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Publication date	2026-04-18
Original Citation	Kaner, G, Yalçın, T, Yurtdaş-Depboylu, G, Dönmez, B, Bayar, E, Kip, M & Harrington, J M 2026, 'Evaluation and prioritization of food environment policies in Türkiye using the Healthy Food Environment Policy Index (Food-EPI)', BMC Public Health, vol. 26, no. 1, 1752, pp. 1-14. https://doi.org/10.1186/s12889-026-27312-5
Type of publication	Article (peer-reviewed)
Link to publisher's version	https://www.scopus.com/pages/publications/105040653678 - 10.1186/s12889-026-27312-5
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Evaluation and prioritization of food environment policies in Türkiye using the Healthy Food Environment Policy Index (Food-EPI)

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Abstract

Background Türkiye is facing an alarming rise in diet-related non-communicable diseases, including obesity and type 2 diabetes. Tackling this issue demands a more proactive policy approach that fosters healthier food environments and supports long-term dietary improvements. The purpose of this study is to evaluate the implementation level of government policies aimed at creating healthy food environments in Türkiye, using the Healthy Food Environment Policy Index (Food-EPI), an internationally recognized framework for assessing implementation levels of food environment policies and comparing them to international best practices.

Method The Food-EPI process in Türkiye was conducted in five main stages between May 2024 and June 2025. The policy and infrastructure support indicators were adapted to the national context, and evidence on national policies and international benchmarks was compiled. A panel of 38 national experts assessed policy implementation through structured evidence review and workshops to identify gaps. In total, 45 policy actions and 50 infrastructure support actions were initially identified, of which 26 policy actions and 28 infrastructure support actions were selected for prioritisation.

Results Across all assessed domains, none of the food policy or infrastructure support indicators in Türkiye reached a "high" level of implementation, with half of the policy indicators (50%) and more than half of the infrastructure support indicators (54%) assessed as having a "low" level of implementation. The top two highest-ranked policy actions identified through the weighted prioritisation process were: (1) reducing taxes on healthy and staple foods and (2) supporting healthy, local, and minimally processed food systems through agricultural policies and direct-to-consumer sales. The top two highest-ranked infrastructure support actions were: (1) increasing dietitian employment in primary care to enhance nutrition monitoring and (2) establishing systems to monitor children's growth, nutritional status, and physical fitness.

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Conclusion Türkiye shows weak implementation across key domains of food environment policy. Experts prioritized actions targeting fiscal measures, agricultural systems, food marketing regulation, product reformulation, and strengthened nutrition monitoring and political commitment. Together, these prioritized actions provide a structured, evidence-informed roadmap to strengthen Türkiye's food policy environment and support progress toward healthier food systems.

Keywords Food-EPI, Food policy, Healthy food environment, Healthy food environment policy index

Introduction

Noncommunicable diseases (NCDs)—such as cardiovascular conditions, cancer, diabetes, and chronic respiratory illnesses—are responsible for more than 40 million deaths globally each year [1]. NCDs represent the leading cause of mortality worldwide and account for approximately 69% of all deaths in Türkiye [2]. These diseases are primarily fueled by lifestyle-related risk factors that are preventable, such as smoking, poor dietary habits, lack of physical activity, and excessive alcohol consumption. Such behaviors contribute to health issues like obesity, hypertension, and high cholesterol, which significantly increase the risk of developing NCDs. In Türkiye, adult obesity prevalence is projected to reach approximately 42.1% by 2030 [3]. Several practical and cost-effective strategies have been proposed to reduce the prevalence and consequences of NCDs [2].

Food environments refer to the interaction of sociocultural, political, economic, and physical factors that together shape individuals' dietary behaviours and nutritional well-being [4, 5]. Unhealthy food environments promote poor dietary habits through economic and commercial conditions that shape food availability, marketing, and pricing. While nutritional quality and palatability are properties of foods themselves, the food environment influences consumption by promoting and positioning less healthy options, often making them more affordable and more heavily marketed than healthier alternatives [6, 7]. Evidence suggests that improving dietary patterns and reducing the burden of NCDs largely depend on the quality of food environments, the implementation of effective food policies, and the strength of supportive infrastructures [7, 8]. Effective food policies and supportive infrastructures have also proven essential in addressing socioeconomic disparities in nutrition [9]. Therefore, it is crucial for governments to adopt preventive policies and interventions aimed at reducing the burden of unhealthy diets. Continuous monitoring of policy implementation, together with evaluations based on international best practices across countries or over time, can stimulate progress in improving food environments. To assist governments in implementing effective actions aimed at improving national food environments, the International Network for Food and Obesity/Noncommunicable Diseases Research, Monitoring and Action Support (INFORMAS) designed the Healthy Food Environment Policy Index (Food-EPI) framework. The Food-EPI is an internationally applied tool that evaluates the extent to which government policies and actions support the creation of healthy food environments. The framework provides a structured approach for benchmarking national policies against international best practices and for identifying priority actions to strengthen food environment policies and improve population nutrition [10].

