



RESEARCH ARTICLE

Determination of fish consumption habits of consumers: Case study of Mary city, Turkmenistan

Ahmet Aydın^{1*}  • Güçgeldi Bashimov² 

¹ Akdeniz University, Finike Vocational School, Department of Crop and Animal Production, Antalya, Turkey

² Business Science Specialist, Mary, Turkmenistan

ARTICLE INFO

Article History:
Received: 11.02.2020
Received in revised form: 20.05.2020
Accepted: 20.05.2020
Available online: 10.06.2020

Keywords:
Fish consumption
Consumer preference
Turkmenistan

ABSTRACT

The aim of this study was to determine the habits of families towards fish consumption in urban areas of Mary city in Turkmenistan. The main data of this study has been compiled by asking 20 questions to 267 consumers who lived in Mary city. Predetermined questions were applied to randomly selected people as question-answer. Sample size of this study was determined with unclustered probability sampling method. According to the research findings, yearly fish consumption of the examined consumers was determined as 3.28 kg per capita. Mostly preferred fish are catfish, herring and grey mullet respectively. Consumers preferred bazaars the most and markets the least as a place to purchase fish. 97% consumers consume fresh fish while 64.79% consume fish by frying. While 56.55% of consumers think that fish prices are high, 34.46% of consumers think it is normal. At the end of the study, it is obtained some results relevant to participant's average monthly income, educational background, their professional status, marital status, types of supplying and consuming fish, cooking methods and attitude towards fish consumption.

Please cite this paper as follows:

Aydın, A., Bashimov, G. (2020). Determination of fish consumption habits of consumers: Case study of Mary city, Turkmenistan. *Marine Science and Technology Bulletin*, 9(2): 118-124.

Introduction

With the increase of the world's population, urbanization and the rise of social welfare, the demand for animal products is increasing day by day with the increase of the phenomenon of healthy and balanced nutrition. The researches emphasize that at least 40-50% of the daily protein requirement should be

obtained from animal-based nutrients (Kiziloglu et al., 2013). However, it is still known that animal protein consumption is insufficient in many countries today. Fish and other seafood products are an important option in order to close the animal protein deficiency. Fishery products are an important resource for closing this deficit as an animal nutrient with high nutritional value and increasing its production through culture

* Corresponding author
E-mail address: ahmetaydin-07@hotmail.com (A. Aydın)



in addition to natural stocks (Dogan, 2002). Fish in particular is an indispensable food item in terms of human nutrition and accordingly human health (Ikenweibe et al., 2011). Fish meat consists mainly of protein, fat and water. However, fish meat contains a significant amount of vitamins, iron and essential amino acids (Gogus and Kolsarici, 1992; Wang et al., 2009; Adeli et al., 2010). Fish oil (omega-3) consumed in high amounts was found to reduce the risk of developing many chronic diseases, especially cardiovascular disease (Trondsen et al., 2004).

Fish constitutes a major source of animal protein in many nations. Global fish consumption is 20.3 kg per capita and it is about 3.3 kg per capita in Turkmenistan (FAO, 2018). It is show that Turkmen people are consumed fishes in low levels. According to FAO (2018) annual fish production is about 15 thousand tons in Turkmenistan. Fish and seafood products contribute to food security at a limited level. Seafood products play an important role exclusively in the diet of the people living in the coastal area.

The aim of this study is to obtain data on the behavior and fish consumption habits of consumers in Mary city center, one of the important cities of Turkmenistan. Therefore, it is aimed to reveal the taste, preference and thoughts of consumers that are effective in their properties and consumption. Thus, this research is intended to contribute to a different approach by setting an example for future fish consumption research.

Materials and Methods

Primary and secondary data sources were used in the preparation of this research. The primary data source of the research is horizontal cross-sectional data obtained via survey from families residing in the urban area of Mary city. The survey form used in the study was developed in accordance with the purpose of the research by using studies that had previously been done for similar purposes. In this study conducted in 2019, a survey of 20 questions was applied to consumers. In the scope of the survey, it was aimed to determine the educational status of the consumers, their monthly income, their yearly fish consumption, the types of fish they consume and love the most, the characteristics they pay attention to when buying fish, and their thoughts on the way they consume and cook fish. In this study, the research, articles, papers, reports prepared before, as well as the statistical data published by the relevant institutions were utilized.

