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RESEARCH ARTICLE ARAŞTIRMA MAKALESİ

Impacts of the COVID-19 pandemic on fish consumption and sales in Muğla province: An evaluation for future outbreaks

COVID-19 pandemi sürecinin Muğla ilindeki balık tüketimi ve satış durumuna etkileri: Gelecekteki salgınlar için bir değerlendirme

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Abstract: This study aimed to examine the changes in fish consumption preferences and fish sales in Muğla province before and after the COVID-19 pandemic. In this context, a survey was conducted with 302 participants consisting of consumers, fish markets, and fish restaurants operating in Muğla province. The questionnaires were administered both face-to-face and online. By analyzing the collected data, a general assessment of fish consumption and sales in the Muğla region during the pre- and post-pandemic periods was carried out. The findings revealed that the pandemic process affected fish consumption and sales patterns primarily through economic conditions, accessibility, and consumer preferences. Overall fish consumption decreased from 86% before the pandemic to 81% after the pandemic, while the proportion of non-consumers increased from 14% to 19%. Although there was an increased tendency toward durable products, a shift in dietary behavior was observed, including changes in meat consumption preferences and supplement use patterns. No significant change was observed in working arrangements, as 75–78% of participants continued working in offices before and after the pandemic. Despite the recognized importance of fish consumption for healthy nutrition, price and accessibility emerged as the main determining factors affecting consumption behavior, with price concerns increasing up to 38% and access difficulties up to 20% in the post-pandemic period. Fish markets remained the dominant purchasing location (approximately 48–51%), while fresh fish continued to be the most preferred product type (>93%) in both periods. Moreover, seafood businesses were significantly affected, as 63% reported that demand was met before the pandemic, whereas this rate dropped to 33% after the pandemic. Half of the enterprises reported a decrease in sales and customer numbers, and 76% indicated that their economic situation worsened. In conclusion, the study highlights the need to further develop fish consumption culture. It also emphasizes the importance of sustainable supply chains, hygiene practices, and consumer awareness during extraordinary circumstances, providing guidance for managing similar crises in the future.

Keywords: Survey, fish consumption, COVID-19, Muğla, pandemic, healthy nutrition

Öz: Bu çalışma, COVID-19 pandemisi öncesi ve sonrasında Muğla ilinde balık tüketim tercihleri ve su ürünleri satışlarındaki değişimleri incelemeyi amaçlamaktadır. Bu kapsamda Muğla ilinde faaliyet gösteren tüketiciler, balık satış noktaları ve restoranlardan oluşan 302 katılımcı ile anket çalışması gerçekleştirilmiştir. Veriler hem yüz yüze hem de çevrimiçi anketler aracılığıyla toplanmıştır. Elde edilen bulgular, COVID-19 pandemisinin bölgede balık tüketimi ve satış davranışları üzerinde önemli etkiler yarattığını göstermektedir. Toplam balık tüketimi pandemi öncesinde %86 iken pandemi sonrasında %81'e düşmüş, balık tüketmeyenlerin oranı ise %14'ten %19'a yükselmiştir. Haftalık tüketim sıklığı büyük ölçüde sabit kalmakla birlikte, tüketim davranışlarında değişimler gözlenmiş; özellikle dayanıklı gıdalara yönelim ve et tüketim tercihlerinde farklılıklar ortaya çıkmıştır. Balık tüketimini etkileyen temel faktörler fiyat ve erişilebilirlik olarak belirlenmiş, fiyat kaygısının %38'e, erişim sorunlarının ise %20'ye kadar arttığı tespit edilmiştir. Balık satın alma noktalarında balık satış yerleri baskın konumunu korumuş (%48–51), taze balık ise her iki dönemde de en çok tercih edilen ürün türü olmuştur (> %93). Çalışma kapsamında çalışma düzeninde anlamlı bir değişim gözlenmemiş ($p > 0.05$), katılımcıların yaklaşık %75–78'i her iki dönemde de ofis ortamında çalışmaya devam etmiştir. Buna karşılık, gelir dağılımı ve bazı davranışsal göstergelerde anlamlı değişimler tespit edilmiştir ($p < 0.05$). Su ürünleri işletmeleri açısından pandeminin etkisi daha belirgin olmuştur. İşletmelerin %63'ü pandemi öncesinde talebin karşılandığını bildirirken, bu oran pandemi sonrasında %33'e düşmüştür ($p < 0.05$). Ayrıca işletmelerin %76'sı ekonomik durumlarının kötüleştiğini, buna paralel olarak satış ve müşteri sayılarında azalma yaşandığını belirtmiştir. Sonuç olarak, COVID-19 pandemisinin Muğla ilinde balık tüketim davranışları ve su ürünleri piyasası üzerinde önemli etkiler yarattığı belirlenmiştir. Gelecekte benzer kriz dönemlerine karşı dayanıklılığın artırılması için tedarik zincirlerinin güçlendirilmesi, hijyen uygulamalarının iyileştirilmesi ve tüketici farkındalığının artırılması gerekmektedir.

Anahtar kelimeler: Anket, balık tüketimi, COVID-19, Muğla, pandemi, sağlıklı beslenme

INTRODUCTION

The COVID-19 disease, caused by coronavirus-2 and first identified in late December 2019 in Wuhan, China, led to the 2019/2020 coronavirus pandemic (Eftimov et al., 2020). The COVID-19 outbreak resulted in significant changes in human life at both local and global scales (Howarth et al., 2021). Due to worldwide lockdowns, the pandemic affected virtually all aspects of life, including transportation, trade, labor mobility, the economy, livelihoods, food systems, commerce, nutrition, social safety nets, food supply chains, and agricultural sectors (Mandal et al., 2021).