In Türkiye, several policies and infrastructure support initiatives to support healthy diets are already in place. The "Türkiye Healthy Nutrition and Active Life Program", developed by the Turkish Ministry of Health, was first launched in 2010 and has since been periodically updated in line with national strategic plans (2013–2017, 2019–2023, and 2025–2028) [11–13]. As part of this program, actions were introduced to reduce saturated fatty acids in foods by replacing them with unsaturated fatty acids. These measures mainly target processed and packaged food products available in the retail market and are implemented through national nutrition policy strategies and reformulation initiatives coordinated by the Ministry of Health. The program also set a target of lowering the proportion of saturated fat to below 10% of total fat content in selected product groups [12]. In addition, the National Program for the Reduction of Excessive Salt Consumption in Türkiye (2011–2015) was developed under the same national framework and later updated for the 2016–2021 period [14, 15]. In line with recommendations submitted to the Ministry of Agriculture and Forestry, several initiatives were implemented within the scope of the Turkish Food Codex to reduce salt levels in selected food products, including bread, olives, tomato paste, cheese, and red pepper products. Efforts to reduce salt content, improve food labelling practices, strengthen collaboration with the food industry, and increase public awareness are ongoing [12, 14]. Furthermore, the Turkish Nutrition Guide was developed based on data from the Turkish Nutrition and Health Survey [16]. Despite these initiatives, the prevalence of obesity and NCDs remains high in Türkiye, indicating that additional and more comprehensive policy actions are required [17].

This study aims to systematically evaluate the level of implementation of government food environment policies in Türkiye using the Food-EPI framework, with the objective of identifying implementation gaps and priority areas for policy strengthening. In addition, the study

explores experts' perceptions regarding the usefulness and applicability of the Food-EPI process in the Turkish context.

Method

The implementation of food environment policies in Türkiye was assessed using the Food-EPI, a standardized framework developed by the INFORMAS to benchmark government actions against international best practices. In this study, the adapted version of the Food-EPI framework developed within the Policy Evaluation Network (PEN) project was used. The PEN-adapted Food-EPI framework consists of two main components: policy domains and infrastructure support domains. The policy component includes six domains—food composition, food labelling, food promotion, food prices, food provision, and food retail—while the infrastructure support component includes six domains—leadership, governance, monitoring and intelligence, funding and resources, platforms for interaction, and health in all policies. Together, these domains comprise a total of 48 indicators (24 policy indicators and 24 infrastructure support indicators) [18]. The structure of the framework is presented in Fig. 1.

Ethical considerations

This study was granted ethical approval by the Izmir Kâtip Celebi University Health Research Institutional Review Board (Application Number: #0050, Date: 18.07.2024). All procedures performed in this study involving human participants were conducted in accordance with relevant guidelines and regulations and with the Declaration of Helsinki and its subsequent amendments. All participants provided informed consent prior to participation in the study.

Food EPI implementation stages

The Food-EPI assessment in Türkiye consisted of five main phases (Fig. 2).

Food-EPI adaptation

At the initial stage, the PEN-adapted Food-EPI framework was reviewed and adapted to the Turkish context between May and June 2024. This Food-EPI assessment was conducted as part of the FOOD systems and policy PATHways for equal population nutrition in Europe (FOODPATH) project, funded under the Partnership Fostering a European Research Area for Health (ERA-4Health) framework [19]. During this phase, the indicators of the PEN-adapted Food-EPI were translated into Turkish and reviewed by the research team to ensure

