

Research Article

Barriers and facilitators of fish and seafood consumption in Iran: A qualitative study of consumers and stakeholders

Farzaneh H.¹, Rezazadeh A.¹, Shams L.², Eini-Zinab H.¹, Ghodsi D.^{3*}, Lalehzadeh Z.⁴

¹Department of Community Nutrition, National Nutrition and Food Technology Research Institute, Faculty of Nutrition Sciences and Food Technology, Shahid Beheshti University of Medical Sciences, Tehran, Iran

²Workplace Health Promotion Research Center, Research Institute for Health Sciences and Environment, Department of Health Policy and Management, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences

³Department of Nutrition Research, National Nutrition and Food Technology Research Institute, Faculty of Nutrition Sciences and Food Technology, Shahid Beheshti University of Medical Sciences, Tehran, Iran

⁴Nutrition Research Center, Department of Biochemistry and Diet Therapy, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran

*Correspondence: delaramghodsi@yahoo.com

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Abstract

The study aimed to explore the perceived barriers and facilitators of seafood consumption from both community members and institutional stakeholders in Iran. A qualitative approach was employed through eight focus group discussions and seventeen semi-structured interviews conducted between May and November 2024. Convenience sampling was used for selecting participants in the focus group discussions, while purposive and snowball sampling methods were applied for the semi-structured interviews to ensure diversity and depth. The thematic content analysis identified multiple interrelated barriers, including policy and economic constraints, access and affordability, product diversity and processing, public awareness and promotion, cultural, religious and sensory factors, and safety concerns. In contrast, the facilitators comprised macro-level policymaking, improvement of infrastructure and supply chains, economic and physical access, safety and health considerations, and cultural and social promotion to enhance aquatic product consumption. Addressing these barriers requires coordinated actions to improve the affordability and physical accessibility of aquatic foods, strengthen supply chains and product diversity, enhance public awareness, and increase consumer confidence in seafood quality and safety. Localized and culturally appropriate interventions, supported by multisectoral collaboration, may help increase seafood consumption and contribute to improved nutrition and public health outcomes.

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Introduction

A healthy, balanced diet is fundamental to both physical and mental well-being, representing a primary human need with a significant impact on longevity and quality of life (Siro *et al.*, 2008). Among various food groups, aquatic foods, including fish and seafood, occupy a distinct position in the human diet due to their exceptional nutritional profile. They are an excellent source of omega-3 fatty acids, possess low levels of cholesterol, and provide essential vitamins (e.g., D, E, and A), minerals, and high-quality proteins, all of which contribute to overall health (Daviglius *et al.*, 2002; Ngo *et al.*, 2011). The consumption of these nutrient-rich foods has been linked to a reduced risk of chronic diseases such as cardiovascular disorders, diabetes, hypertension, and other metabolic conditions (Daviglius *et al.*, 2002; Patel *et al.*, 2009; Ke *et al.*, 2014).

Despite the well-established health benefits of fish and seafood, their consumption remains suboptimal for many populations worldwide. This under-consumption is often attributed to cultural norms, economic constraints, or environmental factors that impede regular access and intake (Govzman *et al.*, 2021; FAO, 2024). Iran possesses substantial fisheries and aquaculture potential, with access to the Caspian Sea, the Persian Gulf, and the Gulf of Oman. The fisheries and aquaculture sectors are increasingly recognized as important contributors to national food production, economic development, and the blue economy (FAO, 2020). Beyond their nutritional value, fish and seafood contribute to food and nutrition security by supporting sustainable food

systems, enhancing dietary diversity, and providing livelihood opportunities (Béné *et al.*, 2015; FAO, 2020). However, per capita seafood consumption in Iran remains below global averages (IFO, 2022; FAO, 2024). Understanding the factors that influence fish and seafood consumption is therefore important not only for improving dietary quality and public health but also for supporting broader food and nutrition security objectives (Béné *et al.*, 2015).

In Iran, official reports indicate annual per capita aquatic food supply of 14.1 kg, which remains considerably below the global average of 20.5 kg (IFO, 2022; FAO, 2024). However, supply-side estimates primarily reflect market availability rather than actual intake. Other estimates—ranging from production-based forecasts to household projections—suggest that per capita consumption may be as low as 1.3 kg per year (ReportLinker, 2024; Statista Market Forecast, 2025). These contrasting figures are summarized in Table 1. Given the gap between the nutritional value of fish and seafood and how little they are actually consumed, it is important to understand what shapes people's food choices in this area.

Previous research has investigated fish and seafood consumption using a variety of methodological approaches, including quantitative surveys, consumer preference studies, and qualitative methods such as focus group discussions and in-depth interviews. As highlighted in a systematic review (Govzman *et al.*, 2021), quantitative studies have been useful in identifying consumption patterns and associated factors, whereas qualitative approaches provide a deeper understanding of the

beliefs, perceptions, motivations, and contextual influences that shape food choices (Dean *et al.*, 2015).

Table 1: Comparison of different estimates of fish consumption in Iran.

