylan M. 2006. The consumption structure of meat and meat products in urban and rural area of van province and the purchase behavior of consumers Msc.Thesis, Yuzuncu Yıl University, Institute of Natural and Applied Sciences, Van, Turkey.

Chen K.Z., Ali M., Veeman M.M., Unterschultz J. and Le T. 2002. Relative importance rankings for pork attributes by Asian-origin consumers in California:Applying an ordered probit model to a choice-based sample. Journal of Agricultural and Applied Economics 34(1):67-79.

Çiçek E., Akgün H. and İlhan S. 2014. Determination of fish meat consumption habits and preferences in Elazığ province. Yunus Research Bulletin 1:3-11.

Collins M. 1986. Sampling (Editors: Worcester R.M. and Downham J.) Consumer Market Research Handbook, London:McGraw-Hill

Dauda A.B., Ojoko E.A. and Fawole B.E. 2016. Economic analysis of frozen fish demand in Katsina metropolis, Katsina State, Nigeria. Journal of Fisheries and Aquatic Science 11(1):93-99.

Demirtaş B., Dağistan E., Akpınar M.G. and Sayın C. 2014. Fish consumption patterns of urban households in Hatay, Turkey. Journal of Academic Documents for Fisheries and Aquaculture 2:69-77.

Djordjevic V., Sarcevic D. and Petronijevic R. 2015. The attitudes and habits of Serbian school children to consumption of fish. Procedia Food Science 5:73-76.

Ercan O. and Şahin A. 2016. Analysis of Fish Meat Consumption at Kahramanmaraş City Centre. KSU J. Nat. Sci. 19(1):51-65.

Erdal G. and Esengün K. 2008. Analysis of factor affecting fish consumption with logit model in Tokat. E.U. Journal of Fisheries & Aquatic Sciences 25(3):203-209.

FAO 2018. The state of World fisheries and aquaculture. ISBN 978-92-5-130562-1 www.fao.org/3/I9540EN/i9540en.pdf (28.08.2018).

Gilbert L.C. 2000. The functional food trend: What's next and what Americans think about eggs. Journal of the American College of Nutrition 19(5):507-512.

Greene W.H. 2012. Econometric Analysis. Seventh Edition. Pearson Prentice-Hall, Upper Saddle River, New Jersey, 07458. ISBN 10:0-13-139538-6

Gül Yavuz G., Yasan Ataseven Z., Gül U. and Gülaç Z.N. 2015. Factor affecting consumer preferences on seafood consumption:The case of Ankara. Yunus Research Bulletin 1:73-82.

Gülyavuz H. and Ünlüsayın M. 1999. Fisheries processing technology. Sahin printing press, Isparta, 366

Gündüz O. and Emir M. 2010. Analysis of factors influencing frozen food consumption: A case study of Samsun, Turkey. J. Agric.Fac.HR.U. 14(3):15-24.

Güngör E.S. 2014. A survey on fish consumption and consumer preference in Erzurum and van provinces Msc.Thesis, Atatürk University, Institute of Natural and Applied Sciences, Erzurum, Turkey.

Gürgün H. 2006. An investigation into the fish consumption in some towns on the shores of Lake Van Msc.Thesis, Ege University, Institute of Natural and Applied Sciences, İzmir, Turkey.

Hatırlı S.A., Demircan V. and Aktaş A.R. 2004. An analysis of households' fish consumption in Isparta province. Süleyman Demirel University Journal of Faculty of Economics and Administrative Sciences 9(1):245-256.

Hicks D., Pivarnik L. and McDermott R. 2008. Consumer perceptions about seafood-an internet survey. Journal of Foodservice 19(4):213-226.

Kornitzer M. 2001. Fish and health among adults. In: Descheemaeker K. and Provoost C. Impact of food on health-Recent developments, Antwerpen:Garant, 53-65.

