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DETERMINATION OF FISH CONSUMPTION HABITS IN DİYARBAKIR PROVINCE

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Abstract: This study was conducted to determine the fish consumption habits in Diyarbakır province and the reasons that influence these habits. A questionnaire survey was carried out on a total of 3310 individuals, consisting of 1910 males and 1400 females, in the center and districts of Diyarbakır. According to the results, it was found that 16% of the respondents consumed fish and the most preferred fish were anchovy (30.81%) and carp (25.98%). When buying fish, 40.04% of people said that they preferred it to be cheap and 20.63% said that they preferred it to be tasty. The study concluded that the majority of fish consumption occurs during the winter season. The primary reasons for not consuming fish, as indicated by the respondents, were the high price (42.38%) and a lack of purchasing power (38.42%). Looking at the monthly consumption of individuals, 49.78% consume less than 1kg of fish. As a result of the study, it was found that fish consumption in Diyarbakır province is far below the national and world average. In addition to socio-economic reasons, this situation is thought to be due to the fact that fish cannot be consumed in all seasons because the city is far from the sea coast. In addition, the rate of aquaculture and consumption of aquaculture products in Turkey is quite low. In this context, the consumption of aquaculture products should be increased.

Keywords: Fish consumption, Diyarbakir, Consumption habits, Socio-Demographic factors

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1. Introduction

The fisheries and aquaculture production sector has become one of the food production sectors that has attracted attention in the 21st century due to the need for protein-rich food, especially with the growing population in recent years. As indicated in the FAO (2019) report, aquaculture products represent 17% of the global consumption of animal protein. According to the report of the Food and Agriculture Organization of the United Nations (FAO, 2022), the sector that has shown the most development among food sectors in the last 10 years is the aquaculture sector. In Turkey, as in the world, the fisheries sector is growing every year. Our country, which has three distinct marine ecosystems and a coastline spanning 8,333 km, boasts a significant inland and marine fisheries production capacity, supported by an extensive network of dams, lakes, and rivers (Arslan and Yıldız 2021). The production, which has been based on hunting for many years, has turned to aquaculture in recent years with the increase of aquaculture with the advancement of technology. Although hunting has been less developed than aquaculture in Turkey and in the world in recent years, it has maintained its importance in aquaculture production. When the distribution of sea fish caught by species was examined, anchovy was the fish caught in the largest quantity with 151.598 tons.

Anchovy was followed by sprat with 28.041 tons and horse mackerel with 19.590 tons. In 2021, 335 thousand 644 tons of aquaculture production took place in seas and 136.042 tons in inland waters. The most important fish species cultivated in inland waters were trout with 135,732 tonnes, sea bass with 155.151 tons and sea bream with 133.476 tons (TUİK, 2022). As the world's population grows, the agricultural products needed to provide an adequate and balanced diet are decreasing. Water resources are one of the most important factors in nutrition. Animal foods are the main source of protein in the human diet. Among animal foods, the protein and nutritional value of fish is high. Omega-3 fatty acids are mainly found in fish (Kris-Etherton et al., 2002). People in developed countries pay attention to nutrition and choose foods that are best for their health. Seafood is a rich source of polyunsaturated fatty acids, which are beneficial for human nutrition. These acids positively impact human metabolism and physiological functions, and are essential for maintaining a healthy lifestyle (OKA, 2014).

In Türkiye, the income level of the consumer, the price of aquaculture products, consumer preferences, consumer habits and the social and economic structure of the region are the factors that influence the demand and consumption of aquaculture products. The fact that the annual per capita consumption of fish is very low in

Eastern Anatolia, Southeastern Anatolia and Central Anatolia, while it is quite high in the Black Sea and other coastal regions, indicates that the amount of aquaculture products consumed in Türkiye varies by region. For example, the per capita consumption of fish in the Black Sea region is around 25 kg, while this value is calculated to be less than 1 kg in Eastern and Southeastern Anatolia (Karakaya and Kırıcı 2016). Studies on fish consumption in Turkey have mostly focused on determining the structure of fish consumption (Karakaya and Kırıcı 2016; Terin et al., 2016; Şen and Şahin 2017). Considering both the benefits of fish for healthy nutrition and its production potential and added value in Turkey, it is necessary to conduct research to determine the factors affecting fish consumption in Turkey and develop necessary strategies. Survey is the most popular and systematic method of data collection when used under appropriate conditions. This study was conducted to determine the structure of fish consumption and the purchasing tendencies of consumers in the city center of Diyarbakır province. In this way, it aims to determine the place of fish meat in the dietary structure of consumers living in Diyarbakır province.