Source / Data Type	Reported Figure	Annual Per Capita (approx.)	Key Note
Iranian Fisheries Organization (IFO, 2022) – Annual per capita supply	14.1 kg/year	14.1 kg/year	Reflects market availability, not actual intake
ReportLinker (2024) – Supply forecast for 2028	357,000 metric tons total	~4–5 kg/year	Based on projected population; production-based estimate
Statista (market forecast 2025) – Household consumption survey	–	~ 1.3 kg/year	Projected household consumption
FAO (2024) – Global average per capita supply	–	20.5 kg/year	Reference for comparison

Several qualitative studies conducted in different countries have demonstrated the value of focus group discussions and interviews in exploring factors influencing fish and seafood consumption. For example, Brunsø *et al.* (2009) used six focus group discussions in Spain and Belgium to investigate motivations and barriers to fish consumption, identifying health perceptions, taste preferences, price considerations, and preparation-related factors as key determinants. Similarly, Bloomingdale *et al.* (2010) conducted five focus groups with 22 pregnant women in the United States and reported that knowledge, perceived benefits, safety concerns, and social influences played important roles in seafood consumption decisions. McManus *et al.* (2007) also highlighted the importance of cultural beliefs, accessibility, affordability, food safety concerns, and consumer awareness in shaping seafood consumption behaviors. Likewise, Best and Appleton (2013), using four focus group discussions with 28 older adults, demonstrated that sensory

characteristics, cost, ease of preparation, physical limitations, and living circumstances substantially influenced the consumption of protein-rich foods, including fish. Together, these studies illustrate the value of qualitative approaches for understanding the complex social, cultural, and contextual factors that shape food consumption behaviors.

Although previous studies have provided valuable insights into determinants of seafood consumption, most have focused primarily on consumer perspectives, with limited attention to the views of policymakers, public health professionals, fisheries authorities, and other institutional stakeholders who influence food systems and consumption environments. Furthermore, studies conducted in Iran have largely relied on quantitative approaches (Rezaeipandari and Keshavarz Mohammadi, 2017). Consequently, there remains a need for context-based qualitative research that simultaneously captures the experiences of consumers and the perspectives of key

institutional stakeholders involved in food systems, fisheries, nutrition, and public health. Addressing this gap may provide a more comprehensive understanding of the barriers and facilitators influencing fish and seafood consumption and help inform more effective policies and interventions.

This study aims to explore the perceived barriers and facilitators of fish and seafood consumption across diverse consumption contexts in selected regions of Iran using a dual-perspective qualitative approach that integrates insights from consumers and institutional actors involved in food systems and public health. By incorporating both community and stakeholder perspectives, this design enables a more comprehensive understanding of the factors shaping seafood consumption and the gap between policy intentions and actual dietary behaviors.

Material and methods

Study design

This qualitative study employed focus group discussions (FGDs) and semi-structured interviews to explore perceived barriers and facilitators influencing fish and seafood consumption (Krueger, 2014; Silverman and Patterson, 2021). A qualitative design was considered most appropriate because the aim of the study was to obtain an in-depth understanding of perceptions, experiences, and contextual factors influencing fish and seafood consumption rather than to quantify prevalence or test predefined hypotheses.

Focus group discussions

Between May and November 2024, eight FGDs were conducted, each involving 6–10

participants and lasting 60–90 minutes. Focus groups were selected because they rely on group interaction and enable participants to respond to, elaborate on, and challenge one another's views, thereby revealing shared norms and divergent perspectives (Morgan and Krueger, 1993). Sessions were held in Tehran (capital and largest metropolitan area), Khodabandeh in Zanzan Province (inland, non-coastal), and Talesh in Gilan Province (coastal, Caspian Sea). These locations were not selected to be statistically representative of Iran; rather, they were purposively chosen to capture maximum variation in fish consumption contexts and seafood access. Tehran was selected because of its metropolitan diversity, Khodabandeh represented an inland setting with relatively limited access to seafood, and Talesh represented a coastal area with a stronger fisheries culture and greater availability of aquatic products (Malterud *et al.*, 2016). Within these purposively selected settings, participants were recruited through convenience sampling, defined as the inclusion of individuals who were readily available and willing to participate. To increase diversity, FGDs were conducted in neighborhoods representing high, middle, and low socioeconomic strata based on local municipal classifications. Thus, maximum-variation sampling was applied at the site-selection level, while convenience sampling was used within each selected setting (Patton, 2015). Each session was moderated by two members of the research team using a discussion guide. Example questions included: What is the importance of consuming fish and other aquatic products? How much fish or

seafood do you consume? In what form do you usually consume fish or seafood, and how do you prepare it? What do you think are the barriers to consuming fish and seafood? What strategies do you suggest for increasing seafood consumption? Are you aware of any national programs aimed at increasing per capita seafood consumption? Which organization, ministry, or authority do you believe plays the most significant role in promoting seafood consumption in the country? Open-ended questions were deliberately used to allow participants to express their views freely and to enable the emergence of unanticipated themes. As such, the use of open-ended questions is consistent with the exploratory nature of qualitative research and semi-structured interviewing (Patton, 2015; Kallio *et al.*, 2016). Informed consent was obtained from all participants before the sessions. All discussions were audio-recorded, and moderators used the guide to maintain focus while allowing participants to elaborate on issues they considered important. Data collection continued until thematic saturation was achieved, defined as the point at which no substantially new themes emerged from additional discussions (Saunders *et al.*, 2018).