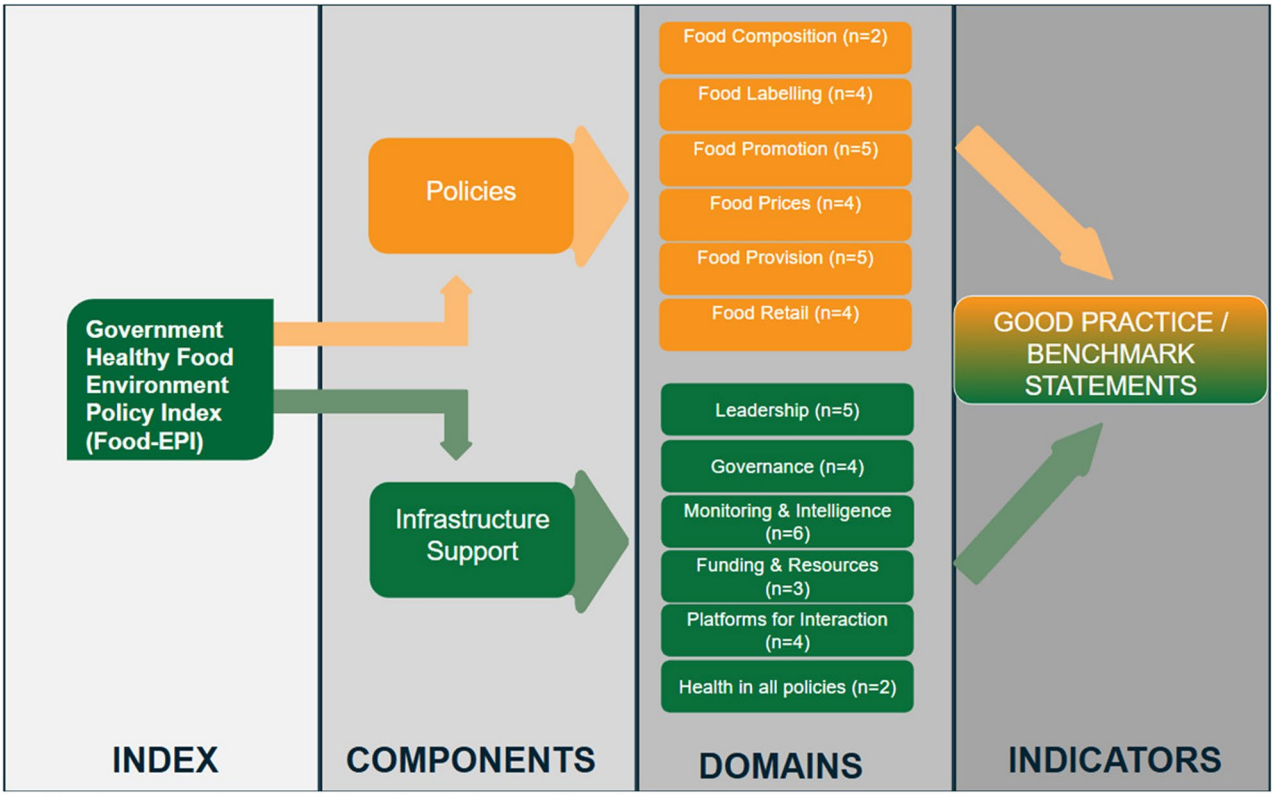


Fig. 1 Key elements and domain structure of the Food-EPI framework [10]

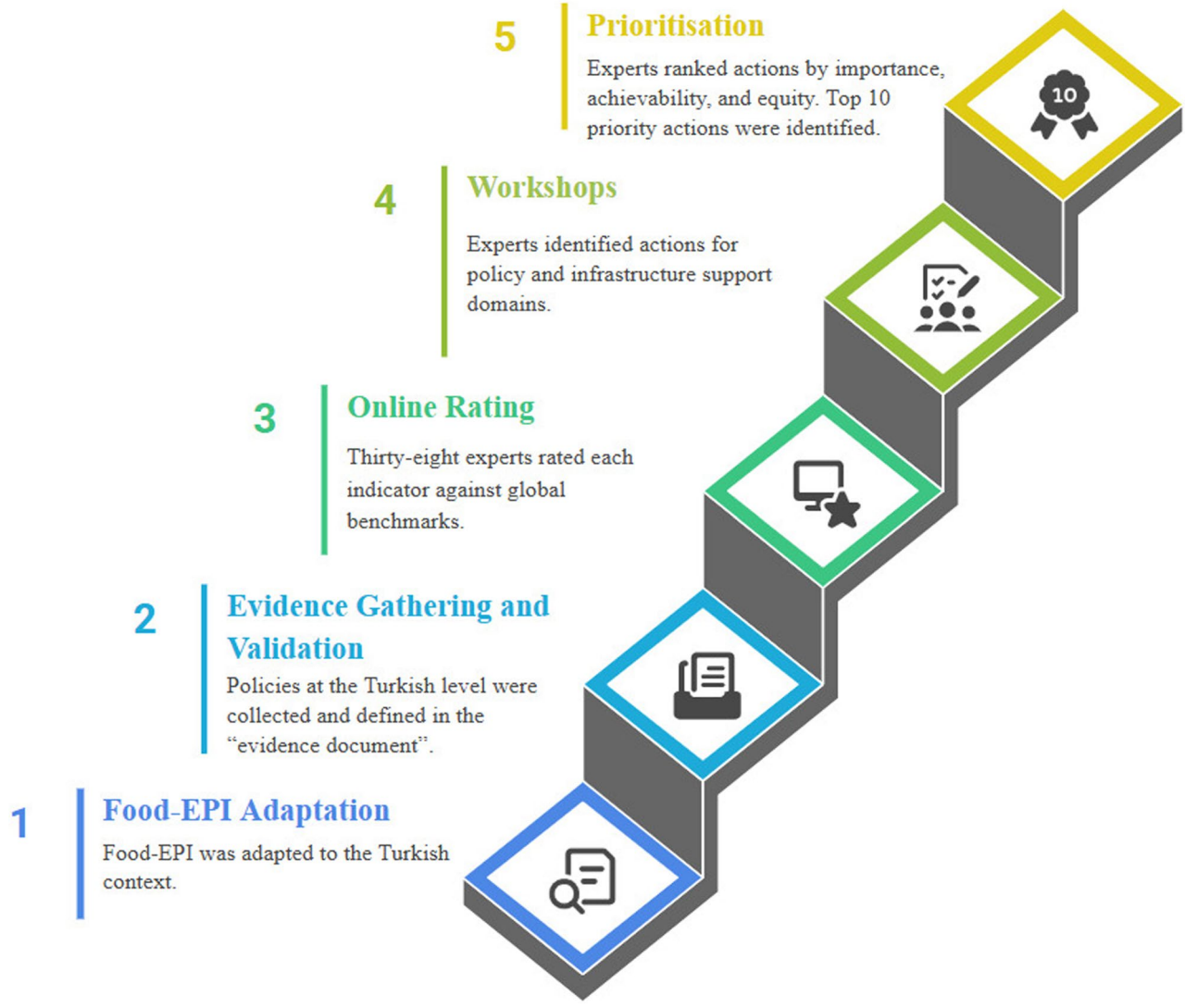


Fig. 2 Summary of the five phases of the Food-EPI Türkiye 2025 process

their relevance to the national policy environment. Rather than modifying the structure of the Food-EPI framework, the existing PEN domains and indicators were retained to maintain methodological consistency and comparability with other European Food-EPI studies. Minor wording adjustments were made where necessary to ensure conceptual clarity within the Turkish policy context while preserving the original meaning of the indicators. The indicators were also reviewed to assess their applicability to the Turkish policy environment while maintaining alignment with the PEN project framework.

