FISH CONSUMPTION PATTERNS OF URBAN HOUSEHOLDS IN HATAY, TURKEY

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ABSTRACT

Although Turkey has a long coastline and a good deal of inland waters, its potential is not fully utilized in terms of fish production and consumption. Fish consumption in Turkey is 7 kg per capita, which is far below that of the world of 18.4 kg per capita. This study was conducted in Hatay, Turkey and included 43 districts. The data of the 412 surveys were collected using the face-to-face interview. Effects of various demographic and socioeconomic characteristics of consumers on fish consumption were analysed. Accordingly, some demographic and socioeconomic characteristics such as marriage, monthly income and spending for food had a significant impact on fish consumption.

Key words: Fish consumption, consumer preferences, logistic regression, Hatay province, Turkey

TÜRKİYE'DE HATAY İLİNDE KENTSEL HANEHALKININ BALIK TÜKETİM YAPISI

ÖZET

Türkiye uzun bir sahil şeridi ve önemli iç su potansiyeline sahip olmasına rağmen balık üretimi ve tüketimi açısından bunu tam olarak kullanamamaktadır. Türkiye'de kişi başına balık tüketimi 7 kg olup 18,4 kg olan dünya ortalamasının çok altındadır. Bu çalışma Türkiye'de Hatay ilinde 43 mahallede yürütülmüştür. Veriler 412 kişi ile yapılan yüz yüze anketle toplanmıştır. Tüketicilerin çeşitli demografik ve sosyo-ekonomik özelliklerinin balık tüketimi üzerindeki etkileri analiz edilmiştir. Elde edilen sonuçlara göre evlilik, aylık gelir ve gıda harcama miktarı gibi bazı demografik ve sosyo-ekonomik özelliklerin balık tüketimi üzerine önemli düzeyde etkisi vardır.

Ahahtar kelimeler: Balık tüketimi, tüketici tercihleri, lojistik regresyon, Hatay, Türkiye

INTRODUCTION

According to 2011 data, throughout the world, some 55 million people were engaged in fish production through fishing and aquaculture. The total world production was 154 million tonnes in 2013, 90.4 million tonnes of which were provided by fishing whereas 63.6 million tonnes by aquaculture (FAO 2013). As for the international movement of fish products, developed countries appear to be main importer due to their higher consumption rate, while developing countries prefer exporting in order to earn more. According to projections, export of fish products will continue to increase in developing countries along with fish consumption and production (TEAE 2007). Turkey has rich marine and freshwater resources for capture fisheries and aquaculture. Total sea and inland water surface area is 25 million hectare, an area which is bigger than forest areas and nearly equal to that of agriculture areas (SPO 2007). In Turkey, generally fish consumption is low and people tend to prefer grains and red meat for daily energy and protein sources. Fish consumption provides only 3% of their protein requirements. In Turkey, more than 76% of capture fisheries production comes from the Black

Sea, 13.1% from the Marmara Sea, 7.6% from the Aegean Sea and 3.1% from the Mediterranean Sea (SPO 2007). Regional seafood consumption patterns in Turkey are not homogenous. While the consumption rate per capita are above the world average in the coastal areas, there is an opposite situation in the central, eastern, and south eastern Anatolia with a rate of far below Turkey's average. Consumers prefer fresh fish over processed fish products in Turkey. Most of the processed fish products are exported to various EU countries, mainly to the Netherlands and Germany. Turkey has been unable to utilize its potential in consumption and external trade of fisheries. Despite a notable increase in aquaculture production, this has not reflected to average consumption amounts. There is a lack of studies that are planned to unravel the causes for this issue. Various previous studies have been conducted to investigate seafood consumption patterns and associated factors in both Turkey and the world. In a study carried out in Turkey by Saygı and Hekimoğlu (2011), many factors effecting fish consumption such as health, taste, attainability, habit, consumer acceptance, price, and alternative red meat prices and some socioeconomic factors such as age, sex, income, occupation and education have been examined. Factors like high prices, cooking difficulties, taste and smell of fish, fishbone presence, and short preservation periods were found to have a negative effect on consumption rate. In another study on the fish consumption habits in Turkey, household's geographic location, monthly income, sex, age, educational level and occupation have been categorically analysed between the years of 1994-2006. According to the results, a meaningful statistical relationship was found between socioeconomic and demographic factors, and fish consumption (Aydın et al. 2011). In a study conducted in Çanakkale, Turkey, the data from 680 consumers showed that in terms of meat preference, chicken took first place, followed by fish and red meat. The most preferred fish was bluefish, and the most commonly consumed ones were tuna, anchovy, sardine and bream. Fresh fish consumption takes first place with 87% of families consuming 1-6 kg per month (Çolakoğlu et al. 2006). An analysis of 151 families in Tokat was conducted to determine the factors effecting monthly fish consumption. According to the results, fish consumption of families was effected at a meaningful level by season and