Key informant interviews

In addition to the FGDs, seventeen semi-structured interviews were conducted with key informants using a combined purposive and snowball sampling approach. Semi-structured interviews were selected because they provide a structured yet flexible format that allows the researcher to follow a consistent interview guide while remaining open to exploring participants' individual

experiences, clarifications, and emerging topics (Kallio *et al.*, 2016). Initial purposive criteria included: (1) holding an official role in fish/seafood policy, nutrition, food safety, or related research; (2) direct involvement in national or provincial food security or health programs; and (3) recognized expertise in public health, fisheries, agriculture, or media related to food promotion. Based on these criteria, key informants were identified from organizations such as the Ministry of Health and Medical Education, the National Nutrition and Food Technology Research Institute, the Supreme Council for Health and Food Security, the Ministry of Agriculture (including the Iranian Fisheries Organization and provincial fisheries offices), and media professionals from the Islamic Republic of Iran Broadcasting (IRIB). Snowball sampling was subsequently used by asking interviewees to identify other knowledgeable and influential individuals in the field of seafood consumption promotion. This strategy helped reach additional stakeholders who may not have been identified during the initial purposive mapping. The final dataset comprised 72 participants across focus groups and interviews. Sample size was not predetermined using statistical formulas. Instead, recruitment continued until thematic saturation was achieved, meaning that no substantially new themes or insights emerged from additional data collection (Guest *et al.*, 2006; Saunders *et al.*, 2018). In qualitative research, adequacy is judged by information richness and saturation rather than numerical size (Malterud *et al.*, 2016).

Interviews lasted 30–60 minutes and were conducted either in person at participants' workplaces or online when face-to-face meetings were not feasible. To ensure consistency in data collection and minimize interviewer variability, all interviews were conducted by the same researcher (HF), a PhD student with training and experience in qualitative interviewing, who had no prior relationship with the interviewees. Conversations were audio-recorded with consent, and field notes were documented systematically.

Participant characteristics

The study included adult consumers participating in FGDs and key institutional stakeholders participating in interviews. Participant characteristics are reported in Supplementary Table S1, including age range, sex, educational background, occupational status, and stakeholder affiliation. This information is provided to enable readers to assess the transferability of the findings.

Interview guide and rigor

The discussion guide used in both FGDs and interviews was developed based on a review of the relevant literature and reviewed for content relevance by four academic experts prior to data collection. While formal quantitative indices such as the Content Validity Index (CVI) or Cronbach's alpha are not applicable to open-ended qualitative instruments, expert review is a commonly used approach for assessing the relevance, clarity, and comprehensiveness of qualitative interview guides (Polit and Beck, 2010; Kallio *et al.*, 2016). Feedback from the four academic

experts was used to refine the guide, and the final version was designed to elicit in-depth perspectives through exploratory, open-ended questions.

Data analysis

Transcripts were read repeatedly to gain familiarity with the data. Meaning units were identified and coded using an open-coding approach. Coding and theme development were conducted in MAXQDA (Version 18, Berlin, Germany) following the thematic analysis framework described by Braun and Clarke (2006). MAXQDA was selected because it facilitates systematic coding, organization of large qualitative datasets, development of themes, and collaborative review by multiple researchers without imposing statistical assumptions (Kuckartz and Rädiker, 2019).

Thematic analysis was chosen because the objective of the study was to explore meanings, perceptions, and contextual barriers rather than to measure frequencies or test hypotheses (Braun and Clarke, 2006). Similar codes were grouped into categories and subsequently refined into broader themes representing key barriers and facilitators of seafood consumption. To ensure trustworthiness, the study applied the criteria proposed by Lincoln and Guba (1985), including credibility, dependability, transferability, and confirmability. Credibility was enhanced through investigator triangulation: initial coding was conducted by the primary analyst, and approximately 40% of the interviews were independently coded by

another member of the research team. Any discrepancies were discussed and resolved through consensus, with a third researcher consulted when necessary. Emerging codes, themes, and interpretations were also reviewed and discussed by the supervisory team throughout the analytical process to enhance the rigor and credibility of the findings. Dependability was supported through review of the coding framework by additional team members to assess consistency and clarify interpretations. Transferability was

facilitated by providing detailed descriptions of participant characteristics (Supplementary Table S1) and study settings, enabling readers to assess the applicability of the findings to other contexts. Confirmability was strengthened by grounding interpretations in participants' own accounts and presenting illustrative quotations throughout the Results section.

