Marine Science
and Technology Bulletin

RESEARCH ARTICLE

Determination of shellfish consumption preferences and habits in Erzurum province

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ARTICLE INFO

ABSTRACT

The purpose of this research is to determine the shellfish consumption preferences and habits between November 2019 and February 2020 in Erzurum province. A survey consisting of 15 questions was asked face to face with 122 people randomly selected to obtain some results relevant to participant's average monthly income, educational background, their occupational status. The relationships between the demographic characteristics of the participants and the consumption habits of shellfish were analyzed with the Chi-square test. When demographic data were examined, 46.72% of the participants were female, 53.28% were male. The highest age group with a rate of 41,80% is 21-30 years old, the lowest being 61-70 years old with a rate of 4,92% has been identified as the group. When the education levels of the participants were analyzed, it was determined that the highest rate (60.65%) was belonged to university graduates. According to the result, 83.3% of the participants stated that they had not information about the nutritional value of shellfish. Also, it was determined that 66.2% of the sharers preferred mussels compared to crustaceans. This study in Erzurum, where the consumption of shellfish is very low compared to the seashore cities, is also an important data source in terms of providing ideas for different researches and aquaculture systems.

Introduction

Since aquaculture is rich in protein, vitamins and minerals, it is among the foods that have an important place in human nutrition and are recommended for health. Aquaculture in terms of consumption; includes molluscs, crustaceans and all kinds of fish and marine mammals. (Baysal, 2004; Oğuzhan et al., 2006).

Shellfish have been used as a food source of people since ancient times (Başçınar, 2007). Due to its animal origin, it is among the foods with high biological value, especially recommended for the nutrition of children. They contain

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mainly protein, iodine, phosphorus, zinc, vitamin E, niacin, vitamin B12, unsaturated fatty acids, omega-3, omega-6, docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA) and many bioactive beneficial components. Because they contain these extremely valuable and useful ingredients, they are classified as more valuable than many animal foods and are in the category of "functional foods", also referred to as nutraceuticals in recent years (Tokuşoğlu, 2016).

Shrimp, crab, lobster, mussel and oyster are the main shellfish products. World fish production (fish, crustaceans and molluscs) is 172.7 million tons in 2017. In 2017, 53.4 million tons of world aquaculture production was fish (66.6%), 17.4 million tons of molluscs (21.7%), 8.4 million tons of crustaceans (10.5%) and 0.9 million. tonnes consisted of other aquatic animal species (1.1%). The production of crustaceans and molluscs is also important in marine fish, which is mostly composed of marine fish. In our country, 21.8% of the total marine products caught production in 2018 was made up of other aquaculture group other than fish. The species with the highest production in this group are striped venus and sea snails, both of which are caught in the Black Sea (Anonymous, 2019).

In this study, it was aimed to determine the consumption preferences and habits of shellfish products by conducting a survey in the form of question and answer to consumers in Erzurum.

Based on this survey, an important place in the world aquaculture production units and shellfish which is high compared to the return of fish and molluscs in Turkey is thought to be done research to increase aquaculture and consumption.

Material and Methods

This study was conducted between November 2019 and February 2020 in order to determine the consumption preferences and habits of shellfish consumption in Erzurum. Erzurum is a province that covers 25,066 km² area in the Eastern Anatolia Region of Turkey. It is bordered by the provinces of Kars and Ağrı to the east, Muş and Bingöl to the south, Erzincan and Bayburt to the west, Rize and Artvin to the north and Ardahan to the northeast. Continental climate rules in the province with long and harsh winters, and short and mild summers. Agricultural activities are carried out in the province. Most of the grain types are cultivated of wheat, barley and rye. Among the industrial plants, mostly sugar beet, potato and sunflower are cultivated. Apple, pear, walnut, apricot, plum, cherry, cherry and cranberry are grown. Livestock in in the province produced. Food industries include beekeeping and trout farming (Anonymous, 2020).

The material of the study consists of data obtained from a survey with a total of 122 individuals (57 women and 65 men). The study was achieved by asking total 15 questions to participants in survey. 10 questions were asked on the seafood and shellfish consumption habits, 5 questions asked to measure demographic characteristics to better understand the underlying factors about consuming habits. The data obtained from the survey were analyzed with the Chi-square test using the SPSS package program and statistical significance level was accepted as $p < 0.05$ (Sümbüloğlu and Sümbüloğlu, 2019).