Evidence gathering and validation

In the second stage, the research team compiled international benchmarks for each indicator and collected evidence on the Turkish government's policy landscape from 2016 onwards, with data collection conducted between May and September 2024. The year 2016 was selected to ensure that the assessment reflects the most recent national policy framework and current strategic public health and nutrition commitments in Türkiye.

Evidence was identified through structured online searches of publicly available official government websites, including the Ministry of Health, Ministry of Agriculture and Forestry, Ministry of National Education, the Ministry of Trade, and the Official Gazette of the Republic of Türkiye. Predefined keywords aligned with the 48 Food-EPI indicators (e.g., nutrition policy, food composition standards, food labelling, marketing regulation, school food standards, taxation, product reformulation, monitoring systems, and governance mechanisms) were used to systematically identify relevant documents. Eligible documents included national-level laws, regulations, strategic plans, policy documents, implementation guidelines, and official governmental reports published

from 2016 onwards. Draft documents, local-level initiatives, non-governmental publications, and media reports were excluded.

Data were obtained from official government documents, reports, and policy materials and consolidated into a single evidence document, which was prepared between October and December 2024. All relevant documents were compiled into a structured evidence document organized according to the 48 Food-EPI indicators. The validity and comprehensiveness of the content were then confirmed by the appropriate governmental authorities through a formal review process to ensure accuracy and completeness. The evidence document also included benchmarks, representing international best practice examples for each indicator. The benchmarks used in the evidence document were sourced directly from the Nourishing Database [20] and the PEN Project evidence document [21]. A detailed list of the international benchmark examples used for each indicator is provided in the Supplementary Materials (Appendix 1).

Online rating

In the third stage, national experts evaluated policy implementation against global benchmarks and proposed targeted improvements for healthier food environments. A total of 65 Turkish experts were invited to participate in the Food-EPI Türkiye process. Experts were identified using a purposive sampling approach based on their academic background and professional expertise in relevant fields, including Nutrition and Dietetics, Public Health, and Food Policy, and Food Engineering. Potential participants were identified through institutional affiliations, publication records, and involvement in national nutrition or public health initiatives. Invitations were sent via email explaining the purpose and procedures of the assessment, and 38 accepted the invitation. Government officials and food industry representatives were not directly involved in the assessment process to maintain independence and minimize potential conflicts of interest. All participants formally agreed to serve on the expert panel and declared any potential conflicts of interest.

The degree of implementation of government policies in Türkiye was evaluated by experts through a structured online survey conducted between January and February 2025, based on 48 Food-EPI indicators. Experts assessed the level of implementation of food environment policies in Türkiye using a five-point Likert scale comparing national implementation with international best practice (1 = < 20% implemented, 2 = 20–40%, 3 = 40–60%, 4 = 60–80%, 5 = 80–100%). In addition, the potential impact of each policy indicator on socioeconomic inequalities was also assessed. An "Undecided" response option was also provided for participants. The full questionnaire is presented in the Supplementary Materials (Appendix 2).

Workshops

In the fourth stage, five structured workshops (four online and one in person) were organized in February 2025 to discuss the policy scoring results, identify gaps in policy and infrastructure support, and formulate recommendations to address these gaps. The workshops served as a deliberative stage in the Food-EPI process, allowing experts to collectively review the rating results and refine the proposed policy and infrastructure support actions.

Of the 38 experts who accepted the invitation to participate in the Food-EPI Türkiye process, 24 attended the online workshop sessions conducted across four meetings, while 14 participated in the face-to-face workshop. Each online workshop session lasted approximately three hours, and the face-to-face workshop was conducted as a full-day meeting. The workshops were facilitated by members of the research team with experience in the Food-EPI methodology. Officials from relevant ministries and public institutions, including representatives from the Ministry of Health and the Ministry of Agriculture and Forestry, attended the workshops as observers. Observers were present to provide clarification regarding existing policies and implementation details when requested by the expert panel. They did not participate in scoring, deliberation, or prioritization processes and were not involved in decision-making. Representatives from the food industry were not involved at any stage of the study in order to maintain the independence of the expert assessment and avoid potential conflicts of interest.

During the workshops, the expert panel reviewed the "implementation gaps" identified through the scoring of each good practice indicator and proposed corresponding actions to bridge these gaps. In addition to evaluating the level of implementation of food environment indicators, their potential impact of policy actions on socioeconomic inequalities was also analysed.

Prioritisation

In the final stage, proposed actions were first reformulated and refined between March and April 2025 following the workshop discussions. Subsequently, a structured online prioritisation survey was conducted in May 2025 to determine which actions should be recommended for policy implementation. Final online prioritisation by experts was completed in June 2025, with policy and infrastructure support actions evaluated separately. Ultimately, 30 experts contributed to the prioritisation phase.