families' social status (Erdal and Esengün 2008). A study was conducted on 3212 consumers from eight EU countries to ask their opinions about preference of origin and reason for two fish types, sea bream and sea bass. The results showed that European consumers considered health benefits and slightly preferred wild fish rather than aquaculture (Vanhonacker et al. 2013). In a study developments and trends on world fish consumption and factors effecting the consumption were dealt with, and changes between the years of 1961-2007 were analysed. According to the study, fish consumption per person increased from 9 kg to 17.1 kg, with an increase of 190% during that period. The factors affecting the consumption trends were shown as changes in traditional eating habits and tastes, an increase of spendable income, fish prices, and changes in the handling of fish products, development of various forms of fish and fish products as well as demographic changes (Knap 2011). A study was conducted with 320 consumers on their perceptions of the quality and safety of fish products. The results showed that 75% of the consumers preferred fresh fish and 42% of the consumers bought fish 3-4 times a month. In the part of the study regarding the safety and quality of the fish products, it was found that the consumers had little knowledge on the issues of traceability, storing or processing (Feng et al. 2009). In a recent study carried out on fish products in Poland, changes in the consumption structure of consumers with new regulations of the EU were analysed by interviewing with 1015 consumers. It was found that 47% of the consumers consumed fish 1-2 times a week. Their preferences were in favour of canned fish products, and mackerel was the most consumed fish. It was also found that the rate of the consumers who know the source of fish products was very low (34%), despite the fact that the information is a necessary in the product labels (Pieniak et al. 2011). In a study conducted in Norway, it was found that the region of residence and having children at school ages in families affected consumption of seafood kind, and total consumption of fish increased with number of household, age and education level (Myrland et al. 2000). Therefore, the aim of the present study was to investigate the consumption patterns of seafood at least in Hatay level, and to determine the factors affecting consumption rates. In this study, factors effecting fish consumption in the eastern Mediterranean

city of Hatay were investigated. Also, recent developments of fish products and fishing in the world as well as Turkey were addressed.

MATERIALS AND METHODS
Material

Main materials for the study were survey data gained by the face-to-face interviews carried out with the consumers in the region. Information about the central district of Hatay were obtained by secondary sources from public enterprises and public institutions. Local and foreign information resources also were referred to. Census data on the research area were gathered from the Turkish Statistics Institute (TÜİK). Socio-demographic features of the household and data about fish consumption preferences were gathered directly through the face-to-face interviews with the consumers. Other studies on the topic were also referred to. The base material of the research data was consumer data from 2008. We considered there was no change in consumer habits and demands on fish products for the above mentioned period and these figures remained unaffected by the time over the study period.

Methods
Determining the bulk sample and data collection

The research area consisted of households in the centre of Hatay. Survey sampling was used in a manner that it would represent various income groups from 43 neighbourhoods in the city centre. In the determination of ideal sample volume for the study, the following sampling formula (Churchill 1995) was applied. Since there had been no information on the ratio of household fish consumption in the research area, in order to reach the maximum sample, P and Q values were considered as 0.50. According to this, with a 95% importance level and 5% error margins, the sample household number determined for the research became 400.

$$n=(\frac{Z_{x/2}}{d})^2 P.Q$$

In the formula;
n : sample volume to be applied in the city centre,
P : possibility of occurrence of the studied unit within the main mass (fish buying consumers' ratio %50),
Q : 1-P (consumers' ratio who do not buy fish 50%),
$Z_{x/2}$: confidence interval (95%, table value 1.96)
d : Error term (5%).

