FOOD and HEALTH

FOOD and HEALTH
E-ISSN 2602-2834

Food and Health 12(1), 59-71 (2026) • https://doi.org/10.3153/FH26006

Research Article

Investigation of seafood consumption habits in preschool education group children (4-6 Years): The case of Çukurova-Adana, Türkiye

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Cite this article as:
Akman, M., Özyurt, G. (2026). Investigation of seafood consumption habits in preschool education group children (4-6 years): The case Çukurova-Adana Türkiye. *Food and Health*, 12(1), 59-71. https://doi.org/10.3153/FH26006

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Submitted: 20.08.2025
Revision requested: 15.09.2025
Last revision received: 22.09.2025
Accepted: 26.09.2025
Published online: 05.01.2026

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Available online at
http://jfhs.scientificwebjournals.com

ABSTRACT

This study was conducted to determine the seafood consumption habits of families living in the Çukurova district of Adana province who have children in the preschool period (4–6 years). Face-to-face surveys were administered to the families of children attending different preschool institutions in the region, and data obtained from 301 participants were evaluated. The majority of the participants were mothers aged between 35 and 39 years; in terms of educational status, most were high school and university graduates, and in terms of occupation, homemakers were predominant. Most of the families were in the middle-income group. According to the results, the most common frequency of fish consumption among children was once a week, followed by twice a month and once a month. More than half of the participants stated that they did not give fish to their babies until the age of one. During pregnancy and lactation, fish and fish oil consumption were low. The fish consumption habits of families showed a distribution similar to those of their children. The most preferred cooking method was baking, and the most preferred fish species was seabass, followed by seabream and anchovy. The consumption of freshwater fish was limited. Analyses revealed a significant relationship between the mother's education level and the frequency of fish consumption of the child, and that the frequency of consumption increased as the income level increased. The data obtained emphasise the importance of educational and informational programs aimed at increasing fish consumption in the early childhood period, covering the 4–6 age range.

Keywords: Seafood, Fish consumption in children, Preschool period, Parental habits

Introduction

Adequate and balanced nutrition is essential for protecting human health and raising healthy future generations. Nutrition is a fundamental factor not only in meeting physical needs but also in maintaining a healthy, productive, and balanced life. Research indicates that, on average, a person consumes approximately 60 tonnes of food in around 70,000 eating occasions over a lifetime (Saltik, 2019). In daily life, individuals make more than 200 decisions about what to eat, indicating that food consumption represents a structurally complex behavioural pattern (Wansink & Sobel, 2007). Therefore, analysing consumer behaviour, particularly shaping nutritional habits at an early age among the child population, is of great importance for public health.

The rapid growth of the global population necessitates the diversification and quantitative increase of resources used for adequate and balanced nutrition. In addition to basic organic nutrients such as carbohydrates, lipids, and vitamins, 40–50% of the protein requirement should be met from animal sources (Amao & Ayantoye, 2014; Çadır & Duman, 2013; Sarıözkan et al., 2007). Ensuring that children in the growth phase have access to adequate and balanced protein sources is critical for their physical and mental development. Animal-derived proteins play a significant role in supporting this process. However, in recent years, the association of red meat with high saturated fat content and increased disease risk, together with concerns over antibiotics and hormones in poultry, has led individuals to seek alternative animal protein sources (Can et al., 2015; Temel & Uzundumlu, 2014). At this point, fish and seafood, which are rich in unsaturated fatty acids, highly digestible, and nutritionally valuable, have come to the forefront (Varlık et al., 2004).

In addition to being a high-quality protein source with high biological value, fish is also rich in omega-3 fatty acids (EPA and DHA), vitamin D, vitamin B12, iodine, selenium, and zinc (Öksüz et al., 2018). These nutrients contribute significantly to strengthening the immune system, preventing cardiovascular diseases, and supporting cognitive development and learning functions (Baysal et al., 2002; Girgin & Nayir, 2024). In particular, regular fish consumption during pregnancy and lactation is critical for the neural development of the child (Özşeker, 2019).

Despite these scientifically proven health benefits, per capita fish consumption in Türkiye remains significantly below the world average. According to 2023 data from the Turkish Statistical Institute (TÜİK), annual per capita seafood consumption in Türkiye is 7.2 kg. In contrast, the global average reported by the Food and Agriculture Organisation (FAO, 2022) is 20.7 kg/year. This difference cannot be explained solely by production or availability; cultural preferences, lack of knowledge, eating habits, and taste preferences are also among the main limiting factors (Durna et al., 2023; Söğüt, 2017). Therefore, research focusing specifically on childhood is needed to increase seafood consumption and to encourage society to adopt this habit from an early age. Fish consumption in children affects not only their current health status but also their capacity to develop sustainable, healthy lifestyle patterns in later life. Understanding the factors that influence children's eating behaviours is essential for establishing lasting healthy dietary preferences. The 0–6 age period is a critical stage for the development of taste preferences, food choices, and the acquisition of basic eating habits. Dietary habits established during this stage significantly shape consumption behaviours in later years (Özşeker, 2019; Söğüt, 2017).