Sampling methods

Sufficient sample size to represent the population in the study was determined by using “unclustered probability sampling method” (Collins, 1986).

$$n = t^2 \times [1 + (0.02)(b - 1)] \times (p \times q)/e^2 \quad (1)$$

Where;

n: Sample size,

t: T table value corresponding to 95% significance level,

b: Sampling stage (taken as 1 since the method is single-stage),

p: Occurrence probability of the relevant case within the main mass taken as 50%,

q: Non-occurrence probability of the relevant case (1-p),

e: Accepted margin of error (The margin of error was taken as 6% in this study).

In the equation, when B=1 is taken, the equality is transformed into the following form:

$$n = t^2 \times (p \times q)/e^2 \quad (2)$$

According to this formula, the sample size is calculated as follows:

$$n = 1.96^2 \times (0.50 \times 0.50) / 0.06^2$$

$$n = 267$$

The data was transferred to the computer using SPSS and Microsoft Excel package programs, and descriptive statistical analyses (frequency, mean and percentage) were performed on the findings. The likert type scale was used to evaluate the factors that consumers care about in buying and consuming fish, as well as their level of knowledge about fish. In the study, expressions on the attitude scale were evaluated on a five point scale (Bilgin, 1995).

Results and Discussion

Socio-demographic characteristics of consumers

It is important to know the socio-demographic characteristics of fish consumers in order to investigate the consumption levels and habits of fish consumers. Table 1 includes some socio-demographic characteristics of fish consumers. Accordingly, 59.55% of consumers are women and 40.45% are men. The result also shows that majority (91.39%) of consumers were married while 8.61% were single. Of the surveyed consumers, 14.98% are in the 18-30 age range, 35.96% are in the 31-40 age range, 40.82% are in the 41-50 age range, and 8.24% are 51 years of age or older. When the number of individuals in the family is examined, 23.22% are 1-3 people, 56.55% are 4-6 people, and 20.23% are 7 or more.

When looking at the educational status of the interviewed consumers, 53.18% of them graduated from high school, 33.71% from vocational high school and 13.11% from university. While looking at the distribution of consumers by occupations, 28.84% are public servants, 20.23% are artisans/merchants, 18.35% are workers, 13.11% are retired, 10.86% are housewives, 5.62% are farmers and 2.99% are from

other occupational groups. The monthly income of the surveyed consumers ranges from \$140 to \$750. 37.07% of consumers have monthly income of less than \$200, 43.45% have between \$201-500, and 19.48% have \$501 and above.

Table 1. Some socio-demographic characteristics of consumers

Characteristics		Number	Rate (%)
Gender	Man	108	40.45
	Woman	159	59.55
Marital status	Married	244	91.39
	Single	23	8.61
Age distribution	18-30	40	14.98
	31-40	96	35.96
	41-50	109	40.82
	Over 51	22	8.24
Educational status	High school	142	53.18
	VHS	90	33.71
	University	35	13.11
Occupation	Public servant	77	28.84
	Artisan /merchant	54	20.23
	Worker	49	18.35
	Retired	35	13.11
	Housewife	29	10.86
	Farmer	15	5.62
	Other	8	2.99
Number of people in the household	1-3	62	23.22
	4-6	151	56.55
	7-+	54	20.23
Monthly household income	0 - 200 \$	99	37.07
	201 - 500 \$	116	43.45
	501 \$ <	52	19.48

Consumers' fish consumption status and habits

Information on the fish consumption characteristics of the interviewed consumers is given in Table 2. When the frequency of fish consumption is examined, 33.33% of consumers consume fish once a month, 31.84% several times a year, 21.72% every fifteen days, 8.61% once a week and 4.50% 2-3 times a week. The average yearly fish consumption of the surveyed consumers is 3.28 kg per capita. This value in the

world is about 20.3 kg/year and it is about 3.3 kg/year in Turkmenistan (FAO, 2018). The amount of fish consumption was the same the country average. Yearly per capita fish consumption was calculated 12.2 kg/year in the study conducted by Karakaya and Kirici (2016) in Bingöl, Turkey, in the study conducted in India by Bhuyan et al. (2017) was 14.27 kg/year, and in another study conducted in Australia by Farmery et al. (2018) was 9.6 kg/year. Compared to these consumption figures, it can be said that the yearly fish consumption per capita in the research area is quite low.