2. Materials and Methods

The study was conducted to determine the fish consumption habits and quantity in Diyarbakır city center and districts. In order to determine the fish consumption habits of the people living in this city and the reasons for them, the questionnaire consisting of 20 questions was administered to a total of 3310 participants, including 1400 women and 1910 men, who were randomly selected, face to face and in the form of question and answer. At the same time, questions were asked about the type of meat, type of fish, frequency of consumption, amount consumed, reasons for preference and non-preference, and the way the products were prepared. Since it is not possible to survey all individuals in the provinces and districts in terms of time and financial means, the equal probability simple random sampling method was applied and the sampling size (equation 1) was obtained using the following equation when the number of population units is over 10,000 (Yazıcıoğlu and Erdoğan 2014).

$$n = P \times Q \times Z\alpha 2/d2 \tag{1}$$

n: Sample size,
P: probability of the event occurring,
Q(1-P): Probability that the event does not occur,
$Z\alpha 2$: confidence coefficient (this number is taken to be 1.96 for a 5% margin of error),
d: Sampling error accepted according to the frequency of the event.
The data obtained were analyzed and interpreted in MS-Excel and the results were compared with the results of similar studies.

3. Results

3.1. Demographic Structure

It is observed that 42.30% of the consumers are male and 57.70% are female. In terms of age distribution, 39.87% of the age group is between 21 and 30 years old, while 21.75% of the age group is between 31 and 40 years old. The number of family members is as follows: 28.24% of respondents have four family members, 23.65% have five, 9.06% have three, 8.76% have seven, 7.85% have eight, and 7.55% have six. The respondents were found to have the following levels of education: 53.17% had completed university studies, 25.67% had completed primary school, and 20.24% had completed secondary school. The occupational groups are as follows: 32.77% are employed in some capacity, 26.58% are retired, and 22.35% are civil servants.

3.2. Fish Consumption Habits

In terms of fish consumption, 42.90% of respondents consume chicken, 40% red meat, 16.01% fish and 1.08% meat. The general opinion on fish prices is that 88.15% of the respondents think that fish prices are expensive. 10.27% of the respondents stated that the prices are normal; 0.96% stated that they have no information about fish prices (Figure 1).
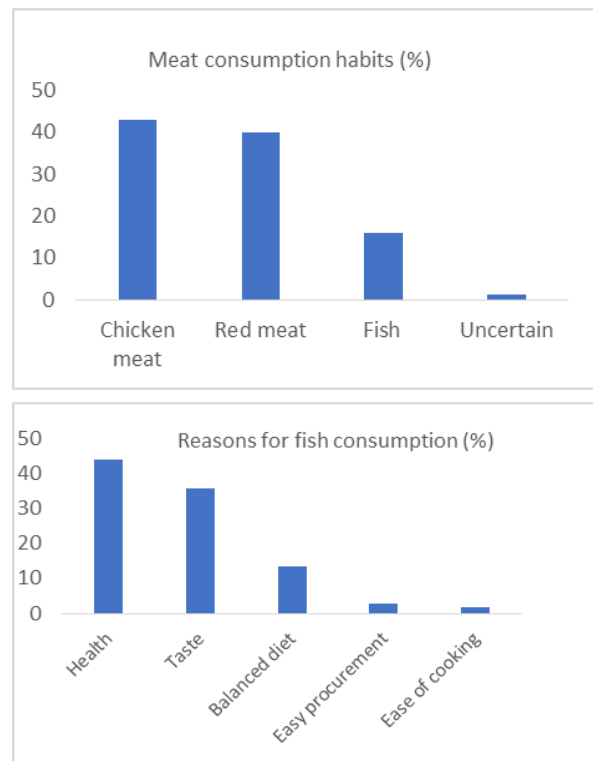

Figure 1. Individuals' meat consumption preferences and reasons for fish choice.