From this;

$$n=(\frac{1.96}{0.05})^2 50*50=400$$

A total of 442 household were surveyed. After ruling out missing and incorrect surveys, 412 surveys were assessed. Surveys were carried out by the face-to-face interviews with household occupants who were chosen at random from neighbourhoods in the city centre of Hatay.

Data Evaluation

Inspected household data were categorized into three groups according to their incomes. These groups were as follows: monthly income less than ₺1 000, (low), monthly income between ₺1 000 and ₺2 000 (middle) and monthly income more than ₺2 000 (high). Monthly food and fish spendings of the household were addressed according to which income group they belong to and the average values of these were considered as the threshold value. Those with monthly fish spending below the average (₺0 to ₺50) were evaluated as low and those with higher spending than the average (₺51 and above) were considered high. As one of the multivariate analysis techniques, logistic regression analysis was carried out by considering the socioeconomic and demographic features which might affect the fish consumption of the household. The amount of monthly fish spending was considered as the dependent variable. All income, food spending, sex, age, educational and marital status, number of children, and mother's occupational status were considered as the explanatory (independent) variable. In the analysis, high fish spending status was stated as (P_i) and low fish spending status was represented as $1-P_i$ Thus, the ratio of $P_i/(1-P_i)$ was the ratio of a family's high fish consumption to the low fish spending. Here the logistic statement was (Hosmer and Lemeshow 2005);

$$P_i = E(Y_i = \frac{1}{X_i}) = \frac{1}{1+e^{-(\beta_1+\beta_2 X_i)}}$$ and the model was written as;

$$P_i = In\left(\frac{P_i}{1-P_i}\right) = \beta_1+\beta_2 X_i$$ in the model;

β_2: the slope and

X_i :independent variables.

From here, how one unit change in the independent variable might alter the ratio of the high fish spending possibility to the low fish spending can be found.

RESULTS AND DISCUSSION

Turkey is a convenient location for fish production. According to the last decade's data, average annual production was 650 thousand tonnes. When the production distribution was analysed according to the 2012 data, it was seen that of the 644 852 tonnes of fish produced in Turkey, 48.95% came from capture fisheries from the sea, 12.51% was from other marine products, 17.30% was from inland water aquaculture, 15.64% was from sea aquaculture, and 5.60% was from fresh water products (TÜİK 2013). In the same period, when we investigated fish consumption per person, it remained around 7 kg without any sign of an increase. The consumption amount was less than the world average of 18.4 kg for the year of 2010 (FAO 2012). This consumption amount was estimated as 9.3 kg for Africa, 20.8 kg for Asia and 22.1 kg for Europe. The main factors effecting the low fish consumption in Turkey are food habits, fish prices and generally limited access to the fresh fish products. Effects of these factors on the basis of the consumer must be demonstrated by the studies. Inland water aquaculture and open sea aquaculture had nearly equal production amounts. According to the statistical data gathered in recent years, inland water aquaculture reached 111.5 thousand tonnes and sea aquaculture was 100.8 thousand tonnes. As for the same data, production from fishing is a little more than 432 thousand tonnes (TÜİK 2013). Production trends for the rest of the world have a similar trend and the portion of production from aquaculture is steadily increasing. Demographic and socioeconomic data of the consumers are given in Table 1. Among the surveyed families, 172 of them (41.7%) were in the low income group, 175 (42.5%) in the middle income group and 65 (15.8%) in the high income group. It was determined that the average size of families in the study was 4 people and the average numbers of children were 1.8. When spending for food and fish consumptions was examined according to total and per person values, it was found there was linear increase with the income levels. While total monthly food spending in the low income group was ₺291, this figure reached near ₺690 in the high income group. Food expenditure per person showed a similar increase. Among the families examined, annual fish consumption level per person was estimated as 16.8 kg in the low income group, 21.96 kg in the middle income group, and 33.24 kg in the high income group. As for food spending, total and per person fish consumption amounts and expenditures also increased from the low income group to the high income group. When the annual consumptions were estimated on the basis of these values, it was seen that average fish consumption in the centre of Hatay nearly 3 times that of Turkey's average. When considering that the research area is a coastal city of the Mediterranean, this consumption amount is surprising. Living in coastal areas is one of the most important factors that contributes to increase in consumptions of different kinds of seafood (Myrland et al. 2000, Trondsen et al. 2004, Verbeke and Vackier 2005). Annual fish amounts consumed according to the educational status, age, income, marital status, number of children, and mother's occupational status of the households surveyed are shown in Figure 1-6. According to the data gained in the research, annual average fish consumption was determined as 21.48 kg/person. As for this value, fish consumption according to educational status was lower than average for primary school educated levels and higher for the other education level groups. The most striking result from other features in the study was that contrary to an increase in the number of children in the family, there seemed to be a decrease in the family's fish consumption. This suggests that the amount of fish purchased by the family does not change according to the number of children in the family in Hatay.