Given that health is the primary concern for consumers when purchasing food, accurate information should be provided on the role of seafood in preventing various diseases and its valuable nutrient composition. To this end, consumer food preferences should first be analysed, and the underlying sources of concern and the barriers to accessing healthy food should be addressed. Regional studies in Türkiye have shown that demographic, economic, and socio-cultural factors strongly influence seafood consumption behaviour. For instance, a study conducted around Keban Dam Lake reported that fish consumption was primarily limited to freshwater species, with freshness and taste being the main determinants of consumer preference (Çadır & Duman, 2013). Similarly, field studies in İzmir, Manisa, Tunceli, and İskenderun have demonstrated that family structure, education level, and income status significantly affect fish consumption frequency (Girgin & Nayir, 2024; Durna et al., 2023; Karadaş et al., 2024).

This study aimed to examine the seafood consumption habits of families with children aged 4–6 years living in the Çukurova district of Adana province. Although Adana is one of Türkiye's major centres for agriculture and food production, its fish consumption rate remains below the national average. Therefore, the selection of Çukurova as the study area is significant, as it reflects both the region's socio-economic structure and its urban living conditions. The primary objective of the study was to analyse the seafood consumption behaviours of preschool children through their families and to identify the factors influencing these behaviours. Furthermore, by assessing knowledge levels, habits, barriers, and potential areas for increasing awareness regarding fish consumption, the

study sought to develop recommendations for promoting seafood consumption. Accordingly, the findings offer a valuable basis for shaping local and national policy initiatives that encourage seafood consumption in early childhood.

Materials and Methods

This study was conducted to determine the fish consumption habits of children attending kindergartens and preschool classes within primary schools in the Çukurova district of Adana. The survey method was used, and a questionnaire was applied to the families of preschool children aged 4-6. According to data obtained from the Çukurova District National Education Directorate, the target population consisted of 3,151 preschool children enrolled in kindergartens and preschool classes within primary schools in the district during the 2023–2024 academic year. Based on this total number of students, the minimum sample size was calculated using the relevant formula (Baş, 2001).

$n = (N \times t2 \times p \times q) / d2 \times (N - 1) + t2 \times p \times q$

N = Total number of individuals in the target population

n = Sample size

p = Probability of occurrence of the investigated event

q = Probability of non-occurrence of the investigated event

t = Theoretical value obtained from the t-distribution table at a given confidence interval

d = Accepted margin of error for the occurrence probability of the event

The study was carried out in 10 schools, and a total of 301 parents participated voluntarily. Parents were contacted directly through the schools, and the questionnaires were distributed and collected with the support of the school administrations. A survey consisting of 25 questions was designed to determine the demographic characteristics and seafood consumption habits of the target group. The survey form was developed by reviewing previous studies on seafood consumption habits (Can et al., 2015; Özşeker, 2019; Söğüt, 2017; Bayraktar et al., 2019; Küçük, 2020; Demirci et al., 2022; Terin & İnanç, 2023; Karadaş et al., 2024), and region-specific questions were added to adapt the content to local conditions. The questionnaire included demographic questions and items on seafood consumption habits structured as multiple-choice and multiple-response questions. Permission was obtained from the National Education Directorate to administer the survey to parents. In addition, ethical approval was received from the Çukurova University Scientific Research Ethics Committee, and the approval was given on September 29, 2023.

Statistical Analysis

The data obtained were categorised and presented in frequency tables. Chi-square (χ^2) test of independence was applied to determine the factors affecting fish consumption habits ($p < 0.05$). The null hypothesis (H_0) was rejected if the p-value was < 0.05, indicating that there was a statistically significant relationship between two categorical variables. Conversely, if the p-value was > 0.05, H_0 was accepted, meaning that no statistically significant relationship existed between the tested categorical variables. All analyses were conducted using the "chisq.test" function in the "stats" package of R (R Core Team, 2024). Additionally, data visualisation was performed using the ggplot2 package in the R language.

Results and Discussion

The demographic profile of the study group was evaluated based on information obtained from the parents of 301 preschool children aged 4–6 years in the Çukurova district of Adana. The demographic data of the children showed that 56.81% were girls and 43.19% were boys. About mothers' educational background, the majority had completed secondary education (30.90%) or held a bachelor's degree (29.57%) (Table 1). The proportion of mothers with an associate degree was 19.60%, while 5.32% had postgraduate education. A small minority of mothers (1.99%) had no formal education. In terms of occupational status, more than half of the mothers (52.16%) were homemakers, while among those in employment, the education sector was the most common field of work (14.63%). The age distribution showed that most mothers (approximately 81%) were between 30 and 44 years of age. As for fathers' education, the most significant proportion were bachelor's degree holders (37.54%), followed by secondary school graduates (26.91%) and associate degree graduates (13.62%). Overall, fathers' educational level was observed to be relatively high, suggesting that the study population reflected a well-educated group (Table 1). In terms of occupation, the highest proportion of fathers (22.26%) was employed in craft and manual labour. Other notable occupational categories included engineering and technical professions, sales and service, and finance and office work. The age distribution indicated that most fathers (62.21%) were between 35 and 44 years of age.

The monthly income levels of the participating families were assessed. The majority of participants reported an income above the legal minimum wage. At the time of the survey, the net minimum wage was 11,402.32 ₺, and 90.37% of participants reported an income exceeding this amount. An income

between 10,000 and 20,000 ₺ was reported by 35.55% of families, while the most significant proportion (39.53%) belonged to the 20,001–50,000 ₺ income bracket. A total of 15.28% of participants reported an income of 50,000 ₺ or more, whereas only 9.63% reported an income below 10,000 ₺.