Supplementary Table S1: Demographic characteristics of focus group participants and key informants
Table S1a: Focus group participants (n=55)

Variable	Category	Value
Age (years)	Range (mean)	25 – 71 (44.0)
Gender	Male	14 (25.4%)
	Female	41 (74.6%)
Education level	Illiterate / Primary / Middle school	15 (27.2%)
	High school / Diploma	11 (20%)
	Bachelor's / Master's	27 (49%)
	PhD	2 (3.6%)
Occupation	Housewife	21 (38.1%)
	Employed	34 (61.8%)
	Persian	17 (30.9%)
Ethnicity	Turkish	23 (43.6%)
	Arab	4 (7.27%)
	Kurdish	5 (9%)
	Talesh	6 (10.9%)

Table S1b: Key informants (n = 17)

A. Highest degree earned

Degree level	Field of study	Number
PhD	Nutrition sciences	5
	Food science and technology	2
	Agricultural economics	1
	Food quality control and hygiene	1
	Fisheries	1
	Pediatrics	1
Subtotal (PhD)		11
Master's	Nutrition sciences	2
	Fisheries engineering and marine biology	4
Subtotal (Master's)		6
Total		17

B. Gender distribution

Gender	Number (%)
Male	11 (64.7%)
Female	6 (35.2%)

C. Organizational affiliation

Organization	Subdivision	Male	Female	Total
Ministry of Agriculture	Institute for Planning and Agricultural Economics	1	0	1
	Iranian Fisheries Organization (Quality Improvement, Processing, Market Development)	3	0	3
	Provincial Fisheries Offices (Sistan & Baluchestan, Arak)	3	0	3
Ministry of Health	Community Nutrition Improvement Office	1	1	2
	Supreme Council for Health and Food Security	0	2	2
University faculty members	Shahid Beheshti Univ. of Medical Sciences / Tehran Univ. of Medical Sciences / National Nutrition Institute / Gorgan Univ. of Medical Sciences	2	3	5
IRIB (Islamic Republic of Iran Broadcasting)	Health Council	1	0	1
Total		11	6	17

Ethical considerations

The study protocol was reviewed and approved by the Ethics Committee of the National Nutrition and Food Technology Research Institute (Project No: IR.SBMU.NNFTRI.REC.1402.018).

Results*Participant characteristics*

A total of 72 individuals participated in this qualitative study, including 55 focus group participants and 17 key informants. Participants ranged in age from 25 to 71 years and represented diverse geographic regions, including Tehran, Zanjan (Khodabandeh), and Gilan (Talesh). The sample included both men and women, with educational backgrounds varying from no formal education to doctoral degrees. Demographic details for both groups are presented in Supplementary Table S1 (S1a and S1b). This diversity enabled a broad spectrum of perspectives on fish and seafood consumption across different social, cultural, and educational contexts.

Facilitators and barriers of aquatic product consumption

After analyzing participants' perspectives through focus group discussions and individual interviews, a range of facilitators and barriers related to fish and seafood consumption were identified. A thematic framework was constructed based on open coding, subthemes, and overarching themes. The complete list of themes, subthemes, and codes is presented in Table 2 (facilitators) and Table 3 (barriers). In the following sections, we highlight the most salient findings and illustrative quotes.

Facilitators

Several facilitators were identified and grouped into eight overarching themes (Table 2). Participants emphasized the role of policy-level support, including integrating seafood promotion into national strategic documents and aligning import-export practices. The need for data-driven planning was also highlighted.

Table 2: Thematic analysis of facilitators to aquatic product consumption based on interviews and focus groups.

Main Theme	Subtheme	Codes
Strengthening macro-level policy and infrastructure for promoting sustainable consumption	Inclusion in strategic documents and laws	Emphasis on increasing fish consumption in national and upstream documents; Policy-making to increase supply and demand
	Balance in exports, imports, and self-sufficiency	Proper exports and imports; Reducing dependency on foreign sources
	Data-driven planning	Clarifying per capita consumption by time and location
Improving production and processing	Economic support and job creation	Loans for aquaculture; Incentives; Supporting graduates and fishermen; Strengthening unions
	Infrastructure and supply chain	Licensing; Aquatic zones; Modern equipment; Rural empowerment
	Climate-aligned aquaculture	Climate- and taste-based fish egg distribution and training; Ecosystem-friendly fish; Economic species
	Innovation from fishing to packaging	Fishing techniques; Post-harvest improvements; Packaging innovation
Improving supply and physical access	Fish supply expansion	Increasing supply; Ensuring stability; Expanding fisheries stores; Mobile outlets; Licensing live fish sales; Fair distribution
	Product variety	Diverse products; Fish paste; Live fish in shops; Variety in offerings
	Physical access	Access to healthy/fresh fish; Remove intermediaries; Coastal residence
Improving economic access	Provision of subsidies and food vouchers for fish purchase	Food vouchers; Targeted coupons; Fish in health centers' food baskets; Vouchers for employees/retirees; Subsidies from harmful goods taxes; State support for fish like poultry
	Price reduction and adjustment	Input subsidies; Lower relative price; Effect of meat prices; Cost reduction via productivity; Shorter chains
	Price regulation	Stakeholder taskforce; Store monitoring
	Household budget management	Improved income; Managing costs to include fish; Replace unhealthy foods (e.g., pizza)
Ensuring safety and hygiene	Production chain monitoring	Health monitoring from sea to shelf; Pollution control
	Hygienic conditions at point of sale	Cold chain; Certified transport; Freshness; Quality assurance; Health labels; Oversight
	Traditions and customs	Nowruz and cultural events increasing fish consumption
Cultural and social promotion	Culture-building	Festivals; Seafood restaurants; Home ponds; Fish-eating days; Free fishing plans; Fish in institutional menus
	Advertising	Billboards; National media; Youth campaigns; Trend foods (sushi); Underused species; Shelf positioning; Reverse psychology ads
	Social influencers	Peer influence; Parental modeling; Influencers; Doctor endorsements
	Early childhood habituation to fish consumption	Fish in childhood diet; School feeding; Curriculum inclusion