Table 1. Consumers' socioeconomic features food and fish expenditure

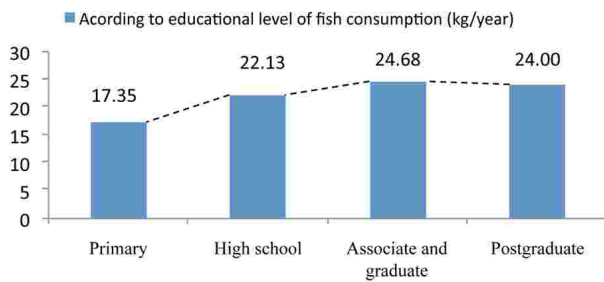| Income groups	Monthly income level (%)	Family size (person)	Number of children (person)	Food expenditure		Fish consumption level		
				Total (₺/month)	Per person (₺/month)	Total (₺/month)	Per person (₺/month)	Per person (Kg/year)
Low	41.7	4.10	1.69	291	71	33	8	16.80
Middle	42.5	4.14	1.91	440	106	55	13	21.96
High	15.8	3.78	1.62	687	179	85	22	33.24
Average	100.0	4.08	1.77	416	102	51	12	21.48

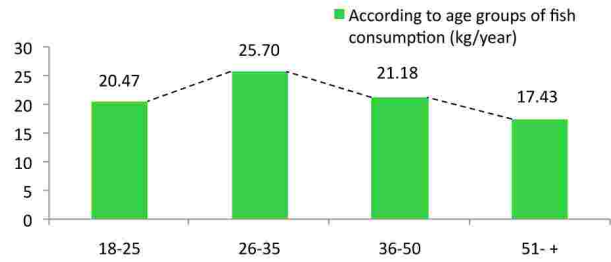**Figure 1.** Educational status and fish consumption

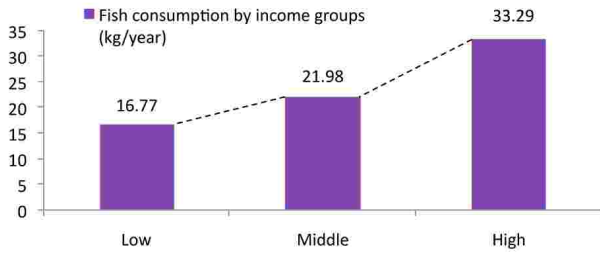**Figure 2.** Age groups and fish consumption

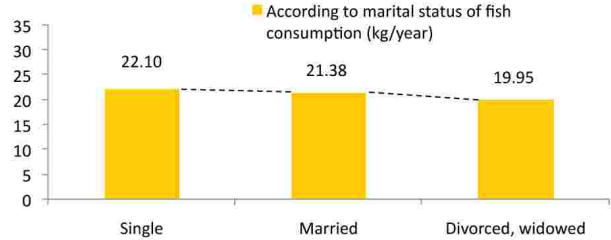**Figure 3.** Income groups and fish consumption