Results and Discussion

Socio-Demographic Features of Consumers Participating in the Survey

46.72% of the consumers participating in the survey are women and 53.28% are men. While the lowest age group of the participants were 61-70 age with a rate of 4.92%, the highest was determined as 21-30 age with 41.80%. 60.65% of the participants of survey were graduated from a university, 4.92% of the participants were graduated from a primary school, 13.11% of the participants were graduated from a high school, and 21.32% of the participants were graduated from postgraduate. 15.57% of the participants are official, 7.38% are self-employed, 41.80% are students, 13.94% are retired, 8.20% are housewives, and 13.11% are from other occupational groups. They were found to be considering the income levels, 32.79% of 1000 TRY and below, 14.76% of 1001-2000 TRY, 26.23% of 2001-3000 TRY, 11.47% of 3001-4000 TRY, and 14.7% of 4001 TRY and above (Table 1).

Saka and Bulut (2020) reported that 57.6% of the participants were male and 42.4% were female. When the ages of the participants were compared, 30.8% were in the 19-29 age group while 27.8% were in the 30-49 age group. When the educational status was examined, it was determined that 33.4% graduated from high school or equivalent schools and 19.1% graduated from undergraduate programs. When the professions of the participants were researched, 27% were students, 20% were self-employed, 18.6% were workers, 13.6% were homemakers, 13.3% were public officers, and 7% were retired.

In the study in Çan district of Çanakkale, the income levels were determined 18.3% of 2000 TRY and below, 19.5% of 2000-3500 TRY, 41.2% of 3500-5000 TRY, and 21% of 5000 TRY and above (Selvi et al., 2019).

Shellfish Products Preference and Consumption Habits of Consumers Participating in the Survey

Depending on the age, the analysis of the answers given by the participants to the question "*How often do you consume seafood?*" is shown in Table 2.

As a result of the Chi-square independence test for the answers given by the participants to the question "*How often do you consume seafood?*" a significant difference was found between the answers given depending on the age ($p<0.05$). While 66.7% of participants between the ages of 51-60 say they consume every fifteen days, this rate is 9.8% for participants between the ages of 21-30. They responded "*How often do you consume seafood?*" 27.5% of the respondents to the question once a week, 35.83% once a month, 5.83% twice a week, 12.5% twice a month and 18.34% once a year in a study in Palu district of Elazig province (Karaton Kuzgun and Demirbağ, 2018).

In another study in Antalya province, the frequency of seafood consumption was determined to be 43.67% once every two weeks and 26.81% once a week (Arslan and Izci, 2016). The answers given to this question in the studies conducted in different regions are thought to cause from geographical conditions, table culture and habits.

Depending on gender, the analysis of the answers given by the participants to the question "*Which of the crustaceans and molluscs do you prefer more?*" is given in Table 3.

As a result of the Chi-square independence test for the answers given by the participants to the question "*Which of the crustacean and molluscs would you prefer more?*", a significant difference was found between the answers given depending on

Table 1. Gender, age, educational status, income level, and occupational distributions of the participants

Gender	N	%
Male	65	53.3
Female	57	46.7
Age		
< 21	14	11.5
21-30	51	41.8
31-40	22	18.1
41-50	11	9.0
51-60	18	14.7
61-70	6	4.9
Educational Status		
Primary school	6	4.9
High school	16	13.1
University	74	60.7
Postgraduate	26	21.3
Income Level		
< 1000 TRY	40	32.8
1001-2000 TRY	18	14.7
2001-3000 TRY	32	26.3
3001-4000 TRY	14	11.5
> 4000 TRY	18	14.7
Occupational		
Official	19	15.6
Free	9	7.4
Student	51	41.8
Retire	17	13.9
Housewife	10	8.2
Other	16	13.1

Table 2. Shellfish consuming frequency according to the age group

Age		How often do you consume?				Total
		Once a week	Fortnightly	Once a month	Once a year	
< 21	Person	2	2	8	2	14
	%	14.3	14.3	57.1	14.3	100
21-30	Person	10	5	24	12	51
	%	19.6	9.8	47.1	23.5	100
31-40	Person	8	6	6	2	22
	%	36.4	27.3	27.3	9.1	100.0
41-50	Person	4	4	3	0	11
	%	36.4	36.4	27.3	0	100
51-60	Person	3	12	2	1	18
	%	16.7	66.7	11.1	5.6	100
61-70	Person	3	0	0	3	6
	%	50	0	0	50	100
Total	Person	30	29	43	20	122
	%	24.6	23.8	35.2	16.4	100

Note: Pearson Chi-square: 45,110 $p<0.05$

Table 3. Consuming preferences according to gender

Gender		Which of the crustaceans and molluscs would you prefer?					Total
		Shrimp	Crab	Lobster	Mussel	None	
Male	Person	10	0	1	43	11	65
	%	15.4	0	1.5	66.2	16.9	100
Female	Person	10	6	0	28	13	57
	%	17.5	10.5	0	49.1	22.8	100
Total	Person	20	6	1	71	24	122
	%	16.4	4.9	0.8	58.2	19.7	100