Fish is one of the most highly traded food commodities worldwide. Measures implemented to slow the spread of COVID-19 affected restaurants, retail outlets, and supply chains, leading to a contraction in fish trade (Paredes et al., 2021). During this period, fishers, hatcheries, processing plants, exporters, and logistics operations were adversely affected (Pahari, 2020). Activities related to delivering aquatic products to consumers experienced both direct and indirect disruptions due to health measures, shifting demand patterns,

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and logistical constraints. In Türkiye, particularly during the initial declaration of the pandemic, decreased demand, curfews, and the temporary closure of wholesale fish markets reduced capture fisheries production; in certain periods, fishing activities were also suspended. Furthermore, the near halt of exports caused serious concerns within the aquaculture sector (Genç et al., 2020). Fish is a food recommended for regular consumption due to its contribution to the maintenance and development of lifelong health, as it contains high-quality protein and essential nutrients such as long-chain n-3 polyunsaturated fatty acids (PUFAs), vitamin D, and iodine (Öksüz et al., 2018). In addition, owing to its rich vitamin and mineral content, fish provides significant health benefits compared to other types of meat (Metin et al., 2021). In particular, the role of n-3 PUFAs in the prevention and management of cardiovascular diseases, as well as various inflammatory and metabolic disorders, has attracted considerable attention (Achouri et al., 2018). Accordingly, healthy eating guidelines recommend consuming at least two portions of fish per week (Lena et al., 2016). During the pandemic period, the nutritional value and potential immune-supporting properties of fish came to the forefront; however, isolation measures and psychological factors altered individuals' dietary habits (Çulfa et al., 2021). Recent studies have examined the effects of the COVID-19 pandemic on seafood consumption behaviors, consumer preferences, and food purchasing patterns, highlighting significant changes in demand structure, particularly toward processed and more accessible seafood products (Aruga and Wakamatsu, 2024; Errickson et al., 2024). Recent studies from different geographical contexts have shown that the COVID-19 pandemic significantly influenced fish consumption behaviors and seafood market dynamics. Lopes and Freitas (2023) reported that fish consumption patterns in Brazil were shaped by multiple interacting factors such as product origin, market structure, and regional differences, while most consumers did not significantly change their fish consumption during the pandemic. Similarly, Kaplan et al. (2023) found that COVID-19 affected dietary habits in Tokat/Türkiye, leading to increased food expenditures and changes in nutritional behavior, with dietary supplements and meat and fruit consumption patterns showing notable shifts. In Indonesia, Partelow et al. (2023) observed a general decline in seafood consumption during the pandemic, alongside increased prices, reduced availability, and a shift from fresh to processed seafood products. Likewise, Mol et al. (2024) reported that consumer perceptions of food safety, price increases, and concerns about supply security significantly influenced fish consumption behavior during lockdown periods, although most changes were not fully sustained post-pandemic in İstanbul/Türkiye. Overall, these studies indicate that COVID-19 affected seafood consumption through a combination of economic, behavioral, and supply-chain-related factors, while the magnitude and direction of change varied across regions.

Although the effects of COVID-19 on nutrition in Türkiye have been investigated, regional studies specifically addressing fish consumption remain limited. Therefore, evaluating fish consumption and sales patterns in Muğla-an important center for aquaculture production and trade-is considered to be of particular significance.

Despite extensive literature on COVID-19 impacts on food systems, studies focusing specifically on regional seafood consumption behaviors remain limited, particularly in coastal areas with strong fisheries and aquaculture activity. Muğla province is an important case study due to its significant role in Türkiye's aquaculture production, seafood trade, and tourism-driven seasonal demand fluctuations, which together create a dynamic structure for analyzing consumption and sales behavior. In this context, the present study contributes to the literature by providing empirical evidence at the regional level, integrating both consumer and seafood business perspectives, and offering insights into how economic, accessibility, and behavioral factors shaped fish consumption patterns during and after the COVID-19 pandemic.

This study aimed to determine whether there was a change in fish sales and consumption patterns in Muğla province during the COVID-19 pandemic compared to the pre-pandemic period, and to examine the underlying causes and consequences of such changes. In this context, surveys were conducted with fish markets, fish restaurants, and consumers in order to reveal the current status of fish consumption and sales. It is anticipated that the findings obtained from this study will provide guidance for potential future pandemic periods.

MATERIALS AND METHODS

In this study, questionnaire forms developed by the researchers, taking into account similar studies in the literature, were used as the data collection instrument. The surveys were administered in Muğla province to a total of 302 participants determined through sample size calculations, consisting of 232 consumers and 70 seafood-related businesses, including fish markets and fish restaurants. The questionnaire items were prepared based on previously published survey studies in the literature (Çolakoğlu et al., 2006; Aydın and Karadurmuş, 2013; Bayraktar et al., 2019; Karakaya et al., 2020; Demir, 2020; Kutlu et al., 2021), as well as the researchers' professional experience. The questionnaire included items addressing participants' socio-economic status before and after the COVID-19 pandemic, fish consumption behaviors, species consumed, consumption frequency, reasons for preference, and cooking methods. The data were collected through face-to-face interviews, and an online survey method was also employed. The survey study was conducted over a seven-month period (December–June 2022).

Sampling procedure and sample size

The planned sample size for the study was determined using the G*Power program. Accordingly, a paired-samples t-test (pre-pandemic vs. post-pandemic) was planned to

compare repeated measurements obtained from the same participants across two periods. Within this framework, assuming a statistical power of 0.95 and a 95% confidence level (α = 0.05), the required sample size was calculated as n = 248. Normal distribution was assumed. Based on this value, the survey was ultimately conducted with 302 participants. A convenience sampling method was employed for the consumer surveys, while a purposive sampling strategy was utilized to select seafood-related businesses (fish markets and restaurants). Participants were selected to represent the main districts of Muğla province, including Bodrum, Akyaka, Marmaris, Muğla city center, Ortaca, and Köyceğiz, in order to ensure spatial coverage of the region's seafood consumption structure and market diversity. Fish markets and restaurants were selected based on their active operation status, relevance to seafood trade, and their ability to represent the main districts of Muğla province. In addition, only establishments that agreed to participate in the survey during the study period were included in the sample.