Table 2. Consumers' fish consumption characteristics

Characteristics		Number	Rate (%)	
Frequency of fish consumption	2-3 times a week	12	4.50	
	Once a week	23	8.61	
	Every 15 days	58	21.72	
	Once a month	89	33.33	
	Several times a year	85	31.84	
Amount of fish consumption (kg/year)	0-2 kg	122	45.69	
	2-4 kg	84	31.46	
	4-6 kg	25	9.36	
	6-8 kg	14	5.24	
	8-10 kg	10	3.75	
Preferred fish species	More than 10 kg	12	4.49	
	Catfish	100	37.45	
	Herring	54	20.23	
	Carp	47	17.60	
	Grey mullet	38	14.23	
Way of fish consumption	Other	28	10.49	
	Fresh	259	97.00	
	Processed	8	3.00	
	Fish cooking methods	Frying	173	64.79
		Baking	64	23.97
Steaming		26	9.74	
Other		4	1.50	
Fish consumption season	Summer	50	18.73	
	Winter	156	58.43	
	Both summer and winter	61	22.84	
Reasons for consuming fish	Being delicious	119	44.57	
	Being healthy	93	34.83	
	Being cheap	34	12.73	
	Having a habit	21	7.87	

Within the scope of the research, 37.45% of consumers stated that they consumed catfish, 20.23% herring, 17.60% carp, 14.23% grey mullet and 10.49% other fish species as a primarily.

When the way consumers consume fish is examined, 97.00% of consumers consume fish as fresh and 3% as processed. In various studies on the subject, the rate of fresh consumption of fish by consumers is 85.12% in Mexico (Pérez-Ramírez et al., 2015), 97% in Erzurum and Van cities, Turkey (Gungor and Ceyhun, 2017), and 76% in Indonesia (Firmansyah et al., 2019).

When the preferred fish cooking methods are sorted from top to bottom, the preferred method is frying with 64.79%, followed by baking with 23.97%, steaming with 9.74% and other cooking methods with 1.50%.

In terms of healthy eating, fish should be consumed in every season. It is seen that the majority of consumers consume fish in winter season (58.43%). However, 18.73% of the surveyed consumers stated that they consumed fish only in summer season, while 22.84% stated that they consumed fish both in summer and in winter season. In previous studies reported that consumers consume fish meat maximum in winter seasons (Erdal and Esengun, 2008; Terin et al., 2016; Kizilaslan, 2019; Saka and Bulut, 2020).

Of the individuals surveyed, 44.57% prefer fish for being delicious, 34.83% for health, and 12.73% for cheap and 7.87% for habit.

Consumers stated that the freshness of the fish is very effective when buying fish with an average score of 4.87. The taste of the fish (4.41 points), price (3.90 points) and the fishbone condition (3.46 points) were mentioned by consumers as effective factors in their preference for fish (Table 3).

Table 3. Distribution of factors affecting consumers' purchase of fish according to their importance

Factors	Attendance Ratings * (%)					Average Score
	1	2	3	4	5	
Freshness	0.37	0.37	1.12	5.62	92.51	4.87
Taste	3.37	5.24	6.74	16.10	68.54	4.41
Price	5.24	9.36	14.61	31.46	39.33	3.90
Fishbone condition	13.48	14.61	15.36	25.47	31.08	3.46

Note: *(1: Not important at all; 5: Very important)

Figure 1 provides information about consumers' preferred fish markets. According to the survey results, 89.88% of consumers buy fish from the bazaar, 7.5% from the market and 2.62% from peddlers. 56.5% of participants find the variety of fish in the market adequate, while 43.5% do not find the variety adequate.