Fish Consumption Frequency and Habits in Children

Data on the frequency of fish consumption among children aged 4–6 years who participated in the study indicated a wide distribution of consumption behaviours. The most frequently reported consumption rate was once per week, with 25.25% of children consuming fish or seafood at this frequency. This was followed by a consumption rate of twice per month, reported by 24.92% of participants. On the other hand, 10.96% of children reported not consuming any fish (Figure 1). Özşeker (2019) reported that in the Eastern Black Sea region, 56.6% of children aged 0–6 years consumed fish at least once per week, with the highest consumption observed in children aged 3–6 years. This finding was consistent with the relatively widespread fish consumption observed in the 4-6 age group in the present study. Söğüt (2017) found that in İskenderun, 41.4% of families with preschool children consumed fish once per month, 29.3% every two weeks, and 21.5% once per week. These rates were comparable to the weekly consumption rate (25.25%) observed in this study. Karadaş et al. (2024) indicated that in Adıyaman and Iğdır, fish consumption frequency was generally limited to 1–2 times per month, with price, health concerns, and taste preferences being the main factors affecting consumption. Considering the consumption rates of twice per week (2.66%), twice per month (24.92%), and once per month (20.6%) observed in this study, the overall frequency of fish consumption was slightly higher compared to the previously cited regions.

In this study, the majority of children who did not consume fish (90.9%) reported avoiding it because they "did not like" fish. Only a limited number of parents cited economic reasons (6%) or health concerns (3%) as factors limiting fish consumption. Similarly, Karadaş et al. (2024) reported that in Adıyaman and Iğdır, individual preferences such as taste and dislike of odour were the main factors restricting seafood consumption. Söğüt (2017) found that in İskenderun, among families with preschool children, the most frequently mentioned reasons for not consuming fish were its smell and the presence of bones. Demirci et al. (2022) reported that, in Adana, among families of middle school students, fish consumption was generally limited to once per month, primarily due to the presence of bones and high cost. These findings indicated that taste preferences and individual liking were the predominant factors among children who did not consume fish.

When the use of fish oil supplements was examined, 32.56% of the participants stated that they regularly gave fish oil supplements to their children, while 22.92% stated that they used them occasionally. However, 44.52% stated that they did not use any supplements. This finding indicated that supplement use was partially considered as an alternative for children with insufficient fish consumption. Since few studies have quantitatively examined fish oil supplement use among children, our findings could not be directly compared with previous research, highlighting an important gap in the literature.

According to the findings regarding the introduction of fish as a complementary food during infancy, 54.49% of participants reported that they did not offer fish to their children before the age of one. The age at which children first encountered fish was mainly concentrated between 10-12 months (24.58%) and 7-9 months (18.27%). These results indicated that a significant proportion of parents approached the introduction of fish cautiously and tended to delay this process. Similarly, Özşeker (2019) reported that in the Eastern Black Sea region, fish consumption among children aged 0–1 years was at the lowest level, whereas consumption increased as children grew older. Considering the findings of both studies, fish consumption during infancy generally remained low, and most parents began offering fish around or after the first year of life. This pattern was likely influenced by safety concerns, including allergy and digestive issues, difficulties in preparation, and the risk of choking due to bones. Consequently, the delayed introduction of fish during infancy highlights the need for guidance and educational interventions to support parents in this process.

Table 1. Education level, occupational group, and age distribution of the parents of the surveyed students.

			Frequency (n)	Percentage (%)
MOTHER	Education Level	Primary School	38	12.62
		Secondary School	93	30.90
		Associate Degree	59	19.60
		Bachelor's Degree	89	29.57
		Master's degree and above	16	5.32
		None	6	1.99
	Occupation	Homemakers	157	52.16
		Education Sector	44	14.63
		Finance and Office Work	35	11.63
		Health Care Professions	27	8.97
		Sales and Service	16	5.32
		Craft and Manual Labour	12	3.99
		Technical and Engineering Jobs	10	3.32
	Age Range (years)	20-24	2	0.66
		25-29	38	12.62
		30-34	85	28.24
		35-39	94	31.23
		40-44	63	20.93
		45-49	14	4.65
		50-54	4	1.33
		55-60	1	0.33
FATHER	Education Level	Primary School	36	11.96
		Secondary School	81	26.91
		Associate Degree	41	13.62
		Bachelor's Degree	113	37.54
		Master's degree and above	26	8.64
		None	4	1.33
	Occupation	Craft and Manual Labour	67	22.26
		Sales and Service	59	19.6
		Technical and Engineering Jobs	58	19.27
		Finance and Office Work	37	12.29
		Law Enforcement	30	9.97
		Education Sector	21	6.98
		Health Care Professions	17	5.65
		Retired	9	2.99
		Not Employed	3	1
	Age Range (years)	20-24	0	0
		25-29	5	1.67
		30-34	57	19.06
		35-39	107	35.79
		40-44	79	26.42
		45-49	32	10.7
		50-57	18	6.02
		55-59	0	0
		60-65	1	0.33