Data analysis

Data analysis was performed using IBM SPSS Statistics 22.0. Descriptive statistics (frequencies and percentages) were used to summarize the data. In addition, a paired-samples t-test was applied to examine differences between pre-pandemic and post-pandemic periods for variables measured for the same respondents. For categorical variables and group-based comparisons, percentage distributions were also evaluated.

RESULTS

Consumer survey results

Demographic characteristics of the participants

According to the survey results, 64% of the 232 participants were male and 36% were female. The age distribution was predominantly concentrated between 25 and 54 years, with the highest proportion (35%) in the 35–44 age group. Regarding educational status, 40% of the participants held a bachelor's degree, constituting the majority. Civil servants represented the most common occupational group both before (56%) and after (53%) the pandemic. In terms of working arrangements, 78% of participants worked in offices and 21% worked from home before the pandemic; these rates changed to 75% and 25%, respectively, after the pandemic. As the majority of participants were civil servants and academics, no statistically significant change was detected in working arrangements ($p > 0.05$). Regarding monthly income distribution, the most common range was 5,001–10,000 TL, accounting for 51% before the pandemic and 46% after. The proportion of participants earning 10,001 TL and above increased from 12% to 24%, and this change was statistically significant ($p < 0.05$). In terms of body weight, the proportion of participants in the 81–90 kg range increased after the pandemic, and overall weight gain was statistically significant ($p < 0.05$). Regarding health status, most participants reported no health problems both before (74%) and after (62%) the pandemic, while 14% stated that they had contracted COVID-19; this difference was statistically significant ($p < 0.05$).

Consumption preferences of the participants

Before the pandemic, participants most frequently consumed meat and meat products, followed by vegetables and fruits. These rates decreased in the post-pandemic period (Figure 1). In contrast, consumption of non-perishable foods increased, while fish consumption rose slightly. Overall, a statistically significant change in food preferences was observed after the pandemic ($p < 0.05$). Regarding dietary supplements, vitamin D was the most commonly used supplement before the pandemic, while 70% reported no supplement use. After the pandemic, vitamin D use increased to 13%, and non-use decreased to 56%, while fish oil consumption remained unchanged at 4%. A slight increase was observed in omega-3/omega-6 use, and overall supplement consumption changed significantly ($p < 0.05$).

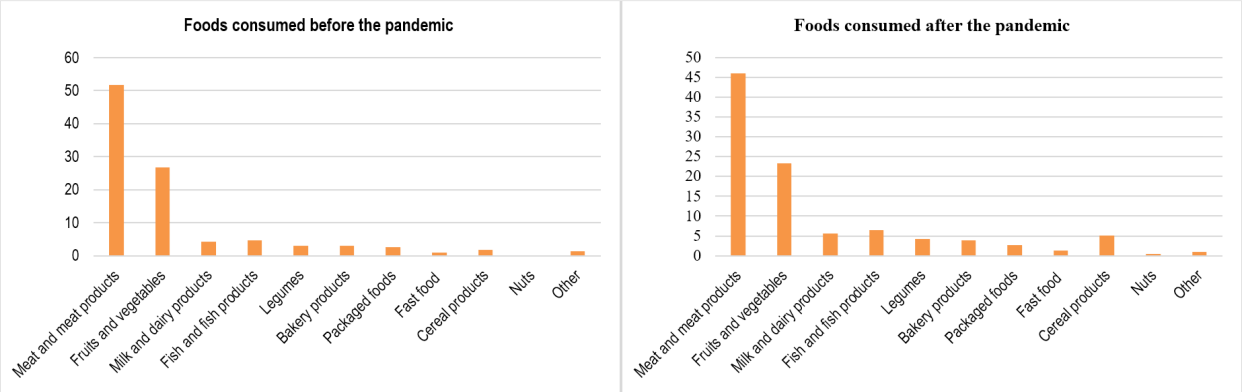

Figure 1. Foods consumed before and after the pandemic

In terms of meat consumption preferences, red meat ranked first before the pandemic, followed by white meat and fish. After the pandemic, red and white meat consumption decreased, whereas fish consumption and non-meat consumption increased ($p < 0.05$) (Figure 2). Fish consumption prevalence was 86% before the pandemic and decreased to 81% after; non-consumption increased from 14% to 19%, and this difference was statistically significant ($p < 0.05$).

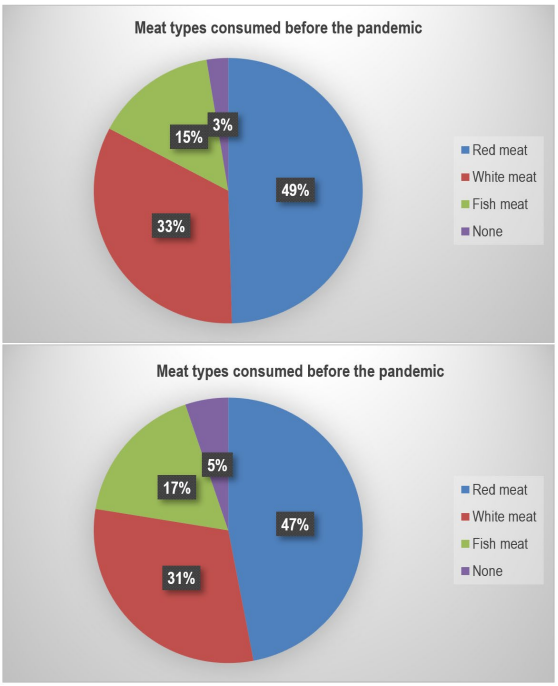

Figure 2. Meat types consumed before and after the pandemic

Among non-consumers, the main reasons were high price, odor, and access difficulties before the pandemic. After the pandemic, high price and access difficulties became more prominent, while odor-related complaints decreased (Figure 3). Overall, reasons were mainly economic and access-related, with a stronger emphasis after the pandemic; however, the difference was not statistically significant ($p > 0.05$).