Consumers' confidence levels in the places where they buy fish were also examined. Accordingly, 63.67% of consumers generally expressed confidence in bazaars, 43.06% in markets and 40.82% in peddlers (Table 4).

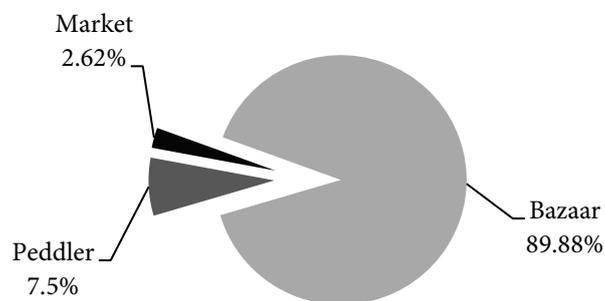


Figure 1. Consumers' preferred fish markets

Table 4. Consumers' confidence levels in places where they buy fish

Places	Always (%)	Usually (%)	Sometimes (%)	Rarely (%)	Never (%)
Bazaar	29.96	33.71	11.24	13.85	11.24
Market	13.85	29.21	13.85	13.50	29.59
Peddler	26.59	14.23	31.84	15.36	11.98

56.55% of the surveyed consumers found that fish prices were generally expensive, while 34.46% stated that they were normal and 8.99% were cheap (Table 5). 81% of consumers in the study conducted in Kenya by Esilaba et al. (2017), 73% of consumers in the study conducted in Kahramanmaraş, Turkey by Ercan and Sahin (2016), stated that fish prices were expensive. It can be said that the result obtained from the research is similar to other study results.

Table 5. Consumers' thoughts on fish prices

Thought	Number	Rate (%)
Very Expensive	64	23.97
Expensive	87	32.58
Normal	92	34.46
Cheap	24	8.99
Total	267	100.00

The status of consumers' participation in certain statements regarding fish consumption was given in Table 6. Consumers were asked to respond to the judgments on fish consumption in Table 6 as "strongly disagree" "disagree" "undecided" "agree" and "strongly agree". When consumers' responses to these judgments were examined, it was determined that 71% of

consumers participated in the statement that fish is an important food item in human nutrition.

It was found that 94% of consumers participated in the statement that fish is healthy, 56% of consumers participated in the statement that I find fish prices high. Approximately 20% of

participants that thought they have consumed enough fish, while 54% stated that they have not consumed enough fish. It was determined that 32.96% of consumers strongly disagreed and 34.08% disagreed with the statement that ads affect my fish consumption.

Table 6. Status of consumers to participate in statements on fish consumption

Statements	Attendance Ratings * (%)					Average Score
	1	2	3	4	5	
Fish is an important food item in human nutrition.	4.49	3.75	20.22	35.21	36.33	3.95
Fish is healthy	0.37	0.37	4.49	54.68	40.07	4.34
I find fish prices high	12.36	14.98	15.73	32.96	23.97	3.41
I consume enough fish	29.59	25.09	25.47	10.11	9.74	2.45
Ads affect my fish consumption	32.96	34.08	20.97	7.49	4.49	2.17

Note: * 1: Strongly Disagree, 2: disagree, 3: Undecided, 4: Agree 5: Strongly Agree

Conclusion

Fish is one of the oldest food sources of humans. Fish with a high nutritional value in terms of our health are consumed today by being loved and the demand is increasing every day. The increase in fish demand is directly related to the knowledge of consumer characteristics and preferences. Therefore, studies in this area are becoming increasingly important.

In this study, fish consumption status of consumers in Mary city of Turkmenistan was examined. According to the findings, the average amount of yearly fish consumption of the individuals surveyed was found to be 3.28 kg per person. The average fish consumption is about 3.3 kg per capita in Turkmenistan. Previous studies demonstrate that fish consumption is influenced by many factors such as sociodemographic background, personal health status, society, household income and education level (Trondsen et al., 2004; Olsen et al., 2007). High fish prices and weak seafood consumption culture are important factors affecting fish consumption in research area. However, the important reason for the low consumption of fish is that the research area is far from the sea. This also reduces the variety of seafood's in the market.