If we look at the frequency of fish consumption, 47.43% of the participants consume fish once a month; 38.67% once a year; 12.53% once every fifteen days; 0.84% do not consume fish; 0.51% consume fish once a week. The reasons for preferring fish are: 43.98% health; 35.64% taste; 13.29% balanced diet; 2.71% easy to obtain; 1.81% easy to cook. According to the respondents, 48.03% of

the people who took part in the survey get their fish from the market, 24.16% from the fish market, 14.44% from hawkers, and 11.78% from the fish market. When buying fish, 46.04% of the participants look for factors such as economy, 29.63% for taste, and 22.26% for less bones. If we look at the most consumed fish, 30.81% say anchovy, 25.98% carp, 22.65% trout, 6.94% sea bream, 5.74% sea bass, 3.62% bonito, 2.11% bluefish, and 1.78% sardine (Figure 2).
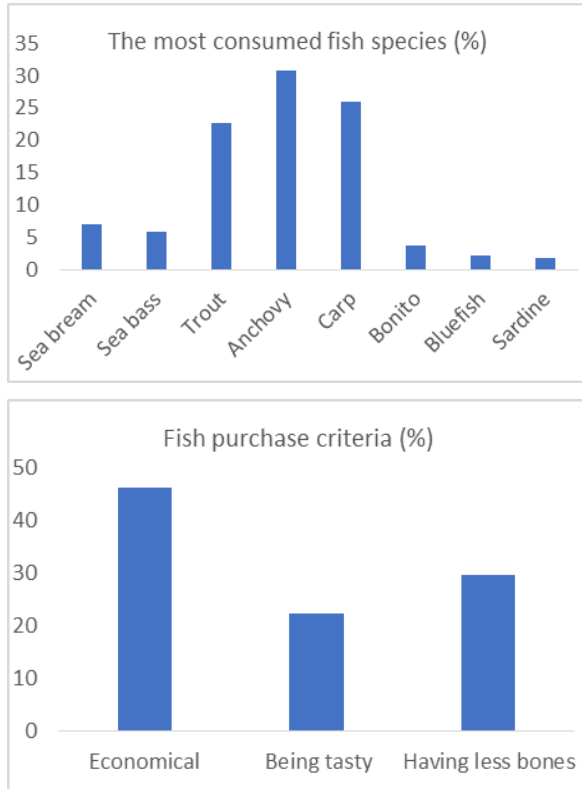
Figure 2. Preferred species of fish and the reasons for this preference.

As a result of the questionnaire, 40.78% of the people consumed less than 1 kg; 24.47% consumed between 1 and 3 kg; 14.19% consumed between 4 and 6 kg; 9.36% consumed more than 10 kg; 8.45% consumed between 6 and 10 kg. 58.61% of the participants stated that they consumed fish mainly in the winter season, 14.35% in the autumn, 11.93% in the summer and 8.45% in the spring. If we look at the way people consume fish, 90.42% eat it fresh, 3.65% eat it canned, 3.53% eat it salted and 1.26% eat it pickled. When it comes to cooking fish, 63.83% of people prefer frying, 33.98% grilling and 1.20% steaming. The reasons for not consuming fish were identified by 42.38% as being expensive; 38.42% as not having the purchasing power; 11.90% as not being tasty; 4.74% as not being available where they live; 1.75% as household size.

4. Discussion

The macro and micro minerals present in fish are of significant importance for maintaining bone health, dental hygiene, dermal integrity, and cellular protection.