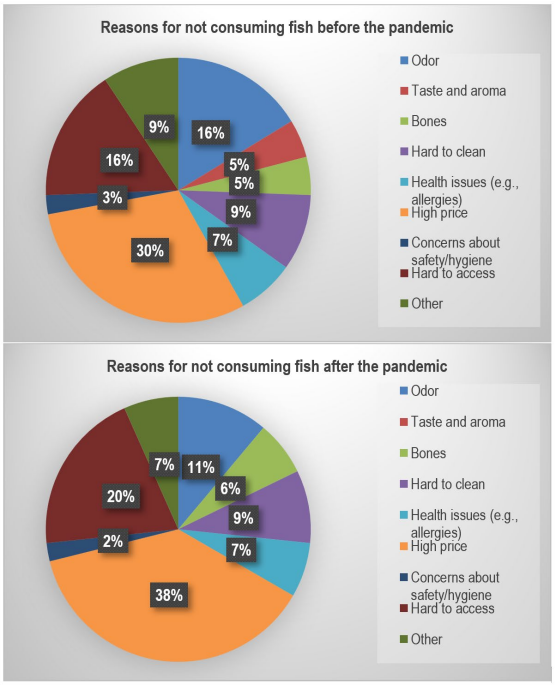

Figure 3. Reasons for not consuming fish before and after the pandemic

Fish consumption frequency remained stable, with "once a week" being the most common pattern (Figure 4), and no significant difference was observed ($p > 0.05$).

Regarding purchasing preferences, fresh fish dominated both before (94%) and after (93%) the pandemic. Frozen products remained at 2%, while other processed products were not preferred. A slight increase in canned fish consumption was observed, but overall preferences did not change significantly ($p > 0.05$). Fish was mainly purchased from fish markets (48% before, 51% after), followed by open-air markets, with no significant change in purchasing locations ($p > 0.05$).

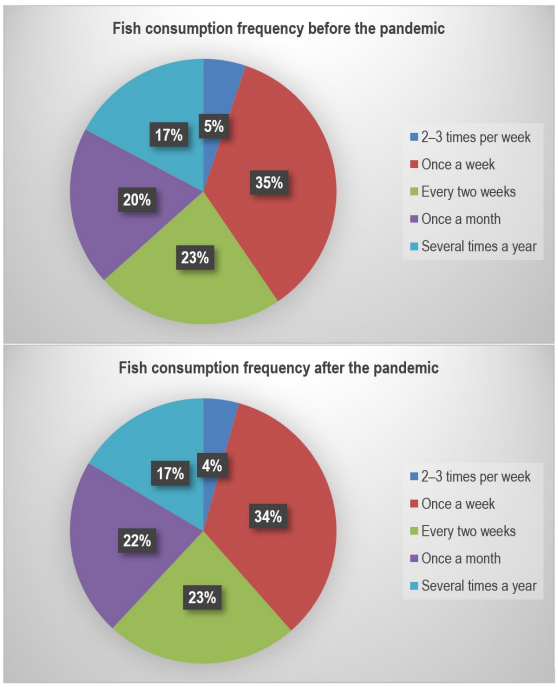

Figure 4. Fish consumption frequency before and after the pandemic

Sea bass and anchovy were the most frequently consumed species in both periods. A statistically significant increase was observed in gilthead sea bream consumption after the pandemic ($p < 0.05$). Other species remained low in consumption. Frying was the most common cooking method in both periods, followed by baking and grilling. No significant differences were observed in cooking methods ($p > 0.05$).

The main reason for fish consumption was balanced and healthy nutrition both before and after the pandemic (Figure 5). However, access difficulties and high prices remained important constraints, with no significant differences between periods ($p > 0.05$). Wild-caught fish was preferred in both periods, decreasing slightly from 61% to 58%.

Preference for farmed fish increased from 10% to 14%, while mixed consumption remained stable. Fish was mostly consumed at home, while restaurant consumption decreased, with no significant difference ($p > 0.05$). Regarding perceptions of fish consumption, 80% of participants before and 79% after

the pandemic stated that fish is important for health (Figure 6), indicating stable awareness ($p > 0.05$). However, the perception that fish should be consumed more frequently increased after the pandemic.

When respondents were asked about the reasons for not purchasing fish during the pandemic, the most commonly reported factors were hygiene concerns, limited access to nearby fish outlets, concerns about crowded environments (Figure 7).