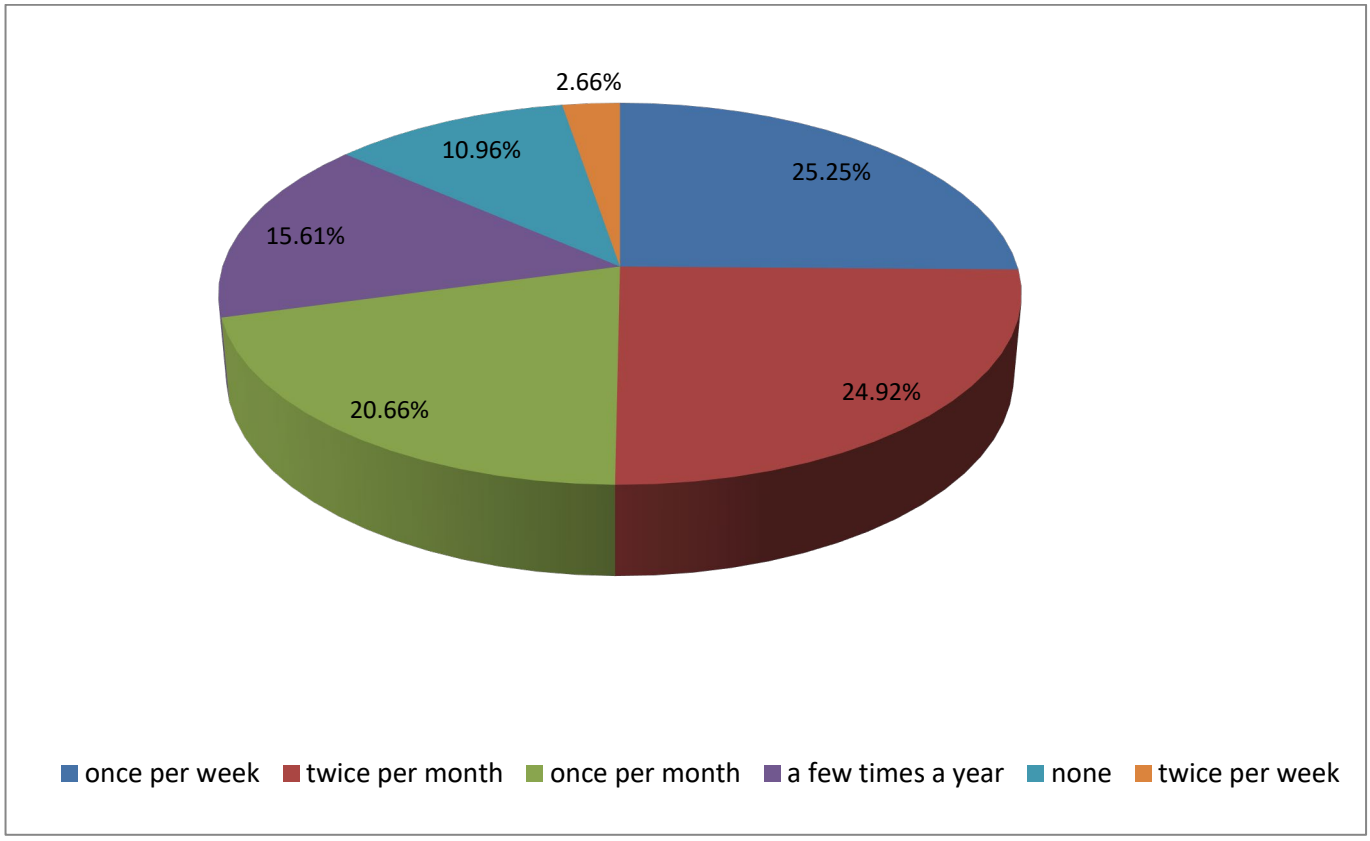

Figure 1. Frequency of fish consumption (%) among children aged 4–6 years

Maternal Fish Consumption Habits during Pregnancy

Regarding the frequency of seafood consumption during pregnancy, 35.88% of participants reported consuming seafood once per month, 21.26% once per week, and 8.31% twice per week, whereas 16.94% stated that they did not consume seafood at all. These results indicated that the proportion of individuals reaching regular weekly consumption was low. In a similar study conducted in the Eastern Black Sea region, the weekly consumption rate was higher (44.9%) and the proportion of non-consumers was lower (8.9%) (Özşeker, 2019). This difference could be explained by regional culinary culture, ease of access to seafood, consumption habits, and the diversity of resources provided by geographic location. The Eastern Black Sea region holds the largest share in Turkey's wild-caught seafood production, and fish is more commonly integrated into the regional cuisine, which contributes to more regular consumption among pregnant individuals. In contrast, in regions such as Adana, where seafood consumption is relatively less widespread, cultural habits and differences in taste preferences may result in lower consumption frequency.

The findings regarding fish oil supplement use during pregnancy indicated that 60.13% of participants did not use any supplements, 20.60% used them daily, and 11.30% used them occasionally. In a similar study conducted in the Eastern Black Sea region, only "use vs. non-use" data were reported, with 17.9% of pregnant participants indicating that they had used fish oil supplements during pregnancy (Özşeker, 2019). Although the proportion of supplement use appeared higher among participants in the Çukurova region, in both regions, usage remained well below the recommended levels. This finding may be associated with a lack of awareness regarding the importance of omega-3 supplementation during pregnancy and insufficient guidance from healthcare professionals.