Table 2 (continued):

Main Theme	Subtheme	Codes
Awareness of health benefits	Raising awareness	Education; Policy-maker sensitization; Research publications; School lessons; Training parents
	Specific health benefits	Omega-3 source; Blood Presser and diabetes control; Rich in phosphorus; Low urea; Wound healing; Vitamins/minerals; Low bad fats; Heart protection; Brain health
Product and preparation diversity	Optimizing fish features	Boneless; Odorless; Safer choices; New/unused species
	Cooking training	Removing smell; Proper cooking; Workshops; Recipe booklets

Table 3: Thematic Analysis of Barriers to Aquatic Product Consumption Based on Interviews and Focus Groups.

Main Theme	Subtheme	Codes
Policy Misalignment and Economic Constraints in the Aquatic Value Chain	Inadequate export/import practices	Imbalanced seafood trade; profit-driven exports over domestic promotion; rent-seeking in tilapia imports
	Misalignment between production and consumption policies	Government focus on production without corresponding consumption planning; absence of consumer-oriented policies
	Lack of support for producers	Inadequate backing for fish farmers; production timing and quantity mismatches
	Market dysfunction	Weak regulation; fish smuggling; price and quality disruptions due to intermediaries
	Broader political and economic challenges	Economic sanctions; removal of preferential currency rates
	Dependence on the import of production inputs	reliance on imported inputs (larvae, feed, drugs)
	Intersectional conflicts and weak cooperation	Conflicting interests between institutions; poor teamwork; disconnection between policy actors and implementers
Limited Physical and Economic Access	Financial limitations	Severe lack of investment and funding for aquaculture projects
	Limited access to diverse aquatic products	Inadequate availability of fresh fish; reduced consumer choice
	High prices and lack of affordability	Expensive fish and seafood; low cost-effectiveness compared to other meats; reduced purchasing power due to economic hardship; decreased catch volumes; high aquaculture costs
Weakness in Processing and Product Diversity	Limited product variety	Few fish types aligned with consumer taste and budget; lack of ready-to-eat or diversified items
	Technological gaps in processing	Outdated technology; weak industrial systems for seafood processing and innovation; ineffective dissemination of technical know-how to fish farmers and processors
Weakness in public awareness and promotion of aquatic product consumption	Weakness in cultural promotion and encouraging seafood consumption	Weak public campaigns; reduced culinary shows; few seafood festivals; limited campaign success
	Weak advertising and brand visibility	Low marketing impact; ineffective branding; poor store placement

Table 3 (continued):

Main theme	Subtheme	Codes
Limited awareness about the nutritional benefits of aquatic products	Limited nutrition awareness	Inadequate public education; confusing or inaccessible information; lack of simplified health messaging
	Poor understanding of preparation and nutritional value	Lack of awareness about seafood benefits and cooking methods; insufficient education in schools; poor understanding of nutrition and fisheries among policymakers and fisheries students
	Weak research and industry linkage	Lack of studies on canned seafood health effects; limited communication of academic findings; weak ties between academia and industry; no systematic national surveys on public knowledge of seafood
	Lifestyle changes and time constraints	Preference for fast food; lack of time; low prioritization of healthy living; high carb and fat intake; emphasis on satiety over nutritional value
Cultural, Religious, and Sensory Challenges	Negative taste perceptions	Lack of habit; family resistance; perceived non-essential nature of fish; rejection of new formats such as canned items
	Negative messaging from traditional medicine	Opposition from traditional medicine; beliefs about seafood's "cold nature"; seasonal consumption misconceptions
	Sensory dislikes	Presence of bones; unpleasant taste or smell; bad past experiences
	Religious constraints	Concerns about halal status of non-scaled species; limited variety of halal seafood
Health-Related Restrictions and Safety Concerns	Medical prohibitions	Doctor-imposed restrictions; kidney-related avoidance; allergy concerns
	Safety concerns in production and distribution	Poor farming hygiene; feed-related worries; contamination with mercury and heavy metals
	Distrust toward retail sources	Doubts about freshness; lack of trust in vendors
	Structural and logistical weaknesses	Inadequate cold chain infrastructure; fast spoilage risks; poor design and product presentation; ineffective labeling

As one key informant stated:

"A clear division of responsibilities, along with a monitoring system and quantitative indicators, can enhance confidence in implementing seafood-related programs. For example, the precise status of per capita consumption—disaggregated by time and location—remains unclear in the country."