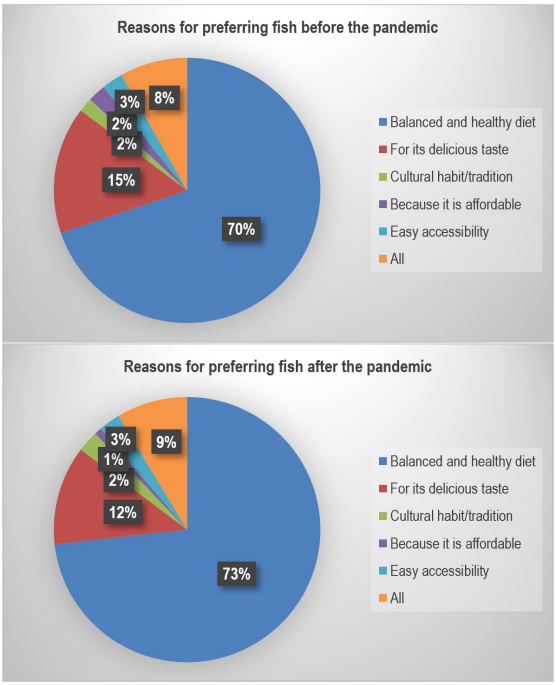

Figure 5. Reasons for preferring fish before and after the pandemic

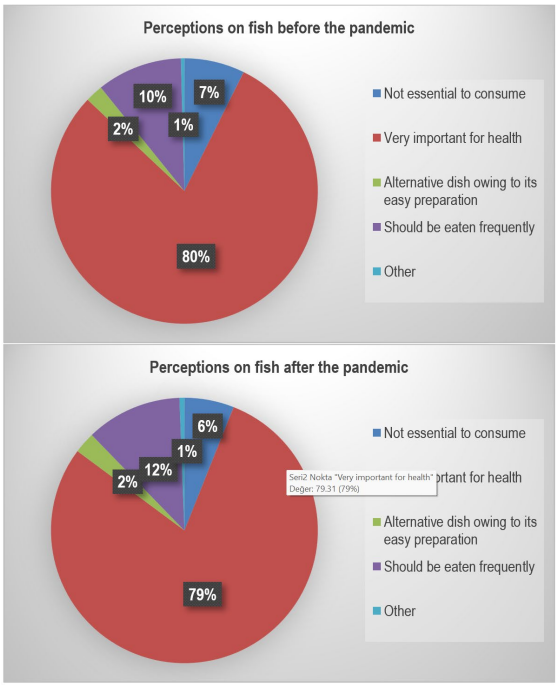

Figure 6. Perceptions on fish before and after the pandemic

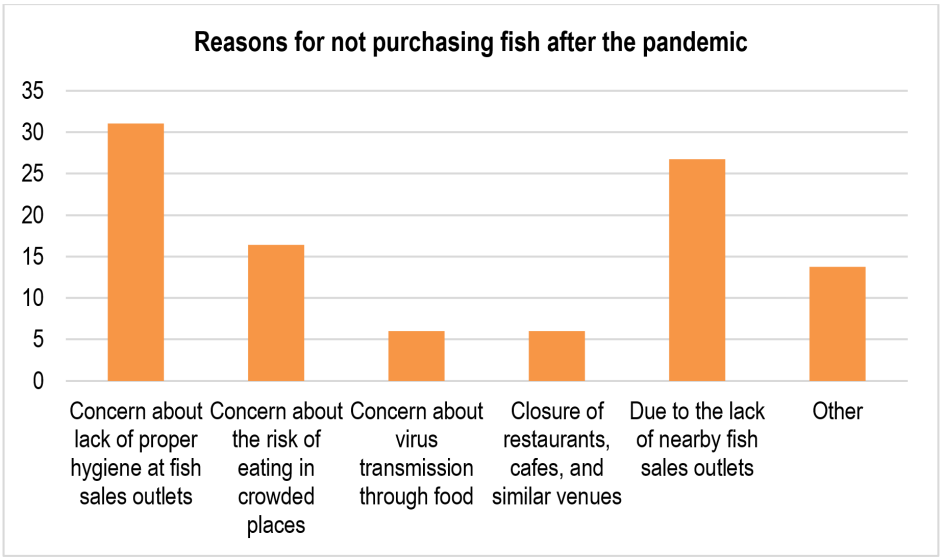

Figure 7. Reasons for not purchasing fish after the pandemic

Regarding information sources, 21% preferred public announcements, 17% traditional media, 19% social media, 2% seminars, 2% printed materials, and 38% all channels.

Survey results for fish restaurants

Most enterprises employed 10 or more staff both before (22%) and after (23%) the pandemic, with no significant change ($p > 0.05$). Sea bass was the most commonly consumed fish species both before and after the pandemic, although a slight decrease in consumption was observed in the post-pandemic period. Gilthead sea bream consumption increased, while no significant change was observed in anchovy and bonito consumption (Figure 8). High-value species such as red mullet, grouper, and dentex were not preferred.

Grilling was the dominant cooking method (86% before, 87% after), followed by frying and baking, with no significant change ($p > 0.05$). Sea bass was the most preferred species by tourists (61%) in both periods, followed by gilthead sea bream (10%). According to restaurant views, 63% reported that seafood demand was met before the pandemic, decreasing to 33% after the pandemic, with a significant increase in unmet demand ($p < 0.05$) (Figure 9). Half of the businesses reported decreased sales and customer numbers, and 76% indicated worsening economic conditions. All restaurants reported increased fish prices.