The findings regarding seafood and fish oil supplement consumption during lactation indicated that 36.21% of participants consumed seafood once per month, while 22.92% reported not consuming it at all. During the same period, the use of fish oil supplements was 26.91%, whereas 73.09% did not use any supplements. These results suggested that seafood

consumption during lactation generally occurred at low frequencies and that fish oil supplementation was not widespread. In the Eastern Black Sea region, 40.9% of lactating mothers reportedly consumed fish regularly, and only 4.1% used fish oil supplements (Özşeker, 2019). It can be concluded that in regions where fish is more commonly integrated into the diet, such as the Eastern Black Sea, omega-3 intake is primarily achieved through natural consumption. In contrast, in the Çukurova region, supplementation appears to contribute more substantially to omega-3 intake.

Family Seafood Consumption Frequency and Preferences

Seafood consumption among families with children aged 4–6 years in the Çukurova district of Adana was reported by 52.15% of participants to occur at least twice per month or more frequently. This proportion included 25.58% who consumed seafood twice per month, 22.92% once per week, and 3.65% twice per week. These findings indicated that seafood was consumed regularly by more than half of the families in the region. However, regular weekly consumption remained limited (26.57%), with overall consumption generally restricted to a few times per month. Comparison with studies conducted in other regions of Turkey revealed notable regional differences. In Hakkâri, seafood consumption was minimal, with 24.7% of participants reporting no consumption, and the highest consumption frequency among consumers was once per month (47.7%). Consequently, the total proportion of families consuming seafood at least twice per month was only 19.7%, indicating very low regular consumption (Terin & İnanç, 2023). In Mardin–Kızıltepe, considering the consumption rates of once per month (46.62%), once every fifteen days (29.58%), and once per week (18.97%), the proportion of families consuming seafood at least twice per month was reported to be approximately 45.55% (Koçhan, 2017). These values were lower than those observed in Çukurova, reflecting limited access to fish in inland regions. In contrast, in Çanakkale, 33.3% of families reported consuming seafood once per week (Saka, 2020), a rate considerably higher than that in Çukurova, reflecting the strong fishing tradition in coastal provinces. The level of seafood consumption among families with children aged 4–6 years in the Çukurova district of Adana, when compared with the national per capita annual seafood consumption (7.1 kg; TÜİK, 2023), was close to the national average, lower than that of coastal provinces, and higher than that of inland and eastern regions, clearly demonstrating regional differences in consumption patterns.

When the patterns of seafood consumption among families were examined, it was found that 70.1% consumed only fresh seafood (e.g., fish, shrimp, squid), 1% consumed only processed products (e.g., canned, frozen), and 3.65% consumed only fish oil supplements. In addition, 13.95% of participants consumed both fresh seafood and fish oil supplements, while a tiny proportion (0.33%) consumed both processed seafood and fish oil supplements. This pattern was largely consistent with findings reported in other regions of Turkey. It was reported that in Kahramanmaraş, 73.5% of participants preferred fresh seafood, whereas 26.5% consumed processed products, with canned (14.8%) and brined (2%) products being the most favoured (Beyazbayrak, 2014). Similarly, it was reported that in Ankara and Çanakkale, 47% of consumers ate fresh, 24% frozen, and 13% canned fish, indicating a wider preference for processed products in these regions (Bayraktar et al., 2019). In Afyonkarahisar, it was reported that 95.65% of participants consumed fresh fish, while processed seafood was "negligibly preferred" (Yiğit et al., 2020). It was also reported that in the Tekirdağ, Süleymanpaşa region, 88.97% of participants consumed fish fresh, and 9.38% consumed it canned or brined (Abdikoğlu et al., 2015). When considered together, these findings suggest that the tendency to consume fresh seafood in Çukurova was found to be in agreement with the national average. However, demand for processed products was also observed, particularly in inland regions. It can be concluded that these differences were closely related to both physical availability and cultural dietary habits.

In this study, the most frequently used strategy by parents to encourage their children to eat fish was to remove the bones (34.88%). This was followed by parents who combined bone removal with cooking the fish in a way preferred by their child, representing 24.24% of the sample. Serving fish in alternative food forms (e.g., mixing it into pasta, salad, or meatballs) was reported by 7.63% of parents. A proportion of 9.97% stated that they did not use any specific method. Preference for canned products remained very low (0.66%), while fish oil supplementation alone was reported by 3.65%. Similarly, parental strategies in the İskenderun district exhibited parallel patterns (Söğüt, 2017). Bone removal was the most common practice (n=774), followed by cooking fish in the child's preferred manner (n=438) and applying reward- or incentive-based methods (n=130). The consumption of canned products was again marginal, reported by just 18 individuals (Söğüt, 2017). These findings indicate that strategies aimed at reducing physical barriers to fish consumption (particularly the presence of bones) are prioritised, and that parents frequently adopt practical approaches to encourage their children to eat fish.

The most preferred cooking method among families was baking (39.53%), followed by frying (32.89%) and grilling (19.27%), while steaming was reported at only 1% (Figure 2). In addition, 7.31% of the participants stated that they obtained

fish from restaurants rather than preparing it at home. These preferences were found to be closely related to the species consumed. The most commonly preferred fish were seabass (43.52%) and gilt-head seabream (29.90%), which are generally suitable for baking or grilling, thus accounting for the high proportion of baking. However, the presence of smaller and fattier species, such as anchovy (21.26%), contributed to the preference for frying. Similar trends were observed in different regions. In Çanakkale, for instance, the most consumed species included bonito, anchovy, bluefish and seabass, with frying (65.2%) and grilling (51.1%) being the most preferred cooking methods (Saka, 2020). Similarly, in Trabzon and Giresun, where anchovy consumption is widespread, the rate of frying reached 53% (Aydın & Karadurmuş, 2013). On the other hand, in inland provinces such as Kahramanmaraş, where trout is more commonly consumed, baking (35.3%) and grilling (31.8%) were reported as the most preferred methods (Beyazbayrak, 2014). It can be concluded that regional cooking preferences are strongly associated with the types of fish available and consumed. Frying predominates in regions where small and oily species are common, whereas baking and grilling are more frequently preferred in areas where larger and fillet-suitable species are consumed. This suggests that cooking practices are influenced not only by cultural factors but also by the physical characteristics of the fish species.