In terms of production and processing, participants highlighted economic incentives and infrastructure improvements as key facilitators. Empowering rural households through training and

climate-adapted seed provision was seen as particularly effective. One key informant noted:

"One of the most effective strategies for increasing per capita fish consumption is empowering rural households to engage in aquaculture—through training and the provision of fish eggs adapted to local climates."

Physical and economic access were recurring concerns. Suggested solutions included expanding seafood outlets, mobile sales units, and targeted subsidies or

vouchers for low-income groups. One key informant proposed:

"Allocate revenue from unhealthy food taxes to subsidize nutritious foods, with active follow-up by the Supreme Council of Health."

A focus group participant recalled a successful initiative:

"During Dr. Qalibaf's tenure, Tehran Municipality gave employees seafood purchase vouchers every three months."

Participants stressed the importance of safety and hygiene—monitoring water quality, cold chain logistics, and health certification—as crucial for building consumer trust.

"Companies that distribute protein products must be monitored to ensure they are healthy, standardized, and properly packaged." (Focus group participant)

"A traceability system from origin to destination, along with cold chain logistics and health monitoring, should be established." (Key informant interview)

Cultural and promotional strategies—such as seafood festivals, social media influencers, and incorporating fish into Nowruz celebrations—were seen as effective for shifting consumer habits. One focus group participant offered an unconventional marketing insight:

"If we temporarily claim that fish is harmful, it might increase demand. In marketing, they say: present the product as rare or hard to obtain—it makes people want it more."

Further examples of cultural and promotional facilitators are provided in Table 2 under "Cultural and social promotion."

Finally, education and nutritional literacy emerged as strong facilitators. Participants called for school-based programs, caregiver training, and public campaigns highlighting fish benefits for heart health, cognition, and chronic disease prevention. However, one key informant noted a critical gap:

"Awareness among senior officials about food security and fish consumption is extremely low. If they were well-informed, they would prioritize the issue and enact public-benefit policies. Part of the promotion effort must target high-level decision-makers—but this mindset is largely absent."

Barriers

Barriers to fish and seafood consumption were numerous. They were grouped into seven overarching categories (Table 3).

A frequently cited issue was policy misalignment. Participants criticized national strategies for overemphasizing aquaculture production while neglecting consumption-related planning. Export-driven priorities, rent-seeking in import policies (e.g., tilapia), and weak market regulation were highlighted as major obstacles. One key informant explained:

"Universities have a responsibility to support this industry, but there is a lack of coordinated teamwork. Institutions like the Fisheries Organization, universities, and veterinary bodies work independently, often with conflicting interests and little collaboration."

Participants also described broad economic constraints—inflation, subsidy cuts, and dependence on imported inputs such as fish larvae and aquafeed—which drive up

production costs and retail prices. One key informant explained:

"Studies show that fish is often among the first items removed from household diets under economic pressure. Since fish is not perceived as essential, this pattern has even been observed among higher-income groups."

Issues of physical and economic access were widely reported. Many respondents mentioned limited availability of fresh fish, poor distribution networks, and high prices relative to other meats. One focus group participant captured the reality of economic pressure:

"For many families, the priority is simply to fill their stomachs. I've encountered mothers who say their children haven't seen chicken or meat for a month. I doubt people inherently dislike fish; when someone says they don't consume it, it's often mainly because of the cost."

Promotion and awareness efforts were considered insufficient—weak advertising, few festivals, poor branding, and ineffective nutrition messaging. One focus group participant noted:

"There's virtually no seafood promotion in our country. Despite cooking shows, I've rarely seen any mention of fish."

Cultural and sensory challenges also emerged as deterrents: unpleasant odor or texture, lack of cooking familiarity, family resistance (especially from children), religious restrictions (non-scaled species for Shiite populations), and seasonal misconceptions. A focus group participant explained:

"Many people don't have the energy to cook. That's why fast food is popular—it's ready-to-eat."

A key informant added:

"Religious dietary rules pose challenges. Shiite doctrine permits only scaled fish, so many species like crabs are excluded. A large portion of the catch is wasted."

Health and safety concerns were prevalent—fears of mercury contamination, poor feed quality, lack of hygiene standards, and weak cold chains. These factors fueled mistrust toward vendors. One focus group participant said:

"People say: fish lives in the sea, but the sea itself is polluted. Factories dump waste directly into the ocean."