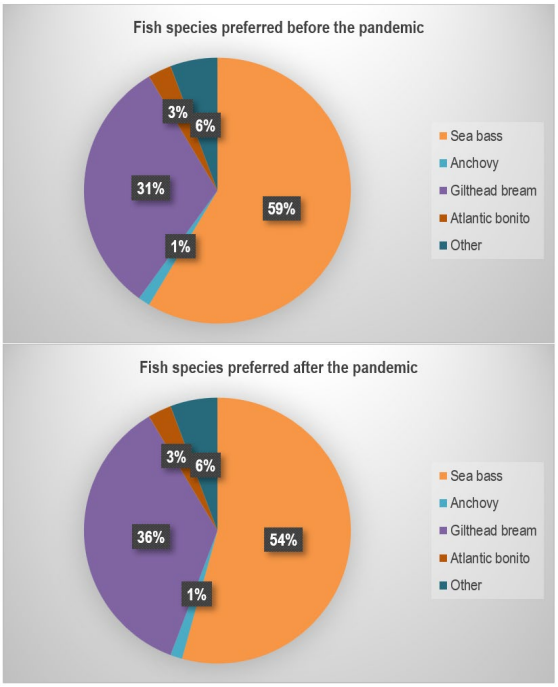

Figure 8. Fish species preferred before and after the pandemic

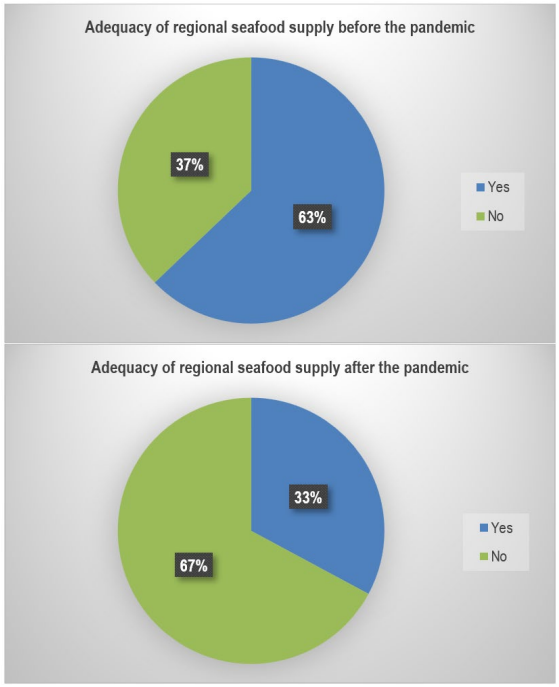

Figure 9. Adequacy of regional seafood supply before and after the pandemic

DISCUSSION

In this study, the changes in fish sales and consumption in Muğla province during the COVID-19 pandemic, compared to the pre-pandemic period, as well as their underlying causes and consequences, were evaluated. While the majority of participants reported no health problems, 14% indicated that they had contracted COVID-19. According to the survey results, no significant change was identified in the proportion of unemployment before and after the pandemic. Mandal et al. (2021) reported in Dhaka, Bangladesh that the pandemic had pronounced effects on income loss and employment.

Recent studies indicate that COVID-19 significantly affected seafood consumption patterns on a global scale. In particular, demand shifted from fresh seafood products toward more stable and processed alternatives, especially during and following lockdown periods (Eftimov et al., 2020). Consistent with this general trend, Demir (2020) reported that the consumption of carbohydrate- and fat-rich foods increased during the pandemic, whereas fish consumption decreased. These behavioral changes are further supported by evidence showing that they have not been fully reversed, while price sensitivity continues to play a significant role in seafood consumption decisions in the post-pandemic period (FAO, 2024; OECD, 2024). Likewise, global seafood market assessments indicate an increasing market share of aquaculture products, attributed to their relatively stable pricing and consistent supply (OECD, 2024; FAO, 2024). Throughout the pandemic period, consumers showed an increased tendency toward foods with extended shelf life, leading to higher demand for preserved seafood products, particularly canned fish. Similar findings suggest that the preference for processed seafood products has persisted beyond the pandemic due to practicality and perceived food safety (Errickson et al., 2024; Aruga and Wakamatsu, 2024). In addition, a substantial shift from restaurant-based consumption toward home-based consumption was observed, accompanied by a decline in restaurant demand.

In the present study, staying at home during lockdown periods negatively affected dietary behaviors. In the post-pandemic period, consumption of meat and meat products declined primarily due to price increases. Both consumers and business operators reported a growing preference for more affordable aquaculture products, particularly farmed sea bass and sea bream. This finding is strongly supported by fisheries market research indicating that aquaculture products have functioned as a substitute protein source during and after the COVID-19 pandemic due to the decreased affordability of wild-caught fish (Atalay et al., 2024; Eminçe Saygı et al., 2025).

However, a decline was observed in the overall proportion of participants consuming fish. Recent analyses indicate that inflationary pressures and food price volatility continue to constrain fish demand as a relatively high-cost protein source during the 2024–2025 period (OECD, 2025). Similarly, reductions in seafood consumption frequency have been reported, particularly among low- and middle-income consumer groups in developed markets (Errickson et al., 2024). When respondents were asked about the reasons for not consuming fish, the most frequently cited factors were high prices, unpleasant odor, and limited accessibility. Similar findings in Türkiye identify price and accessibility as the primary determinants of fish consumption behavior (Arslan and İzci, 2016; Yılmaz et al., 2022). Moreover, affordability remains the most critical constraint despite increasing nutritional awareness (OECD, 2024; FAO, 2024). Furthermore, Kutlu et al. (2021) reported that increased hygiene concerns regarding unpackaged foods during the pandemic led to a rise in consumers' preference for packaged products. This is consistent with global seafood studies indicating sustained preference for packaged and processed seafood products due to perceived food safety concerns (FAO, 2024; Aruga and Wakamatsu, 2024).

Business operators reported a decline in fish diversity and stated that, due to high prices, consumption of wild-caught fish and high-value seafood products such as squid, shrimp, and octopus decreased. Recent fisheries sector reports also highlight that small-scale seafood enterprises remain highly vulnerable to price shocks and supply chain disruptions (FAO, 2024; OECD, 2025). Recent studies also conducted in Türkiye have further emphasized that the COVID-19 pandemic created significant disruptions in seafood trade, aquaculture economics, and market stability. Tolon (2023) reported that unusual economic conditions and pandemic-related market fluctuations substantially affected farmed fish prices in Türkiye, particularly through increases in input and production costs. Similarly, stakeholder-based assessments of the Turkish fisheries and aquaculture sector demonstrated that the pandemic caused considerable economic losses, marketing difficulties, and supply chain challenges for seafood enterprises (Atalay et al., 2024). These findings support the present study by highlighting the economic vulnerability of the fisheries sector and the changing dynamics of seafood markets during and after the COVID-19 pandemic. Despite participants' awareness of the importance of fish for healthy nutrition, seafood consumption culture remains insufficiently developed at the national level. This is further supported by recent literature suggesting that nutritional awareness alone is not sufficient to increase seafood consumption without improvements in affordability, accessibility, and supply stability (FAO, 2024; OECD, 2025).