As a result of the research the consumption rate of fresh fish was determined as 97%. This trend is similar with other studies on consumption of seafood. A significant number of consumers stated that they prefer fish because it is healthy and delicious. Fish consumption is known to have a positive effect on certain diseases. The health researches revealed that consumption of fish oil (omega-3) reduced the risk of many diseases, particularly cardiovascular diseases (Trondsen et al., 2004). The

most preferred fish consumed in research area is catfish because it is cheap, nutritious and has taste well.

The purchasing of fish is influenced by many factors such as freshness, taste, smell, price, health, nutrition and quality. A research conducted in France has shown that quality and freshness are the most important factors in the sale of fish (Botrel, 2007). Results show that the most important criteria influencing fish choice by consumers as taste, nutritious and price.

The level of education is an important element in consumers' choice of fish. Also, the socioeconomic situation, differences in the household income and their occupations can cause differences in consumption areas (Salehi, 2006). According to the findings 46.82% of consumers are graduates from higher education. 33.33% of consumers stated that they consumed fish once a month, 31.84% several times a year, 21.72% every fifteen days, 8.61% once a week, and 4.50% 2-3 times a week.

When the research results are evaluated in general, the majority of consumers think that the fish is nutritious and healthy. However, a significant number of respondents surveyed stated that fish prices were high. In order to increase the consumption of fish, it is important to have different varieties regularly at fish outlets and to offer them to consumers at reasonable prices. Fish have many benefits in terms of human health. Therefore, the importance of fish consumption in terms of human health should be emphasized. For this reason, with effective training and extension services, consumers should be directed to healthy nutrition. In addition, more extensive surveys into consumer tendency to fisheries will be important sources of initiatives to increase consumption.

Acknowledgements

We would like to thank the anonymous reviewers for their comments.

Compliance with Ethical Standards

Authors' Contributions

AA designed the study. GB wrote the first draft of the article and performed analyses. Both authors read and approved the final 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.