It was observed that families living in the Çukurova district of Adana predominantly preferred marine fish in their consumption. The most frequently consumed fish species were reported as seabass (43.52%), seabream (29.90%) and anchovy (21.26%), clearly reflecting this tendency. In contrast, interest in freshwater fish was notably low. Among the participants, 69.10% indicated that they did not prefer any species from Seyhan Dam Lake, while only 17.94% preferred zander, 9.97% preferred carp, and 2.99% preferred catfish. Similar results were reported in a study conducted in Konya, where freshwater fish consumption was indicated at only 10% (Bolat & Cevher, 2018). Accordingly, the low consumption rates of freshwater fish are thought to be influenced not only by sensory factors (e.g., taste or odour) but also by structural factors, such as the population's limited familiarity with these species and the difficulty of accessing them in markets or retail outlets. This indicates that lack of promotion and limited accessibility represent significant barriers to the widespread consumption of freshwater fish.

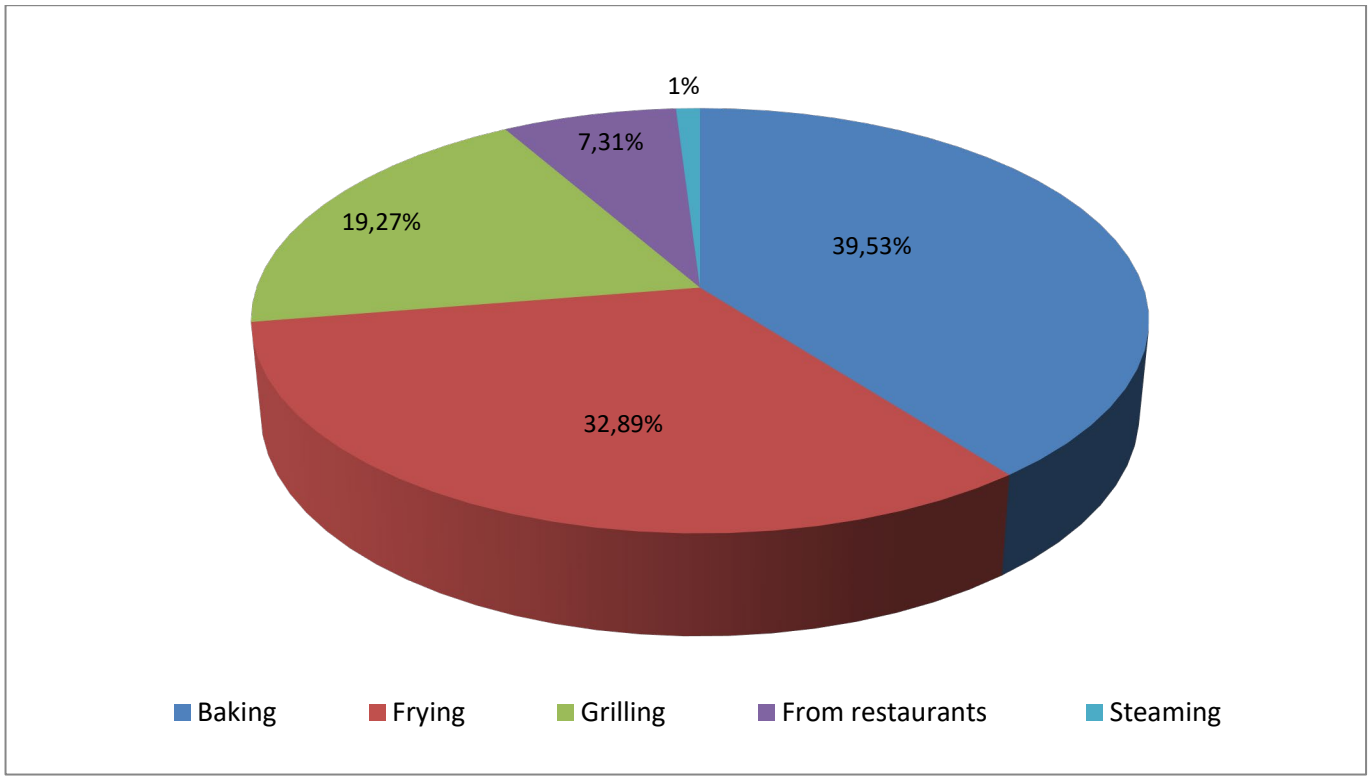

Figure 2. Preferred fish cooking methods among families

Health Benefits of Fish: Knowledge Level and Information Sources

According to the study findings, 50.50% of families living in the Çukurova district of Adana reported being aware that fish consumption may help reduce health problems, 42.86% indicated partial awareness, and 6.64% stated that they had no knowledge on the matter. These results suggest that the overall knowledge level is moderate. Similarly, Coşkun and Doğruyol (2025) reported that only 4% of Generation Z individuals had no knowledge about the nutritional value and health benefits of seafood, while 55% possessed moderate knowledge and 18% reported having extensive knowledge. In addition, in Osmaniye, 68.4% of survey participants were reported to be aware of the nutritional value of fish (Küçük, 2020). Furthermore, Karadaş et al. (2024) indicated that regional differences affected knowledge levels, with individuals in Iğdır demonstrating greater awareness of the health-related aspects of fish consumption compared to those in Adıyaman.