This study has some limitations. The primary objective was to provide a descriptive snapshot of the changes in seafood consumption and sales patterns before and after the COVID-19 pandemic. Consequently, the statistical design mostly relied on descriptive statistics and paired-samples tests to evaluate direct behavioral shifts. Future studies employing multivariate analytical approaches, such as logistic regression or chi-square modeling, are strongly recommended to systematically assess the potential relationships between sociodemographic variables, including income level, gender, and occupational status, and seafood consumption behaviors during global crises.

CONCLUSION

This study shows that the COVID-19 pandemic significantly affected fish consumption and seafood markets in Muğla province, mainly due to economic conditions, accessibility, and changing consumer preferences. Fish consumption decreased from 86% to 81%, while non-consumption increased to 19%. Although a shift toward durable products was observed, overall fish consumption declined due to high prices and limited access. Economic pressure was evident. The seafood sector was also strongly affected, with 33% of restaurants reporting met demand after the pandemic compared to 63% before ($p < 0.05$), and 76% of enterprises reporting worsening economic conditions. Wild-caught and high-priced seafood consumption decreased, while aquaculture products gained preference. Nevertheless, fresh fish remained dominant (>93%), indicating stable consumption habits despite the crisis. The results suggest that fish consumption culture needs further development. Therefore, awareness campaigns, improved supply chain infrastructure, hygiene control, and price stability are essential for resilience in future crises.

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AUTHORSHIP CONTRIBUTIONS

Cansu Metin Hacisa: Conceptualization of the study, development of the questionnaires, manuscript writing. Ekrem Şahin: Conducting the survey, Yunus Alparslan: Development of the questionnaires, manuscript writing

CONFLICT OF INTEREST STATEMENT

The authors declare that there are no conflicts of interest.

ETHICAL APPROVAL

This study was approved by the Muğla Sıtkı Koçman University Faculty of Science and Engineering Research Ethics Committee with Protocol No. 210009 and Decision No. 7 on 12/11/2021.

DECLARATION OF AI USE

Artificial intelligence (ChatGPT) was utilized for language editing and linguistic refinement.

DATA AVAILABILITY

All relevant data are presented within the article.

REFERENCES

Achouri, N., Kharrat, N., Smichi, N., Miled, N., Gargouri, Y., & Fendri, A. (2018). Nutritional properties, oxidative stability, and in vitro digestibility of oils extracted from muscles of wild and breeding eels (*Anguilla anguilla*). *Journal of Food Processing and Preservation*, *42*, e13519. https://doi.org/10.1111/jfpp.13519

Arslan, M., & İzci, L. (2016). Antalya ili su ürünleri tüketim alışkanlıklarının belirlenmesi. *Süleyman Demirel University Journal of Eğirdir Fisheries Faculty*, *12*(1), 75-85. https://doi.org/10.22392/egirdir.246325

Aruga, K., & Wakamatsu, H. (2024). Investigating the consumption patterns of Japanese seafood during the COVID-19 pandemic. *Commodities*, *3*(2), 182-196. https://doi.org/10.3390/commodities3020012

Atalay, M.A., Sevgili, H., Giannetto, D., Sara, G., Kanyilmaz, M., Erkan, S., & Mangano, M.C. (2024). A stakeholders' perception: Turkish aquaculture sector under COVID-19 pandemic effect with consideration of anthropogenic stressors. *Marine Policy*, *164*, 106153. https://doi.org/10.1016/j.marpol.2024.106153

Aydın, M., & Karadurmuş, U. (2013). Trabzon ve Giresun Bölgelerindeki su ürünleri tüketim alışkanlıkları. *The Black Sea Journal of Sciences*, *3*(9), 57-71. https://izlik.org/JA64YC53JU

Bayraktar, S., Ergün, S., & Ayvaz, Z. (2019). Ankara ve Çanakkale'de su ürünleri tüketim tercihleri ve alışkanlıklarının karşılaştırılması. *Acta Aquatica Turcica*, *15*(2), 213-226. https://doi.org/10.22392/actaquatr.489281

Çolakoğlu, F.A., İşmen, A., Özen, Ö., Çakır, F., Yığın, Ç., & Ormancı, H.B. (2006). Çanakkale ilindeki su ürünleri tüketim davranışlarının değerlendirilmesi. *Ege Journal of Fisheries and Aquatic Sciences*, *23*(1/3), 387-392. https://izlik.org/JA63XJ43DC

Çulfa, S., Yıldırım, E., & Bayram, B. (2021). COVID-19 pandemi süresince insanlarda değişen beslenme alışkanlıkları ile obezite ilişkisi. *Online Turkish Journal of Health Sciences*, *6*(1), 135-142. https://doi.org/10.26453/otjhs.798631

Demir, G. (2020). Nutrition, health behaviour changes, and eating behaviours of adults during the COVID 19 pandemic period. *Turkish Journal of Family Medicine and Primary Care*, *14*(4), 639-645. https://doi.org/10.21763/tjfmpc.792397

Eftimov, T., Popovski, G., Petković, M., Seljak, B.K., & Kocev, D. (2020). COVID-19 pandemic changes the food consumption patterns. *Trends in Food Science & Technology*, *104*, 268-272. https://doi.org/10.1016/j.tifs.2020.08.017

Eminçe Saygı, H., Tekoğul, H., Kop, A., & Sagun, O.K. (2025). Türkiye's aquaculture sector during the COVID-19 pandemic. *MEMBA Journal of Water Sciences*, *11*(4), 531-552. https://doi.org/10.58626/memba.1807404

Errickson, L.B., Jin, Y., Zemeckis, D., & Hallman, W.K. (2024). Seafood consumption trends among U.S. consumers: Influences of the COVID-19 pandemic. *Foods*, *13*(17), 2682. https://doi.org/10.3390/foods13172682

FAO. (2024). The state of world fisheries and aquaculture 2024. Food and Agriculture Organization of the United Nations.