Discussion

The present study explored the perceived barriers and facilitators of fish and seafood consumption in Iran from the perspectives of both consumers and key institutional stakeholders. Overall, the findings suggest that seafood consumption is influenced by a complex interplay of policy, economic, infrastructural, cultural, and informational factors. These findings are broadly consistent with previous qualitative studies conducted in other settings, which have identified affordability, accessibility, cultural norms, food safety concerns, and consumer awareness as important determinants of seafood consumption (McManus *et al.*, 2007; Brunsø *et al.*, 2009; Bloomingdale *et al.*, 2010). However, by incorporating the perspectives of institutional stakeholders alongside consumers, the present study provides a more comprehensive understanding of the systemic factors influencing seafood consumption in Iran.

One of the main findings in this study was the lack of alignment between

production-centered policies and those aimed at encouraging domestic consumption of aquatic foods. Although aquaculture initiatives have expanded in recent years, the absence of consumer-oriented planning has limited their impact (FAO, 2020). Market inefficiencies stemming from export-focused agendas, unregulated imports, and low support for producers further highlight structural gaps (Cherif and Hasanov, 2024). Fragmentation among key institutions-such as fisheries, veterinary organizations, and academic bodies-has weakened coordinated efforts to improve seafood consumption (Symes, 2007). Rising production costs due to sanctions, removal of subsidies, and reliance on imported inputs have made aquatic products less accessible for many households (Bank, 2021). According to Béné's framework, these governance challenges reflect a broader disconnection within food systems where production, consumption, and health goals are not integrated (Béné *et al.*, 2019).

In our study, limited physical and financial access to aquatic products was repeatedly mentioned by participants as a key barrier to consumption, especially among residents of non-coastal provinces. Informants pointed to poor distribution infrastructure, lack of regional cold-chain facilities, and seasonal supply disruptions that reduce availability and variety in retail outlets. These empirical insights are consistent with broader patterns observed in previous studies, such as those by Hosseini *et al.*, who identified access and affordability as central constraints affecting nutrition choices in Iran (Hosseini *et al.*, 2017). Similarly, World Bank analysis

highlights how subsidy removal, inflation, and economic stagnation have weakened purchasing power and raised the cost of protein-rich food items, including seafood (Bank, 2021). Béné's framework further emphasizes that resilient food systems require equitable access and affordability, and warns that economic exclusion undermines both sustainability and public health goals (Béné *et al.*, 2019).

Participants identified poor marketing and low public awareness as key factors hindering seafood consumption. They pointed to limited presence in retail spaces and media, confusion over nutritional value, and a lack of user-friendly education tailored to local tastes. Similar gaps have been observed in prior research, where weak branding and ineffective health communication contributed to low consumer engagement (Shaviklo, 2016). Froehlich *et al.* likewise argue that building robust consumer awareness is essential for promoting sustainable and nutritious seafood choices, especially in systems with fragmented governance (Farmery *et al.*, 2018). Investing in culturally adapted promotional strategies and simplified public education could help enhance seafood's visibility and acceptability.

Our findings revealed several cultural and sensory factors that limit seafood consumption, including lack of culinary familiarity, negative taste perceptions, and dietary norms. Religious concerns and traditional beliefs-such as doubts about permissibility or perceptions from folk medicine-also emerged as influential. Similar constraints have been reported in previous studies, where cultural norms and

sensory aversions shaped food behavior more than economic factors (Shepherd and Raats, 1996). Altintzoglou *et al.* emphasize that taste, odor, and preparation complexity play pivotal roles in consumer acceptance, especially where seafood is not culturally entrenched (Altintzoglou *et al.*, 2011). Tackling these issues may require tailored messaging, convenient product formats, and public health engagement strategies.

Participants consistently emphasized the need for stronger governance, better institutional coordination, and more coherent policies linking production, distribution, and consumption objectives. Similar concerns have been highlighted in studies examining aquaculture governance and seafood-sector development in other countries. For example, Giannetto *et al.* (2014) emphasized the role of government support and strategic planning in the development of Türkiye's aquaculture sector. Likewise, Do *et al.* (2022), in a study of seafood processing firms in Vietnam, demonstrated that coordination across supply-chain actors and institutional support mechanisms can contribute to improved sector performance and competitiveness. In Malaysia, Witus and Vun (2016) highlighted the importance of policy frameworks, environmental sustainability considerations, and cooperation among stakeholders in supporting aquaculture development. Consistent with these observations, participants in the present study perceived fragmented governance structures and weak coordination among responsible organizations as important barriers to improving seafood consumption. Together,

these findings suggest that stronger policy alignment, institutional collaboration, and coordinated action across the seafood value chain may support efforts to promote aquatic food consumption in Iran.

The present study also highlighted affordability, distribution challenges, and limited physical access as major barriers to seafood consumption. These findings are consistent with previous research demonstrating that economic constraints and inadequate food distribution systems can substantially reduce access to nutritious foods (Béné *et al.*, 2019; Bank, 2021). International experiences further suggest that improvements in cold-chain infrastructure, regional distribution networks, and targeted support mechanisms can enhance both the availability and affordability of seafood products (Ken Research, 2022). Therefore, investments in infrastructure and market access may represent important strategies for increasing seafood consumption in Iran.