In this study, it was found that participants primarily obtained information about fish consumption from their own education (42.86%), while media (8.31%) and physicians (5.65%) served as more limited sources. Family health centres were the least consulted source, at only 0.66%. In another study conducted in the Eastern Black Sea Region, 49.5% of mothers acquired information about fish from their own knowledge. However, consultation with institutional sources such as physicians (20.9%) and family health centres (15.1%) was higher than in Çukurova (Özşeker, 2019). In contrast, in regions with higher education levels, such as Çanakkale, positive attitudes toward fish consumption were primarily reported to develop through individuals' own knowledge (Saka, 2020). However, quantitative data on information sources were not provided in that study. It can be concluded that individual education and experience play a central role in acquiring knowledge about fish consumption. At the same time, support through institutional channels, particularly family health centres and physicians, is important for public health.

Evaluation of Variables Affecting Seafood Consumption in Children

According to the study findings, as the maternal education level increased, the frequency of children's fish consumption also significantly increased. Among children of mothers with a bachelor's degree, the proportion consuming fish once per week reached 34.8%, rising to 56.2% for children of mothers with a postgraduate degree (Figure 3). On the other hand, among children of mothers with primary education, 18.4% were reported to not consume fish at all. This may be related to the higher knowledge and awareness levels of mothers with higher education about nutrition. However, no significant relationship was found between paternal education level and children's fish consumption frequency, suggesting that mothers more strongly guide dietary patterns in early childhood. Similarly, a significant relationship was observed between parental education level and fish consumption frequency in children aged 0-6 in the Eastern Black Sea Region. It was observed that children of parents with primary or secondary education consumed fish less frequently, whereas children of parents with university and postgraduate education consumed fish more frequently (Özşeker, 2019). In another study conducted among families with children in İskenderun, parental education and employment status were identified as significant factors affecting seafood consumption; weekly consumption among families with higher education was reported at 10%, compared to 1.6% among families with primary education (Söğüt, 2017). Similarly, when the frequency of fish consumption was examined according to the educational status of adults in Kahramanmaraş, it was seen that 90.4% of the participants with a master's or doctorate degree consumed fish regularly, while only 50% of the illiterate individuals consumed fish regularly; however, this difference was not reported as statistically significant (Beyazbayrak, 2014).

In this study, it was found that family income level had a significant effect on the frequency of seafood consumption among children (Figure 4). As income increases, so does the frequency of fish consumption; among children from high-income families, the proportion consuming fish once a week reached 41.3%, whereas in low-income families, this rate remained at 3.4%. On the other hand, the proportion of children who consumed fish only a few times a year was markedly higher in the low-income group at 31.08%. Similarly, a study in the Eastern Black Sea region reported that higher income levels were associated with increased fish consumption frequency, particularly weekly consumption among children in high-income families (Özşeker, 2019). Another study in İskenderun observed a similar trend, noting that children from families with higher monthly incomes consumed fish more regularly, while consumption frequency was considerably lower in lower-income groups (Söğüt, 2017). It can be concluded that the greater variety and access to balanced nutrition available to higher-income families is an important factor contributing to the increased frequency of seafood consumption among their children.

When examining the frequency of fish consumption among families and their children, similar patterns were observed in both groups. As shown in Figure 5, the most common consumption frequency for both families and children was "twice a month," followed by "once a week" and "once a month."

Similarly, previous studies have highlighted the significant role of parental consumption behaviours in shaping children's dietary patterns (Özşeker, 2019; Söğüt, 2017). It can be concluded that the presence of regular fish consumption within the family serves as a key factor encouraging comparable consumption frequencies among children.