Genç, E., Kaya, D., Atalay, M.A., & Kanyılmaz, M. (2020). COVID-19 pandemisinin su ürünleri sektörüne etkileri: Kısa değerlendirme. *Turkish Journal of Bioethics*, *7*(3), 162-167. https://izlik.org/JA39RP66FA

Howarth, A., Jeanson, A.L., Abrams, A.E.I., Beaudoin, C., Mistry, I., Berberi, A., Young, N., Nguyen, V.M., Landsman, S.J., Kadykalo, A.N., Danylchuk, A.J., & Cooke, S.J. (2021). COVID-19 restrictions and recreational fisheries in Ontario, Canada: Preliminary insights from an online angler survey. *Fisheries Research*, *240*, 105961. https://doi.org/10.1016/j.fishres.2021.105961

Kaplan, E., Kaplan, K., & Gözener, B. (2023). Effects of Covid-19 pandemic on food consumption habits of consumers (Example of the central district of Tokat province). *Turkish Journal of Agriculture - Food Science and Technology*, *11*(4), 671-681. https://doi.org/10.24925/turjaf.v11i4.671-681.5487

Karakaya, E., Sökmen, T.Ö., & Kırıcı, M. (2020). Erzincan ili balık tüketim alışkanlıklarının belirlenmesi. *MEMBA Journal of Water Sciences*, *6*(1), 18-29. https://izlik.org/JA42AB74BK

Kutlu, N., Ekin, M.M., Alav, A., Ceylan, Z., & Meral, R. (2021). COVID-19 pandemi sürecinde bireylerin beslenme alışkanlığında meydana gelen değişimin belirlenmesi üzerine bir araştırma. *International Journal of Social, Political and Economic Research*, *8*(1), 173-187. https://doi.org/10.46291/IJOSPERvol8iss1pp173-187

Lena, G.D., Nevigato, T., Rampacci, M., Casini, I., Caproni, R., & Orban, E. (2016). Proximate composition and lipid profile of red mullet (*Mullus barbatus*) from two sites of the Tyrrhenian and Adriatic seas (Italy): A seasonal differentiation. *Journal of Food Composition and Analysis*, *45*, 121-129. https://doi.org/10.1016/j.jfca.2015.10.003

Lopes, I.G., & Freitas, T.M. (2023). Fish consumption in Brazil: State of the art and effects of the COVID-19 pandemic. *Aquaculture*, *574*, 739615. https://doi.org/10.1016/j.aquaculture.2023.739615

Mandal, S.C., Boidya, P., Haque, M. I., Hossain, A., Zubair Shams, Z., & Mamun, A. (2021). The impact of the COVID-19 pandemic on fish consumption and household food security in Dhaka city, Bangladesh. *Global Food Security*, *29*, 100526. https://doi.org/10.1016/j.gfs.2021.100526

Metin, C., Alparslan, Y., & Baygar, T. (2021). Köyceğiz Lagünü'nden avlanan Altınbaş (*Chelon auratus*) ve Mavri (*Chelon labrosus*) kefallerinin besin kompozisyonu ve yağ asidi profilinin mevsimsel değişimi. *Acta Aquatica Turcica*, *17*(2), 175-185. https://doi.org/10.22392/actaquatr.773796

Mol, S., Karakaş Geyik, S., & Süren, Y. (2024). The impact of the COVID-19 pandemic on fish and food perception, consumption, and purchasing behaviors of Turkish consumers. *Aquatic Research*, *7*(1), 15-29. https://doi.org/10.3153/AR24003

OECD. (2024). Fisheries and aquaculture outlook 2024. Organisation for Economic Co-operation and Development.

OECD. (2025). Food systems and fisheries resilience report 2025. Organisation for Economic Co-operation and Development.

Öksüz, A., Alkan, Ş.B., Taşkın, H., & Ayrancı, M. (2018). Yaşam boyu sağlıklı ve dengeli beslenme için balık tüketiminin önemi. *Food and Health*, *4*(1), 43-62. https://doi.org/10.3153/JFHS18006

Pahari, T. (2020). Pandemic COVID-19's Probable impacts on Indian fisheries sectors & Its protective measures. *Biotica Research Today*, *2*(11), 1130-1134.

Paredes, S., Pascoe, S., Coglan, L., & Richards, C. (2021). Increasing local fish consumption: A Bayesian belief. *Network Analysis*, *33*(1), 104-121. https://doi.org/10.1080/08974438.2020.1860853

Partelow, S., Nagel, B., Paramita, A.O., & Buhari, N. (2023). Seafood consumption changes and COVID-19 impact index in West Nusa Tenggara, Indonesia. *PLoS ONE*, *18*(1), e0280134. https://doi.org/10.1371/journal.pone.0280134

Tolon, M. T. (2023). A price index of farmed fish: The case of Turkish aquaculture market. *Aquaculture Economics & Management*, *27*(2), 267-281. https://doi.org/10.1080/13657305.2023.2168089