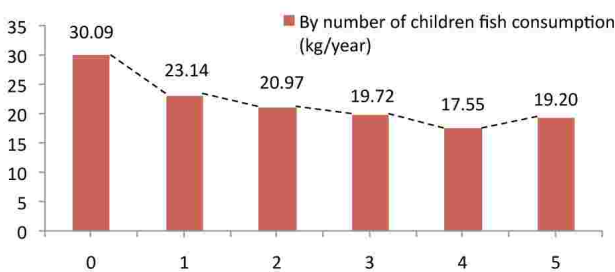**Figure 4.** Marital status and fish consumption

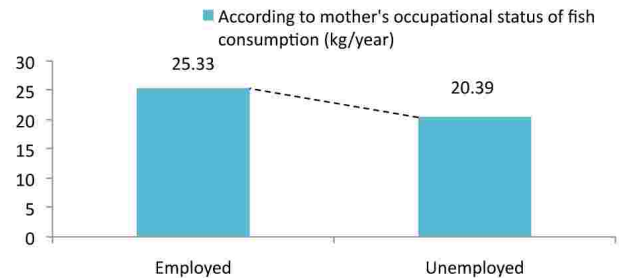**Figure 5.** Number of children and fish consumption

Figure 6. Mother's occupational status and fish consumption

Categorical variables considered in the analysis and their characteristics are summarised in Table 2. It was found that 64% of the consumers were male and 40% of the consumers were between the ages of 36 and 50. The ratio of high school educated and undergraduates were 34% and 35% respectively. Of the families, 25% had working mothers and families with 2 children had the biggest ratio with 35%. Among the participants, 74% were married, while the rest were either single or divorced. As for fish consumption, 296 consumers (72%) were considered spending less than the average (₺50 per month) while 116 consumers were consuming at higher rates (28%). Apart from these variables, the monthly food spending amount, which was not categorical, was used in the analysis as another independent variable. Against the possibility of a multi linearity problem resulting from the main mass between the independent variables in the analysis, Forward Stepwise Selection (Forward: LR) method was used in order to determine the ideal variable group. Due to the fact the error chi square statistics of variables which were not in the beginning model was $x^2\beta_0$ 119.762, p≤.05, it is understood that admitting one or more of the variables in the model will contribute to the explanatory effect of the model. Stepwise selections applied to the variables, coefficient predictions and values relating to their importance are all shown in Table 3. Variables which were not found meaningful were eliminated through the stepwise processes and the model was continued with the meaningful variables. According to this, by inclusion or elimination of the last variable used in the predictions, stepwise processes were completed.

Table 2. Features belonging to the categorical variables covered in the analysis

Variables	Explanation	Frequency	Ratio (%)
Income (Monthly)	Low (₺0-999)	172	41.7
	Middle (₺1 000-2 000)	175	42.5
	High (₺2 001 and above)	65	15.8
Sex	Male	263	63.8
	Female	149	36.2
Age	18-25	79	19.2
	26-35	110	26.7
	36-50	166	40.3
	51 and over	57	13.8
Education	Primary	119	28.9
	High school	142	34.5
	Associate and undergraduates	144	34.9
	Postgraduates	7	1.7
Mother's occupational status	Employed	103	25.0
	Unemployed	309	75.0
Number of children	0	66	16.0
	1	104	25.2
	2	144	35.0
	3	60	14.6
	4	33	8.0
	5	5	1.2
Marital status	Single	90	21.8
	Married	303	73.5
	Divorced, widowed	19	4.6
Fish consumption	Low	296	71.8
	High	116	28.2

Table 3. Steps applied in the targeted model variables and coefficient estimates

Step	Variables	ß	SE	Wald	df	P	Exp (ß)
1	Monthly food spending	0.005	0.001	61.966	1	0.000	1.005
	Fixed	-3.178	0.315	101.541	1	0.000	0.042
	Monthly income			18.704	2	0.000	
	Monthly income (low)	-1.720	0.439	15.378	1	0.000	0.179
2	Monthly income (middle)	-0.391	0.339	1.334	1	0.248	0.676
	Monthly food spending	0.004	0.001	25.042	1	0.000	1.004
	Fixed	-1.816	0.511	12.620	1	0.000	0.163
	Marital status			12.278	2	0.002	
	Marital status (single)	0.857	1.144	0.561	1	0.454	2.356
	Marital status (married)	2.002	1.106	3.274	1	0.070	7.404
3	Monthly income			14.988	2	0.001	
	Monthly income (low)	-1.560	0.446	12.204	1	0.000	0.210
	Monthly income (middle)	-0.343	0.345	0.989	1	0.320	0.709
	Monthly food spending	0.004	0.001	28.102	1	0.000	1.004
	Fixed	-3.822	1.224	9.758	1	0.002	0.022