References

- Adeli, A., Hasangholipour, T., Hossaini, S. A., Saleh, H. & Shabanpour, B. (2010). Tehranish household preference of farmed fish consumption. *Research Journal of Fisheries and Hydrobiology*, 5(2): 129-136.
- Bhuyan, P. C., Goswami, C. & Kakati, B. K. (2017). Study of fish consumption patterns in Assam for development of market driven strategies. *Research Journal of Chemical and Environmental Sciences*, 5(6): 42-52.
- Bilgin, N. (1995). Sosyal Psikolojide Yöntem ve Pratik Çalışmalar. Ankara, Turkey: Sistem Press. 178p.
- Botrel, S. (2007). Quality requirements in the French seafood market. correardb consulting Norge Conference. Retrieved in September 19, 2019 from <http://www.seafood.no/binary?id=81629>
- Collins, M. (1986). Sampling, pp. (85-110). In: Worcester, R.M., Donwham, J. (eds.), Consumer Market Research Handbook. McGraw-Hill Press, London. 840p.
- Dogan, K. (2002). Importance of fisheries sector in agriculture sector. *Agriculture İstanbul*, 80: 8-12.
- Ercan, O. & Sahin, A. (2016). Analysis of fish meat consumption at Kahramanmaraş city centre. *KSU Journal Natural Science*, 19(1): 51-65. <https://doi.org/10.18016/ksujns.57816>
- Erdal, G. & Esengun, K. (2008). The analysis of the factors effecting fish consumption in Tokat province by logit model. *Ege Journal of Fisheries & Aquatic Sciences*, 25(3): 203-209.
- Esilaba, F. A., Moturi, W. N. & Mokuu, M. A. (2017). Urban consumers' fish preferences and the determinants influencing fish selection and consumption: Case study of Nakuru Town, Kenya. *International Journal of Fisheries and Aquatic Studies*, 5(3): 356-360.
- FAO. (2018). The state of world fisheries and aquaculture 2018- Meeting the sustainable development goals. Rome.
- Farmery, A. K., Hendrie G. A., O'Kane, G., McManus, A. & Green B. S. (2018). Sociodemographic variation in consumption patterns of sustainable and nutritious seafood in Australia. *Frontiers in Nutrition*, 5: 118. <https://doi.org/10.3389/fnut.2018.00118>
- Firmansyah, Oktavilia, S., Prayogi, R. & Abdulah, R. (2019). Indonesian fish consumption: An analysis of dynamic panel regression model. *IOP Conference Series: Earth Environmental Science*, 246: 012005. <https://doi.org/10.1088/1755-1315/246/1/012005>
- Gogus, A. K. & Kolsarici, N. (1992). Fisheries technology. Publication No: 1243. Ankara, Turkey: Ankara University Faculty of Agriculture Press.
- Gungor, E. S. & Ceyhun, S. B. (2017). A survey on fish consumption and consumer preference in Erzurum and Van provinces. *Alinteri Journal of Agricultural Sciences*, 32(2): 1-10. <https://doi.org/10.28955/alinterizbd.298341>
- Ikenweibe, N. B., Idowu, A. A., Bamidele, N. A., Samuel, O. & Fadipe, E. O. (2011). Effect of socio-economic factors on fish catch in lower Ogun River, Isheri-olofin and Ihsasi, Ogun state, Nigeria. *International Journal of Agricultural Management & Development*, 1(4): 247-257. <https://doi.org/10.22004/ag.econ.147568>
- Karakaya, E. & Kirici, M. (2016). Determination of fish meat consumption habits in Bingol city center. *International Journal of Social and Economic Sciences*, 6(1): 74-85.
- Kizilaslan, N. (2019). An analysis of factors affecting fish consumption in a healthy and balanced nutrition. *Asian Journal of Clinical Nutrition*, 11(1): 9-16. <https://doi.org/10.3923/ajcn.2019.9.16>
- Kiziloglu, R., Kizilaslan, H. & Dolek, G. (2013). A research on determining ecological and industrial egg consumption preferences: the case of Tokat central province. *Alinteri Journal of Agricultural Sciences*, 24(1): 20-28.
- Olsen, S. O., Scholderer, J., Brunsø, K. & Verbeke, W. (2007). Exploring the relationship between convenience and fish consumption: A cross-cultural study. *Appetite*, 49(1): 84-91. <https://doi.org/10.1016/j.appet.2006.12.002>

- Pérez-Ramírez, M., Almendarez-Hernández, M. A., Avilés-Polanco, G. & Beltrán-Morales, L. F. (2015). Consumer acceptance of eco-labeled fish: A Mexican case study. *Sustainability*, 7(4): 4625-4642. <https://doi.org/10.3390/su7044625>
- Saka, F. & Bulut, M. (2020). Determination of fish consumption in Çanakkale. *Marine Science and Technology Bulletin*, 9(1): 7-14. <https://doi.org/10.33714/masteb.658093>
- Salehi, H. (2006). An analysis of the consumer market for carp and carp products in Iran. *Iranian Journal of Fisheries Sciences*, 5(2): 83-110.
- Terin, M., Hamamci, G., Gul, T. & Terin, S. (2016). Determination of households fish consumption structure and purchase behaviors in urban areas of Van. *Ege Journal of Fisheries and Aquatic Sciences*, 33(3): 241-249. <https://doi.org/10.12714/egejfas.2016.33.3.08>
- Trondsen, T., Braaten, T., Lund, E. & Eggen, A. E. (2004). Health and seafood consumption patterns among women aged 45-69 years. A Norwegian seafood consumption study. *Food Quality and Preference*, 15(2): 117-128. [https://doi.org/10.1016/S0950-3293\(03\)00038-7](https://doi.org/10.1016/S0950-3293(03)00038-7)
- Wang, F., Zhang, J., Mu, W., Fu, Z. & Zhang, X. (2009). Consumers' perception toward quality and safety of fishery products, Beijing, China. *Food Control*, 20(10): 918-922. <https://doi.org/10.1016/j.foodcont.2009.01.008>