Limited diversity and inadequate processing of aquatic products emerged as recurring concerns across both focus group discussions and key informant interviews. Many participants indicated that the limited availability of different species and processed seafood products reduced the attractiveness of seafood for consumers with diverse tastes, lifestyles, and purchasing capacities. Respondents frequently expressed a preference for affordable value-added and ready-to-cook products that would better fit local cooking practices. These findings are consistent with previous studies showing that insufficient product differentiation, limited processing capacity, and weak alignment

between available products and consumer preferences can contribute to lower seafood consumption (Shaviklo, 2016; Einarsdóttir *et al.*, 2022). Product innovation and diversification have been identified as important strategies for improving consumer acceptance and strengthening seafood value chains (Kelling *et al.*, 2023). Therefore, expanding product diversity and improving processing infrastructure may represent important opportunities for increasing seafood consumption in Iran.

In addition, both consumers and key informants emphasized the importance of public awareness, effective communication, and consumer confidence in seafood quality and safety. Similar findings have been reported in previous qualitative studies. For example, Brunsø *et al.* (2009), using focus group discussions with consumers in Spain and Belgium, found that health perceptions, concerns about preparation, price, and trust in product quality strongly influenced fish consumption decisions. Likewise, Bloomingdale *et al.* (2010), through focus groups with pregnant women in the United States, reported that knowledge about health benefits, perceived risks, safety concerns, and social influences played important roles in seafood consumption behavior. Farmery *et al.* (2018) further highlighted the importance of consumer awareness and trust in promoting sustainable seafood choices. The consistency of these findings with the present study suggests that increasing seafood consumption requires not only educational interventions but also measures that strengthen transparency, quality

assurance systems, labeling practices, and consumer confidence in seafood products.

Finally, cultural beliefs, social norms, and sensory preferences emerged as influential determinants of seafood consumption. Participants described how taste preferences, cooking habits, family traditions, and cultural perceptions shape food choices. Similar findings have been reported internationally, where seafood consumption is strongly influenced by cultural familiarity, social practices, and perceived ease of preparation (Shepherd and Raats, 1996; Altintzoglou *et al.*, 2011). Experiences from countries in the region also highlight the use of culturally tailored promotional activities, culinary education, seafood festivals, and community-based initiatives as approaches to promoting seafood consumption and healthier dietary practices (Elzit, 2024; Sallet, 2025). These approaches may help increase the acceptability of seafood and support long-term behavioral change.

Taken together, the findings indicate that increasing seafood consumption in Iran requires more than simply expanding production. Sustainable improvements are likely to depend on coordinated efforts that simultaneously address policy coherence, affordability, infrastructure, product innovation, consumer awareness, and cultural acceptance. The inclusion of both consumer and stakeholder perspectives provides a comprehensive understanding of these interconnected factors and offers practical insights for future policies and interventions aimed at improving food and nutrition security.

This study offers several methodological strengths. Efforts were made to maximize

variation in perspectives by including participants from different socioeconomic backgrounds, stakeholder groups, and geographic settings. Focus group discussions were conducted in selected regions representing metropolitan, inland, and coastal contexts, including neighborhoods with different socioeconomic profiles in Tehran. In addition, the inclusion of both consumers and key institutional stakeholders—including policymakers, researchers, implementers, and media representatives—provided a broader understanding of the factors influencing fish and seafood consumption from both community and system-level perspectives.

Nonetheless, several limitations should be acknowledged. As a qualitative study, the objective was not to achieve statistical representativeness but rather to obtain rich and diverse perspectives and develop an in-depth understanding of the phenomenon under investigation. Therefore, the findings should be interpreted as reflecting the experiences and views of participants from selected regions and stakeholder groups rather than the entire Iranian population. Sample size was determined based on thematic saturation, a recognized criterion for adequacy in qualitative research, rather than statistical considerations. Although efforts were made to include participants with diverse socioeconomic, occupational, and geographic backgrounds, some viewpoints from remote or underserved populations may not have been captured. Despite these limitations, the study provides valuable context-specific insights that may inform future research, policy development, and the design of

interventions aimed at improving fish and seafood consumption.

Conclusion

This qualitative study provides context-specific insights into the factors influencing fish and seafood consumption in Iran. Key barriers identified by participants included institutional fragmentation, affordability constraints, limited physical access, low public awareness, and cultural concerns, while facilitators included stronger policy coordination, improvements in infrastructure and supply chains, and targeted economic support measures. The findings suggest that greater alignment between production, distribution, and consumption policies may help address governance-related barriers, whereas improvements in cold-chain infrastructure and economic access could facilitate seafood consumption, particularly in non-coastal and lower-income areas. In addition, the themes related to consumer distrust, safety concerns, and limited culinary familiarity highlight the potential value of culturally appropriate educational and promotional initiatives. Overall, the findings indicate that improving fish and seafood consumption in Iran will require coordinated actions across multiple sectors and may contribute not only to healthier dietary patterns but also to broader food and nutrition security objectives.

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