Socioeconomic inequalities are known to influence dietary patterns and related health outcomes. Individuals with lower socioeconomic status (SES),

typically characterised by lower levels of education and/or income, tend to consume higher amounts of unhealthy foods, particularly ultra-processed and energy-dense products, compared with those with higher SES [22, 23]. In line with this consideration, the potential impact of each policy indicator on SES-related inequalities in Türkiye was also evaluated. Within the policy domain, each indicator was assessed in terms of its potential influence on SES-related inequalities in Türkiye. Experts judged how implementing each policy indicator could affect SES inequalities in Türkiye, selecting one of the following response options: substantial reduction, small reduction, no effect, small increase, or substantial increase in inequalities. An additional "Undecided" option was also available.

Experts were invited to prioritise the proposed policy actions according to three key criteria—achievability, importance, and equity—with the prioritisation applied based on weighting ratios determined by the experts. For the achievability criterion, experts were instructed to evaluate each action in terms of its feasibility (the practicality and ease of implementation), acceptability (the degree of support from major stakeholders such as government bodies, the public, health professionals, and industry representatives), affordability (the financial cost associated with implementation), and efficiency (the expected cost-effectiveness of the intervention). When evaluating importance, participants were encouraged to take into account the magnitude of the implementation gap, the potential influence of each action on improving dietary patterns and food environments (in terms of both reach and effect size), as well as any additional beneficial or adverse consequences. For the equity criterion, experts evaluated the extent to which each action could influence social and economic disparities, as well as the level of structural change it would entail. Each expert provided a distinct ranking for every action under each criterion, using a scale from 1 to 26, where 1 indicated the highest perceived priority or impact. Thus, a ranking of 1 reflected the action considered most significant, achievable, or effective in reducing socio-economic inequalities, whereas higher numbers denoted progressively lower perceived priority, achievability, or equity impact.

Experts were asked to rank the recommended infrastructure support actions in the same way as policy actions based on two distinct criteria: importance and achievability. The ranking was performed independently for each criterion, meaning that each expert assigned two separate scores to each action - one reflecting its perceived importance and the other its achievability.

Assessment of the Food-EPI process

All experts were invited to provide feedback through a structured questionnaire to assess the usefulness of the Food-EPI framework and the overall implementation process.

Data analyses

Implementation levels were determined by calculating the mean score for each indicator and converting it into a percentage. Based on these values, indicators were grouped into the following categories: High (>75%), Medium (51–75%), Low (26–50%), and None/Very Low (≤25%). Inter-rater reliability (IRR) was evaluated using the Gwet AC2 statistic (Agreestat 2013.1, Advanced Analytics, Gaithersburg, USA) to determine the extent of agreement among the expert panel members in their ratings of each indicator.

Each expert's assigned weights were applied to their ranking scores to compute a weighted total scores for each action. Participants assigned percentage-based weights to each criterion to reflect its relative importance. For policy actions, weights assigned to importance, achievability, and equity were required to total 100%. Similarly, for infrastructure support actions, the weights assigned to importance and achievability were expected to sum to 100%. Reverse scoring was applied to identify high-priority actions, with smaller total scores indicating greater priority. For each indicator, the median rating was used to determine the overall perceived impact on SES inequalities. Descriptive statistics, including means and percentages, were used to summarise the ratings for each domain.

Results

Comparative assessment of Türkiye's policy implementation and infrastructure support relative to global best-practice benchmarks

Table 1 refers to the implementation levels of food environment policy indicators, while infrastructure support indicators are presented separately in Table 2. The expert panel consisted of academics from the fields of Nutrition and Dietetics ($n=29$), Public Health Nursing ($n=4$), Public Health Specialist ($n=1$), and Food Engineering ($n=1$), as well as dietitians working in primary health care ($n=3$). Based on the expert panel's assessment, none of the food policy or infrastructure support indicators achieved a 'high' level of implementation (>75% implementation relative to international best practice). For several policy indicators, Türkiye's performance was rated at a medium level when compared with international benchmarks (16%, $n=4/24$), as well as for some infrastructure support indicators (41%, $n=10/24$). Medium-level implementation was identified in several policy areas, including food composition standards for processed foods, ingredient and nutrition labelling and nutrition and health claims, as well as regulations on broadcast advertising of unhealthy foods targeting children. Similarly, several

Table 1 Extent of policy implementation and anticipated impact on socioeconomic inequalities across food environment domains in Türkiye

		Policy Implementation Level				
		None/Very Low (≤25%)	Low (26-50%)	Medium (51-75%)	High (>75%)	
Food Composition	Food composition goals for processed foods					↓
	Food composition goals for out-of-home meals					↓
Food Labelling	Ingredient and nutrition labelling					↓
	Nutrition and health messaging					↓
	Front-of-package labeling					↓
	Nutrition information on menus and menu boards					↔
Food Promotion	Regulating broadcast advertising of unhealthy foods to children					↓
	Regulating digital and social media advertising of unhealthy foods to children					↓
	Regulating unhealthy food advertising to children in non-broadcast media					↓
	Regulating food marketing to children in settings such as schools and sports facilities					↓↓
	Regulating the use of child-directed marketing techniques on food packaging					↓
Food Prices	Providing tax exemptions or reductions for healthy foods					↓
	Implementing taxes on foods high in fat, sugar and salt					↓
	Implementing food subsidies to promote healthy eating					↓
	Income support or vouchers to promote access to healthy foods					↓
Food Provision	Implementing school policies that promote healthy food choices					↓↓
	Implementing policies in public sector settings that promote healthy food choices					↓
	Implementing healthy public food procurement and service policies					↓
	Public sector training and support structures for healthy food environments					↓
	Private sector engagement through training and support mechanisms					↓
Food Retail	Regulations limit the proximity of unhealthy food outlets to schools and child settings					↓
	Zoning and land-use policies promote healthy food environments by supporting healthy outlets					↓
	Promoting the in-store availability and prominence of healthy foods					↓
	Policies support the relative availability of healthy versus unhealthy foods in food service settings					↓