According to the results of the analysis, there were no meaningful relations between fish consumptions of the families and the independent variables discussed at the beginning, such as sex, educational status, age of the respondent, mother's occupational status, family size, or the number of children. Thus, these variables were eliminated through the stepwise selection. The first variable which was included in the model of the coefficient predictions was the monthly food spending of the household. In the next steps, monthly income of the family and marital status of the surveyed person were included and the prediction was finalised. Among the variables reached at Step 3 in the model prediction, the single (as for marital status) people with a Wald statistical value of 2 and coefficient predictions of the household with a middle income level were not found statistically meaningful. The fish consumption of the married consumers was 6.4 times bigger than the reference category (divorced or widowed). In other words, a potential one unit increase in the fish consumption of the unmarried consumers is more than 6 times of the married families. Fish consumption of the low monthly income families surveyed in the study will show a decrease of 79% as a response to the one unit potential increase in the fish consumption of the high income group. The results of the analysis showed a positive relation between the monthly food spending and fish consumption of the families. With a potential one unit increase in the monthly food spending of the family, their fish consumptions will increase by 4%. -2LL values related to initial and final models, the significance test (Omnibus test) were significant (489.798-366.742=123.055$p≤0.05$). Correct classification rate in the model was obtained as 71.8%. In the final model, the Cox and Snell R^2 value was obtained as 0.26 and the Nagelkerke R^2 value was 0.37. Since these values are between the threshold values (0.20-0.40) which are accepted for the logistic regression analysis by a number of researchers, it could be concluded that they were favourable for the predicted model.

CONCLUSION

In the present study, fish consumption of consumers in the centre of Hatay and the factors effecting this consumption were assessed using one of the multi variable analysis techniques, logistic regression. Data were collected from participants who were chosen intentionally from 43 neighbourhoods to represent the different income groups of consumers. The data from 412 consumers were assessed. The average annual fish consumption in the area was approximately 21.5 kg. This consumption amount was 3 times bigger than the average fish consumption of Turkey. In many past

studies, it was seen that living in a coastal region leads to consuming high amount of seafood. It was seen that when there was a one unit increase in the monthly food spending of the family, there would be a positive increase in spending for fish by 4%. In a similar way, when the fish consumption of the reference group was increased by one unit, consumption of the married ones would show an increase of more than 6 times. Between the fish consumption of the high income and low income family groups, however, there seemed to be a negative correlation. There did not seem to be meaningful relations between the fish consumption of the families and the other variables (sex, education, mother's working status, family size, and number of children in the family). Despite a significant potential plus an increase in production amounts of fish in Turkey, this do not reflect fish consumption rates. The main reason for this is in the food habits of the people. In Turkey, grains, legumes, and vegetable based foods are more common. Besides the food habits, some disadvantages of fish and other fish products cannot be ruled out. For instance, difficulty of cleaning, fishbone presence, accessibility of fresh products, short shelf-life, undesirable smells, a scarcity of fish restaurants and expensive processed fish are considered as other factors that hinder the increase of fish consumption. Fish meat consumption, as opposed to red and chicken meat, is quite low when compared to EU countries and the rest of the world. To increase fish consumption, a rise in the household income and food spending, an awareness of importance of a balanced and sufficient diet, and changes in consumption habits will make positive impacts. Consumption needs to be encouraged by raising the consumer's awareness and by promoting the fish processing industry. Cheaper production should also be implemented in order to increase off-season consumption. Regulation changes to increase the food spending capacities of households are also necessary.

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