Note: Pearson Chi-square: 9,853 $p<0.05$

Table 4. Factors affecting the preference to buy shellfish

Gender		What do you pay attention to when buying shellfish?					Total
		Cleaning of the place taken	Freshness	Price	Species	Other	
Male	Person	9	22	16	10	8	65
	%	13.8	33.8	24.6	15.4	12.3	100
Female	Person	17	28	3	4	5	57
	%	29.8	49.1	5.3	7	8.8	100
Total	Person	26	50	19	14	13	122
	%	21.3	41	15.6	11.5	10.7	100

Note: Pearson Chi-square: 14,879 $p<0.05$

Table 5. Consuming preferences of shellfish species according to the age group

Age		Which of the crustaceans and molluscs would you prefer more?					Total
		Shrimp	Crab	Lobster	Mussel	None	
< 21	Person	0	2	0	10	2	14
	%	0	14.3	0	71.4	14.3	100
21-30	Person	5	0	1	41	4	51
	%	9.8	0	2	80.4	7.8	100
31-40	Person	9	2	0	8	3	22
	%	40.9	9.1	0	36.4	13.6	100
41-50	Person	5	0	0	4	2	11
	%	45.5	0	0	36.4	18.2	100
51-60	Person	1	2	0	5	10	18
	%	5.6	11.1	0	27.8	55.6	100
61-70	Person	0	0	0	3	3	6
	%	0	0	0	50	50.0	100
Total	Person	20	6	1	71	24	122
	%	16.4	4.9	0.8	58.2	19.7	100

Note: Pearson Chi-square: 58,282 $p<0.05$

gender ($p<0.05$). While 66.2% of men prefer the most mussel response, this rate is 49.1% for women. It was found that they did not prefer other crustaceans and molluscs. This situation is caused the fact that the consumption of shellfish is not common in our country and that there is more mussel consumption in the settlements that have a coast. In the study in Ardahan province, the most consumed seafood was found to be mussels with 11.92% (Kılıç et al., 2019). They found that consumers in Ankara province consumed mussels with 47.50%, followed by squid and shrimp respectively (Yavuz et al., 2015). In another study in the province of Burdur has been reported mussels with 71.40%, shrimp with 39.30%, squid with 25%, octopus with 7.10%, lobster with 3.60% and crab with 3.60% (Orhan and Yüksel, 2010).

Depending on gender, the analysis of the answers given by the participants to the question "*What do you pay attention to when buying shellfish?*" is given in Table 4.

As a result of the Chi-square independence test for the answers given by the participants to the question "*What do you*

pay attention to when buying shellfish?", a significant difference was found between the answers given depending on gender (p<0.05). While 49.1% of women respond to freshness, this rate is 33.8% for men. 82% of individuals in the province of Denizli reported that they pay attention to freshness while buying fish (Telli, 2018). In the central district of Kahramanmaraş province, 73% of the participants were found to pay attention to freshness while purchasing fish (Beyazbayrak, 2014). They emphasized that the people who buy fish in Rize province attach great importance to keeping the fish fresh (Temel, 2014). The survey results in different regions are similar to our results. Aydın and Bashimov (2020) reported that the freshness of the fish is very effective while buying fish consumers in urban areas of Mary city in Turkmenistan.

Depending on the age, the analysis of the answers given by the participants to the question "*Which of the crustaceans and molluscs would you prefer more?*" is given in Table 5.

In terms of the answers given to "*Which of the crustaceans and molluscs do you prefer more?*", it was observed that there was a significant difference between the ages in accordance to the Chi-square independence test (p<0.05). While 80.4% of the participants between the ages of 21-30 say they consume more mussels, this is 27.8% for the age group of 51-60.

Depending on the education level, the analysis of the answers given by the participants to the question "*Do you have information about shellfish?*" is given in Table 6.

In terms of the answers given to "*Do you have information about shellfish?*", it has been revealed that there is a significant difference between the educational status as a result of the Chi-square independence test (p<0.05). While 87.5% of the secondary education graduates give no answer, this rate is 30.8% for graduate graduates. This situation thought to be due

Erzurum province does not have a seaside, the consumption of shellfish as human food is not widespread enough and due to the table culture. Kılıç et al. (2019) were reported that 78.48% of consumers in Ardahan province had knowledge about fish meat, while 19.21% did not.

Table 6. Knowledge level of consumers on the shellfish according to the education level

Educational Status		Do you have information about shellfish?		Total
		Yes	No	
Primary school	Person	1	5	6
	%	16.7	83.3	100
High school	Person	2	14	16
	%	12.5	87.5	100
University	Person	32	42	74
	%	43.2	56.8	100
Postgraduate	Person	18	8	26
	%	69.2	30.8	100
Total	Person	53	69	122
	%	43.4	56.6	100

Note: Pearson Chi-square: 15,858 p<0.05

The analysis of the answers given by the participants to the question "*How often do you consume seafood?*" depending on their income levels is given in Table 7.