Implementation levels represent the extent of policy implementation relative to international best practice and are based on mean expert scores converted to percentages: None/very low: ≤25%, Low: 26–50%, Medium: 51–75%, High: >75%

Symbols indicate the expert panel's judgement regarding the anticipated impact on socioeconomic inequalities: ↓: Small Reduction, ↓↓: Substantial Reduction, ↔: No Effect. Impact categories reflect qualitative expert judgement based on median ratings

infrastructure support indicators were rated as having medium implementation. These included indicators related to political leadership and strategic commitment to nutrition, such as high-level political leadership and public commitment to nutrition, defined national targets for population nutrient intakes, comprehensive and culturally appropriate food-based dietary guidelines, and a government-endorsed multisectoral nutrition implementation plan. Medium-level implementation was also identified for governance and policy processes, including evidence-informed policy-making for food and nutrition, transparent and inclusive policy development processes, and government provision of open access to nutrition monitoring data. In addition, monitoring systems for overweight, obesity, and NCD prevalence, as well as the existence of a government-established agency responsible for health promotion, were also rated at a medium level (Table 1).

Experts reported that most policy indicators were expected to produce only modest reductions in socioeconomic inequalities. In contrast, two policy domains were

Table 2 Extent of implementation of infrastructure support policies in Türkiye

		Extent of Implementation			
Food Composition		**None/Very Low (≤25%)**	**Low (26-50%)**	**Medium (51-75%)**	**High (>75%)**
Leadership	High-level political leadership and public commitment to nutrition				
	Defined national targets for population nutrient intakes				
	Comprehensive and culturally appropriate food-based dietary guidelines				
	Government-endorsed multi-sectoral nutrition implementation plan				
	Explicit policy objectives to address health inequalities				
Governance	Limiting commercial and industry interference in health policy-making				
	Evidence-informed policy-making for food and nutrition				
	Transparent and inclusive processes for developing food policies				
	Government ensures open access to nutrition monitoring data				
Monitoring & Intelligence	Surveillance of food environments and food marketing practices				
	Surveillance of population dietary intake and nutritional status				
	Surveillance of overweight, obesity and related risk factors				
	Surveillance of NCD prevalence and related risk factors				
	Monitoring and evaluation frameworks for nutrition policies				
	Surveillance of health equity outcomes and disparities				
Funding & Resources	Government funding for local and community-based nutrition initiatives				
	Government funding to support research on obesity and diet-related NCDs				
	Government-established agency responsible for health promotion				
Platforms for Interaction	Systems for intergovernmental coordination on health and nutrition programmes				
	Public–private platforms to support healthy and sustainable food environments				
	Multi-stakeholder platforms involving government, civil society, and academia				
	Whole-of-system approach connecting local and national stakeholders				
Health in all policies	Evaluating the public health impact of implemented food policies				
	Health impact assessment of policies outside the food sector				

Implementation levels represent the extent of policy implementation relative to international best practice and are based on mean expert scores converted to percentages: None/very low: ≤25%, Low: 26–50%, Medium: 51–75%, High: >75%

perceived to have substantial potential to reduce these inequalities: restrictions on the marketing of unhealthy foods in settings frequented by children (Food Promotion) and initiatives to promote healthy food choices in schools, including improvements to cafeteria options, vending machines, and event foods (Food Provision). Menu board labelling, however, was perceived to have no impact (Table 1).

Assessment results indicated a 'low' level of performance against international benchmarks for half of the policy indicators (50%, $n = 12/24$) and the majority of infrastructure support indicators (54%, $n = 13/24$). These covered several domains, including those related to food promotion, prices, provision, and retail, as well as governance, monitoring&intelligence, funding&resources, platforms for interaction, and health in all policies (Table 2). The IRR among experts was estimated at 0.241, with a 95% confidence interval ranging from 0.17 to 0.34.

Identification and prioritization of food policy actions

During the workshops, the expert panel reviewed the "implementation gaps" identified through the scoring of each good practice indicator and proposed corresponding actions to bridge these gaps. In total, 45 policy actions and 50 infrastructure support actions were recommended. After the workshop, experts were invited to review and, if necessary, amend the proposed actions. During this review process, actions with overlapping content were merged, and those considered unclear or insufficiently specific were refined. In addition, suggested actions that fell outside the scope and objectives of the policy or infrastructure support domains were excluded from further consideration. As a result of this process, 26 policy actions and 28 infrastructure support actions were selected for prioritisation.