Furthermore, they are essential for maintaining healthy heart rhythm, blood pressure, fluid balance, muscle function, reproductive system function, and gut flora (Varlık et al., 2004). Cevher (2018) conducted a study in Konya Province and found that 53% of the participants were university graduates, 26% were high school graduates and 11% were middle school graduates. In a study conducted in Antalya province, 34.72% of the participants were university graduates, 31.72% were primary school graduates, 23.08% were high school graduates and 10.48% were middle school graduates (Arslan and İzci 2016). When analyzing the educational status of the participants in Tunceli province, 55.5% of them have university education and 24.4% of them are high school graduates (Yüksel et al., 2011). In this study, 53.17% of the respondents were university graduates, 25.67% were primary school graduates and 20.24% were secondary school graduates. The occupational groups are 32.77% workers, 26.58% pensioners and 22.35% civil servants. In the study conducted by Kırıcı et al. (2018) in the city center of Siirt province, it was found that 40.6% of people consumed white meat, 31.4% consumed red meat and 22.5% consumed fish. Soylu (2018) reported in his study conducted in Kayseri that red meat was the most consumed, followed by chicken meat and then fish. Yüksel et al. (2011) found that red meat (40%), chicken meat (38%) and fish meat (22%) were the most consumed types of meat by people living in Tunceli. Olgunoğlu et al. (2014) conducted a study to determine fish meat consumption habits in Adıyaman and found that the most consumed meat products were chicken meat (56%), red meat (38%) and fish meat (5%). Arslan and İzci (2016) found that the meat consumption rate was 46.96% for chicken meat, 36.12% for red meat and 16.92% for fish meat, respectively. In this study, 42.90% of the respondents consume chicken meat, 40% red meat and 16.01% fish meat. Reasons such as the high nutritional value or the healthiness of fish meat were found to be first in the preference for fish consumption with 72.3% in Tekirdağ province by Abdikoğlu et al. (2015), 29% in Ankara and Çanakkale provinces by Bayraktar et al. (2019), 51.2% in Erzurum, 67.9% in Bayburt and 67.3% in Erzincan by Doğan (2019). In the studies conducted by Kırıcı et al. (2018) in Siirt province and Karakaya and Kırıcı (2016) in Bingöl, the deliciousness factor ranked first in fish consumption preference with 57.6% and 60.1%, respectively. In general, it can be said that fish meat consumption is higher in places closer to water resources, while red meat and chicken meat are consumed more than fish meat in places far from water resources. It can be said that this situation is caused by the eating culture, the transport or the way of getting the fish to the region and the prices. Cevher (2018) conducted a study in Konya and found that 57% of the participants consumed 1-3 kg and 32% consumed 4-6 kg of fish per month. Çelik (2014) found in his study in Manisa that 33% consumed 1-2 kg, 24% consumed 2-4 kg, 20% consumed 1 kg and

23% consumed more than 4 kg of fish, and the per capita consumption of aquaculture products was 7.7 kg/year. In the study conducted in Ankara and Çanakkale provinces, it was found that 81% of participants preferred to consume fish once a week or once a month (Bayraktar et al., 2019). Çiçek et al. (2014) found that 28% of consumers in Elazığ province consumed fish meat once every fifteen days, 25% once a week, 23% once a month, 15% several times a year, 4% two to three times a week, and 5% did not consume fish at all. In a study conducted in Siirt province, the frequency of fish consumption was found to be once a month, with 32.5% of respondents indicating this as their preferred frequency (Kırıcı et al., 2018). In a study conducted by Terin et al. (2016) in Van, the frequency of fish consumption every fifteen days was identified as the most prevalent, with a rate of 30.6%. In their study conducted in Mersin, Şen and Şahin (2017) reported that 43% of individuals consumed fish once a week and 42% consumed fish once a month. In this study, 47.43% of the participants consumed fish once a month, 38.67% consumed fish once a year, 12.53% consumed fish once every fifteen days, 0.84% did not consume fish, and 0.51% consumed fish once a week. Bayraktar et al. (2019) reported that the most consumed fish type was anchovy with 59%, and the highest fish consumption was in winter (37%). In a study conducted in Süleymanpaşa district of Tekirdağ province, it was found that the most consumed marine fish was anchovy with 25.66%, the most consumed freshwater fish was trout with 46.78%, and people consumed fish mostly in winter (34.78%) (Abdikoğlu et al., 2015). In this study, the most consumed fish were anchovy (30.81%), carp (25.98%), trout (22.65%), sea bream (6.94%), sea bass (5.74%), bonito (3.62%), bluefish (2.11%), and sardine (1.78%). In many previous studies carried out throughout Turkey, it has been observed that individuals consume anchovies the most. In other studies, Çolakoğlu et al. (2006) stated that people living in Çanakkale province buy fish from fish markets and fish markets. Temel (2014) stated that 80% of people living in Rize province buy fish from fish markets. Balık et al. (2013) found that the people living in Aybastı and Fatsa districts of Ordu prefer to buy fish from peddlers and fish markets, while Aydın and Karadurmuş (2013) found that the people living in Trabzon and Giresun provinces generally (50.81%) procure fishery products from fish stalls. Erdal and Esengün 2008 found that families living in Tokat prefer certain fish sellers (85%) when buying fish. In this study, 48.03% of the participants said that they bought fish from the market, 24.16% from the fish market, and 14.44% from travelling vendors, 11.78% from the fish market and 0.60% from the fish market. In a study conducted in Adıyaman, 41% of the participants fried the fish in oil, 35% cooked it in the oven and 23% cooked it on the grill (Olgunoğlu et al., 2014). Cevher 2018, in his study in Konya, found that 60% of the participants preferred frying and 20% preferred grilling. In this study, 63.83% of individuals preferred frying,