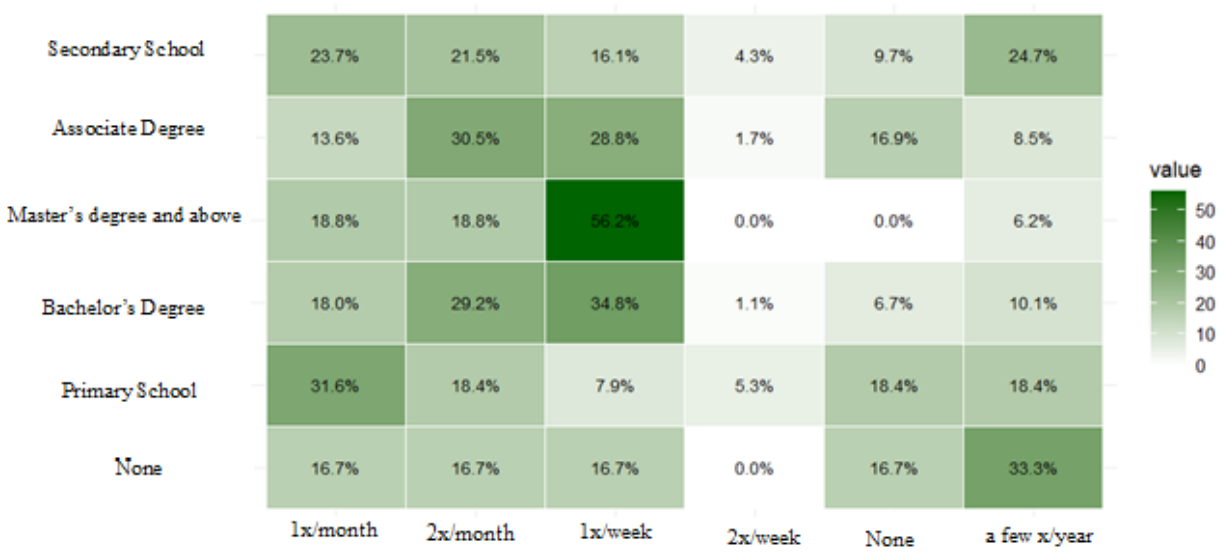

Figure 3. Heat map showing the relationship between maternal education level and the frequency of seafood consumption in children

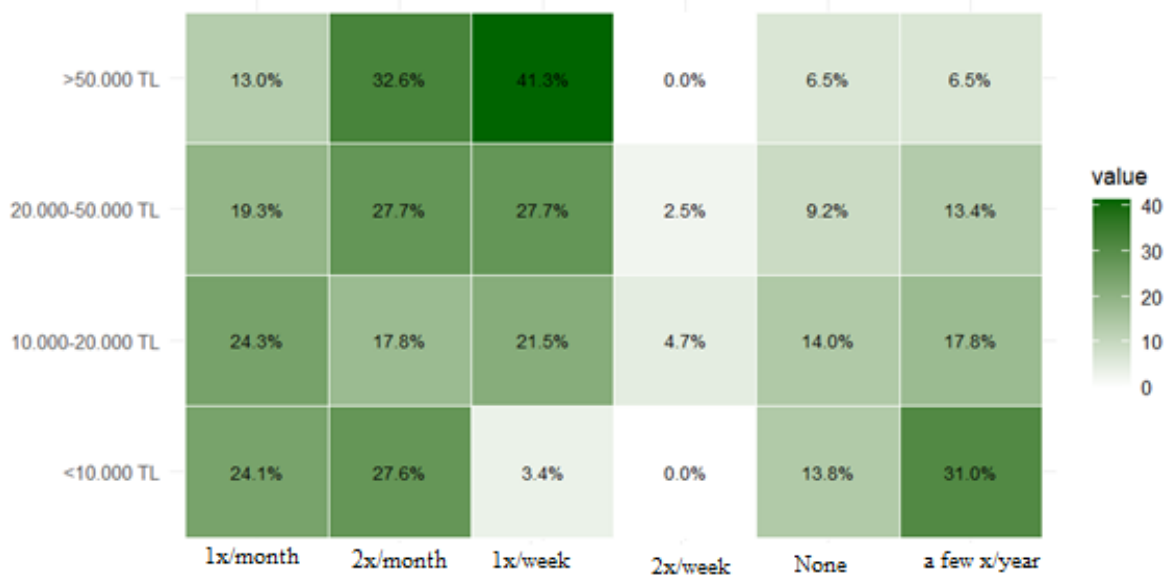

Figure 4. Heat map showing the relationship between family income level and the frequency of seafood consumption among children



Figure 5. Relationship between family fish consumption and child fish consumption

Conclusion

The findings of this study provide important insights for promoting fish consumption habits among preschool-aged children. Firstly, comprehensive educational and awareness programs targeting parents should be designed to increase understanding of the importance of fish in the diet, cooking techniques, and preparation methods suited to children's dietary preferences. The results indicate a significant relationship between maternal education level and children's fish consumption frequency, suggesting that mothers should be prioritised as the primary target group in such interventions. Low fish and fish oil consumption during pregnancy and lactation underscores the need for guidance and support programs tailored to these periods. Furthermore, improving families' access to fresh fish and reducing economic barriers through local policies and initiatives may positively influence consumption. Considering that children are often not given fish due to concerns related to bones, odour, or preparation difficulties, the food industry could contribute by increasing the availability of boneless, convenient, and sensory-appealing fish products suitable for children. Finally, conducting similar studies across different regions using comparable methodologies would enhance the generalizability of findings and support the development of nationwide strategies to promote fish consumption.

Compliance with Ethical Standards

Conflict of interest: The author(s) declare that they have no actual, potential, or perceived conflicts of interest related to this article.

Ethics committee approval: Ethical approval for the survey was obtained from the Scientific Research Ethics Committee of Çukurova University on 22 September 2023 (808173).

Data availability: The data will be made available upon request by the author(s).

Funding: This study was supported by the Çukurova University Scientific Research Projects Unit (Project Code: FYL-2023-16236).

Acknowledgements: We would like to thank Prof. Dr. Caner Enver ÖZYURT for his contributions to the statistical analysis process, as well as the school administrators and teachers who assisted with the survey, and all parents who dedicated their time to complete the questionnaire.

Disclosure: This study was produced from the Master's Thesis of Müge AKMAN (Çukurova University, Graduate School of Natural and Applied Sciences, Department of Fisheries and Seafood Processing Technology Science).

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