Leek S., Maddock S. and Foxall G. 2000. Situational determinants of fish consumption. British Food Journal 102(1):18-39.

Maddala G.S. 1983. Limited-dependent and qualitative variables in econometrics. New York: Cambridge University Press.

Mangen M.J. and Burrell A.M. 2001. Decomposing preference shifts for meat and fish in the Netherlands. Journal of Agricultural Economics 52(2):16-28.

McFadden D. 1973. Conditional logit analysis of qualitative choice behaviour. In: P. Zarembka (Ed.), Frontiers in econometrics (pp. 105-142). New York: Academic Press.

Myrland O., Trondsen T., Johnston R.S. and Lund E. 2000. Determinants of seafood consumption in Norway: lifestyle, revealed preference and barriers to consumption. Food Quality and Preference 11(3):169-188.

Olgunoğlu İ.A., Bayhan Y.K., Olgunoğlu M.P., Artar E. and Ukav İ. 2014. Determination of habits of fish meat consumption in the province of Adıyaman. Electronic Journal of Food Technologies 9(1):21-25.

Onurlubaş E. 2013. The factors affecting fish consumption of the consumers in Keşan Township in Edirne. Bulgarian Journal of Agricultural Science 19(6):1346-1350.

Orhan H. and Yüksel O. 2010. Fishery product consumption survey in Burdur province. Süleyman Demirel University Journal of the Faculty of Agriculture 5(1):1-7.

Perez-Ramirez M., Almendarez-Hernandez M.A., Aviles-Polanco G. and Beltran-Morales L.F. 2015. Consumer acceptance of eco-labeled fish:A Mexican case study. Sustainability 7:4625-4642.

Pleadin J., Lesic T., Kresic G., Baric R., Bogdanovic T., Oraic D., Vulic A., Legac A. and Zrncic S. 2017. Nutritional quality of different fish species farmed in the Adriatic Sea. Ital. J. Food Sci. 29:537-549.

Rickertsen K. 1996. Structural change and the demand for meat and fish in Norway. European Review of Agricultural Economics 23(3):316.330.

Sarı M., Demirulus H. and Söğüt B. 2000. A research on determination of fish meat consumption habits of students in Van province. In Proceedings of the East Anatolian Region 4th Aquaculture Symposium, Erzurum, Turkey.

Saygı H., Bayhan B. and Hekimoğlu M.A. 2015. Fishery products consumption in the cities of Ankara and İzmir in Turkey. Turkish Journal of Agriculture-Food Science and Technology 3(5):248-254.

Şen A. 2011. Individuals living in Konya and Mersin provincial centers comparison of fish consumption on the habits and knowledge level Msc. Thesis, Selçuk University, Institute of Natural and Applied Sciences, Konya, Turkey.

Tatar O. 1995. Nutritional properties of fish and healthy respect. E.U. Journal of Fisheries & Aquatic Sciences 12:169-170.

Trondsen T., Braaten T., Lund E. and Eggen A.E. 2004. Health and seafood consumption patterns among women 45-69 years. A Norwegian Fish Consumption Study 1996. Food Quality and Preference 15(2):117-128.

Trondsen T., Scholdere J., Lund E. and Eggen A.E. 2003. Perceived barriers to consumption of fish among Norwegian women. Appetite 41(3):301-314.

Turan H., Kaya Y. and Sönmez G. 2006. Fish meat value and place of human health. E.U. Journal of Fisheries & Aquatic Sciences 23:505-508.

TURKSTAT 2018. Turkish Statistical Institute. Aquaculture statistics. www.tuik.gov.tr/PreTablo.do?alt_id=1005 (28.08.2018).

Uzundumlu A.S. 2017. Determining fish consumption behavior among households and the most suitable type of fish in Erzurum Province. Iran J. Fish Sci. 16(2):684-697.

Verbeke W. and Vackier I. 2005. Individual determinants of fish consumption: application of the theory of planned behavior. Appetite 44(1):67-82.

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