33.98% preferred grilling and 1.20% preferred steaming. In a study conducted in Antalya province, it was found that 80% of the individuals consumed fresh seafood products (Arslan and İzci, 2016).

In this study, the consumption pattern of fish among individuals was examined and it was found that 90.42% consumed fresh fish, 3.65% consumed canned fish, 3.53% consumed salted fish and 1.26% consumed salted fish. A review of the data from the surveys conducted in our country reveals that a significant proportion of the population consumes fresh fish. In contrast, the consumption of processed fish products remains relatively low. The reasons for this can be attributed to the fact that both aquaculture and fishing supply the market with fresh fish, which is readily available at all times. Consequently, the consumption of processed fish products is not a habit that is widely practiced. In a study conducted in Tokat province, the average annual per capita fish consumption was 13 kg/year (Erdal and Esengün 2008), 4.1 kg/year in Tunceli province (Yüksel et al., 2011), 3.6 kg/year in Elazığ province (Çiçek et al., 2014), 21.5 kg/year in Hatay province (Demirtaş et al., 2014), 20.07 kg/year in Rize province (Temel 2014), 14.69 kg/year in Tekirdağ province (Abdikoğlu et al., 2015), 7.7 kg/year in Manisa province (Dereli et al., 2016), 16.8 kg/year in Van province (Terin et al., 2016). In this study, as a result of the survey, monthly fish consumption was determined as follows: 40.78% of individuals consumed less than 1 kg; 24.47% between 1 and 3 kg; 14.19% between 4 and 6 kg; 9.36% more than 10 kg; 8.45% between 6 and 10 kg.

5. Conclusion

The consumption rate of aquaculture products in the province is well below the world and national averages. A review of the research findings reveals that the majority of consumers perceive fish as a nutritious and healthy food. Nevertheless, a considerable number of respondents indicated that fish prices are elevated. It is very important to analyses the market demand very well and to meet the demand in time. It is important that fish is available on the market at the desired time, especially in the winter season, and that it is fresh. Promotional and production activities should be emphasized to encourage the consumption of aquaculture products, which are healthy food, in the province with a high youth population. Product promotion, especially of processed products, cold chain transport of fish, widespread use of hygienic fish markets and activities to promote fish consumption in schools will increase fish consumption.

Author Contributions

The percentage of the author(s) contributions is presented below. The author reviewed and approved the final version of the manuscript.

	F.Ö.	K.A
C	100	
D	100	
S	80	20
DCP	80	20
DAI	80	20
L	80	20
W	80	20
CR	80	20
SR	80	20
PM	80	20
FA	80	20

C= concept, D= design, S= supervision, DCP= data collection and/or processing, DAI= data analysis and/or interpretation, L= literature search, W= writing, CR= critical review, SR= submission and revision, PM= project management, FA= funding acquisition.

Conflict of Interest

The author declared that there is no conflict of interest.

Ethical Consideration

Ethics committee approval was not required for this study because of there is no animal or human research. Written and informed consent forms were obtained from participants for the study.

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