As a result of the prioritization process, the five most highly ranked policy and infrastructure support recommendations are presented in Table 3. The majority of the recommended policy actions were assessed as having either a low or moderate level of implementation during the benchmarking process. Key policy priorities included reducing taxes on healthy and staple foods, strengthening agricultural policies to support the production and distribution of healthy and minimally processed foods, introducing stricter regulations on the promotion of unhealthy foods targeting children on social media and digital platforms, strengthening existing advertising restrictions on television and radio broadcasts targeting children, and implementing reformulation policies to reduce sugar, salt, and saturated fat in processed foods. Key infrastructure support priorities included expanding nutrition monitoring within primary healthcare services through the integration of dietitians, establishing comprehensive systems to monitor children's growth and nutritional status, strengthening political leadership in nutrition policy, increasing funding for nutrition services in primary care, and improving transparency and monitoring of nutrition-related policies and action plans. All recommended infrastructure support actions focused on areas with currently limited or moderate implementation levels. The complete set of 26 policy actions and 28 infrastructure support actions is presented in the supplementary material (Appendix 3).

Evaluation of the Food-EPI process and methodology

Out of the 30 expert panel members, 24 completed the evaluation survey, resulting in a response rate of 80%. A total of 95.8% ($n = 23$) of experts indicated that the Food-EPI framework and its indicators were either comprehensive or sufficiently comprehensive. While the majority (91.3%) considered the three-step methodology to be 'appropriate' or 'very appropriate', a small proportion (17.4%) found it difficult to assess the level of implementation in comparison to international benchmarks.

All respondents agreed that the Food-EPI has the potential to positively impact nutrition policy, and supported repeating the initiative in the future to monitor nutrition policy developments in Türkiye.

Discussion

This study provides the first comprehensive national assessment of food environment policies in Türkiye using the Food-EPI framework. The findings reveal that none of the assessed policy or infrastructure support indicators achieved a "high" level of implementation when benchmarked against international best practices. The majority of indicators were rated as having low or very low levels of implementation, although several indicators were assessed as having medium implementation. Taken together, these findings indicate substantial gaps in the regulatory, fiscal, and governance mechanisms required to support healthier food environments. Experts prioritised actions targeting fiscal measures, agricultural systems, food marketing regulation, product reformulation, and strengthened nutrition monitoring. Several structural, political, and economic factors can explain the reason these actions emerged as priorities. First, the increasing consumption of processed and ultra-processed foods, especially among children and adolescents, and their well-established adverse health effects highlights the need for stronger regulatory approaches targeting food marketing and product reformulation [24]. Second, economic constraints and rising food prices have made access to healthy foods more difficult for many households, which explains the prioritisation of fiscal measures such as reducing taxes on healthy staple foods and supporting local food systems [25]. Third, strengthening nutrition monitoring systems and integrating

Table 3 Top five policy* and infrastructure support** actions proposed by Turkish Food-EPI experts

No	Top five recommended policy actions*	Domain	Average Level of Implementation of Current Policies***
1	Taxes on healthy and staple food products should be reduced.	Price2	Low
2	Agricultural policies should be developed to support the production, processing, distribution, and consumption of healthy, local, and minimally processed food products such as vegetables, fruits, and legumes; in addition, direct-to-consumer sales models from farmers should be promoted.	Price3	Low
3	Promotions of unhealthy foods targeting children on social media and digital platforms should be strictly regulated. In this context, legal regulations for digital content creators should be established; age restrictions, food labelling systems, and publicly supported healthy content policies should be implemented to minimize children's exposure to unhealthy marketing content.	Promotion2	None/very low
4	To restrict the promotion of unhealthy foods to children, it is recommended to strengthen existing advertising restrictions on television and radio broadcasts, ensure that informational messages are displayed clearly and legibly, increase the dissemination of public service announcements, and include more healthy eating content in popular programs.	Promotion1	Medium
5	Reformulation policies should be developed for all food products—particularly packaged foods and beverages—to reduce the content of sugar, salt, and saturated fat, and mandatory standards aimed at decreasing these components should be implemented. In this context, market surveillance should be strengthened, and regular and effective monitoring mechanisms should be established.	Composition1	Medium
No	**Top five recommended infrastructure support actions****	**Domain**	**Average Level of Implementation of Current Policies***
1	Monitoring of nutritional status and dietary intake levels should be expanded within primary healthcare services through the integration of dietitians.	Monitoring2	Low
2	Processes for monitoring growth, nutritional status, and physical fitness levels in school-aged children should be structured in a lifelong sustainable manner, starting from preschool. In addition to regular height and weight measurements, physical activity tracking should be expanded to include all schools, and biochemical parameters should be monitored every six months. Furthermore, screening for eating behavior disorders should be integrated into monitoring systems starting from lower secondary school.	Monitoring3	Medium
3	Political support for the field of nutrition should be made visible; nutrition should be included among the priority policy areas of the Ministry of Health of the Republic of Türkiye, and concrete and sustainable strategies should be developed in this regard.	Leadership1	Medium
4	Programs promoting healthy eating should be integrated into the core service portfolio of primary healthcare; staffing and budget planning should be carried out to ensure the employment of at least one dietitian in each public health unit.	Funding1	Low
5	The sustainability, regular monitoring, and auditability of nutrition-related action plans, screening programs, and policies should be ensured; the outcomes and results obtained should be shared transparently with the public, civil society organizations, and academic institutions.	Leadership4	Medium

* Final ranking reflects combined scores for importance, equity, and achievability

** Final ranking reflects combined scores for importance and achievability

***Expert panel ratings of indicators as reflected in the evidence document

dietitians into primary healthcare services were prioritised due to the recognised need to improve early detection and prevention of nutrition-related health problems. Finally, experts emphasised the importance of stronger political commitment and governance structures to ensure that nutrition becomes a visible and sustained public health priority in Türkiye. Taken together, these factors can explain the reason of the identified actions were considered both high-impact and contextually relevant for improving the food environment and nutrition outcomes in Türkiye.