As a result of the Chi-square independence test in terms of the answers given to the question "*How often do you consume?*", it was revealed that there is a significant difference in terms of income levels (p<0.05). While 42.9% of individuals with 3001-4000 TRY income level answer every fifteen days, this rate is 10% for individuals whose income level is below 1000 TRY. In study in Erzurum province, the frequency of fish consumption

Table 7. Shellfish consuming frequency according to the income level

Income level (TRY)		How often do you consume?				Total
		Once a week	Fortnightly	Once a month	Once a year	
<1000	Person	5	4	21	10	40
	%	12.5	10	52.5	25	100
1001-2000	Person	3	5	7	3	18
	%	16.7	27.8	38.9	16.7	100
2001-3000	Person	9	11	7	5	32
	%	28.1	34.4	21.9	15.6	100
3001-4000	Person	4	6	4	0	14
	%	28.6	42.9	28.6	0	100
>4001	Person	9	3	4	2	18
	%	50	16.7	22.2	11.1	100
Total	Person	30	29	43	20	122
	%	24.6	23.8	35.2	16.4	100

Note: Pearson Chi-square: 25,704 p<0.05

Table 8. Consuming preferences of shellfish species according to the occupational group

Occupational		Which of the crustacean and mollusc do you prefer?					Total
		Shrimp	**Crab**	**Lobster**	**Mussel**	**None**	
Official	Person	7	0	0	10	2	19
	%	36.8	0	0	52.6	10.5	100
Freelancer	Person	2	0	0	4	3	9
	%	22.2	0	0	44.4	33.3	100
Student	Person	5	2	1	39	4	51
	%	9.8	3.9	2	76.5	7.8	100
Retired	Person	2	2	0	7	6	17
	%	11.8	11.8	0	41.2	35.3	100
Housewife	Person	1	1	0	2	6	10
	%	10	10	0	20	60	100
Other	Person	3	1	0	9	3	16
	%	18.8	6.3	0	56.3	18.8	100
Total	Person	20	6	1	71	24	122
	%	16.4	4.9	0.8	58.2	19.7	100

Note: Pearson Chi-square: 34,341 $p < 0.05$

was determined to be 26.7% of those with an income of 3501 TRY and above consume fish once a week, this rate is 12.5% for those whose income is 2000 TRY and less (Karakulak et al., 2019).In another study Erzincan province, the rate of those who consume fish fortnightly is 50%, the rate of those who consume fish once a month is 40%, and the rate of those who consume fish once a week is 10% (Karakaya, 2020). Quasim et al. (2020) stated that 38.8% eat fish once a month, 32% two to three times a month, 20.6% four times a month, and 8.03% more than four times a month.

Depending on the profession groups, the analysis of the answers given by the participants to the question "*Which of the crustacean and molluscs do you prefer?*" is given in Table 8.

As a result of the Chi-square independence test conducted to determine whether there is a difference between the professional groups in terms of the answers given to the question "*Which of the crustacean and molluscs do you prefer more?*", it was revealed that there was a significant difference ($p < 0.05$). It was determined that the participants consumed the most mussels with a rate of 76.5%, while this rate was 20% for housewives in Table 8.

Conclusion

In conclusion, consumption of shellfish, especially rich in nutrition, is very low in our country compared to other seafood products. According to Turkey Statistical Institute (TurkStat, 2018) fisheries data; 628631 tons of seafood was put into consumption. 35.3% marine fish, 9.9% other seafood, 4.8% inland fisheries and 50% aquaculture products. While the average fish consumption per capita was 5.49 kilograms in

2017, it increased by 11.8 percent to 6.14 kilograms in 2018. There are many reasons for this. In our study, it was seen that the lack of information about the nutritional content of shellfish is an important factor. The fact that most of the participants, whose education level is at the high school level, stated that they do not have information about shellfish products supports this situation. It is thought to be of benefit to increase shellfish training activities in the region. It is another result of our study in the responses that the consumption will increase if the prices of shellfish are reduced. The low use of shellfish in food culture in our country affects consumption significantly. These and similar studies are encouraging factors in the introducing and consumption of shellfish. This study in Erzurum, where the consumption of shellfish is very low compared to the seashore cities, is also an important data source in terms of providing ideas for different researches and aquaculture systems.

Compliance with Ethical Standards

Authors' Contributions

POY designed the study. GA performed statistical analysis. Both authors read and approved the final version of the article.

Conflict of Interest

The authors declare that there is no conflict of interest.

Ethical Approval

For this type of study, formal consent is not required.

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