The absence of any indicators rated at a high level of implementation in Türkiye aligns with patterns observed in several upper-middle-income countries applying the Food-EPI framework. Similar findings have been reported in Mexico, Poland, and Malaysia, while Thailand has also demonstrated substantial implementation gaps across multiple policy domains [26–29]. Furthermore, evidence from Canada suggests that even in higher-income settings, substantial gaps may persist between infrastructure support systems and the implementation of enforceable policy measures [30]. Consistent with this pattern, the present assessment also identified larger gaps in policy implementation compared with infrastructure support in Türkiye [30]. Weak implementation of food environment policies may limit the effectiveness of existing nutrition strategies and reduce the ability of the policy environment to shape healthier dietary behaviours.

In particular, insufficient regulation of food marketing, pricing, and product composition may contribute to the continued availability and promotion of unhealthy foods, potentially exacerbating diet-related NCDs and widening socioeconomic inequalities in diet and health outcomes [8, 31]. Overall, these findings suggest that translating institutional capacity into comprehensive and enforceable regulatory action remains a key challenge across diverse national contexts.

In contrast, several European countries participating in the PEN and Science & Technology in Childhood Obesity Policy (STOP) initiatives demonstrated comparatively stronger policy performance. Finland, followed by Norway and Portugal, reported higher levels of implementation across multiple domains [32]. These findings illustrate that high-level implementation is achievable when governance structures, regulatory enforcement, and cross-sectoral coordination mechanisms are well established. Türkiye's comparatively weaker performance across most policy and infrastructure support domains indicates that further institutional consolidation and policy coherence are required to reach international best practice levels.

When we compared the World Health Organization's (WHO) NCD Progress Monitor 2022 report with the situation in Türkiye, we observed inconsistencies in the implementation of policies related to saturated fatty acids, trans fats, and marketing restrictions targeting children. While these measures have been reported as fully implemented by the WHO, our assessment found that their implementation level is low or moderate. We therefore concluded that there is a discrepancy between official reporting and regulatory practices in this area [33]. This discrepancy may be explained by several factors, including differences in assessment methodologies, the reliance of global monitoring systems on self-reported government data, and the gap that may exist between the formal adoption of policy measures and their effective implementation or enforcement in practice. Our findings highlight the importance of continuous monitoring of NCDs and government-led action to achieve nutrition-related targets.

In light of these gaps, the priority actions identified by experts reflect several structural challenges within the Turkish food policy environment. Fiscal measures aimed at improving the affordability of healthy foods highlight how current price structures and market dynamics may limit access to healthier options for many population groups. Similarly, the emphasis on agricultural policies supporting the production and distribution of healthy, minimally processed foods underscores the need to better align food system policies with nutrition and public health objectives. The prioritisation of stronger regulation of digital food marketing also reflects the growing influence of online and social media environments in shaping children's food preferences.

In addition, the recommended infrastructure support actions point to systemic limitations in current monitoring and governance mechanisms. Strengthening nutrition surveillance systems and increasing the integration of dietitians within primary health care were therefore viewed as essential steps to improve data availability and support evidence-informed policy development. Among the prioritised infrastructure support actions, experts also highlighted the importance of strengthening monitoring systems for children's growth, nutritional status, and physical activity in school settings. However, the implementation of regular monitoring systems in schools—such as periodic assessments of children's height, weight, physical activity levels, and biochemical indicators—raises important ethical and practical considerations. From an ethical perspective, such monitoring initiatives must ensure the protection of children's privacy, obtain appropriate parental consent, and avoid potential stigmatisation related to body weight or health status. In addition, practical challenges may arise regarding resource requirements, trained personnel, the burden on school systems, and the feasibility of conducting repeated measurements over time. Therefore, if implemented, school-based monitoring programmes should be designed within a child-sensitive and ethically robust framework that prioritises confidentiality, voluntary participation, and supportive health promotion rather than individual-level surveillance [31, 34].

Another important finding relates to the potential impact of certain policy actions on reducing socioeconomic inequalities. Although restrictions on the marketing of unhealthy foods in child-focused settings (Food Promotion) and improvements in school food environments (Food Provision) were identified as having the greatest potential to reduce socioeconomic inequalities, these actions were not ranked among the top five policy priorities. This reflects the prioritisation framework used in the Food-EPI process, where actions are ranked based on a combination of criteria including importance, achievability, and equity. While these actions were considered particularly relevant for reducing inequalities, other policy measures such as fiscal interventions and food system-level policies were perceived by experts to have broader population-level impact and greater feasibility within the current policy context in Türkiye.

Beyond the actions prioritised by experts, several policy measures that have gained increasing international attention (such as taxes on foods high in fat, salt, and sugar, front-of-pack nutrition labelling, and comprehensive school food standards) were not ranked among the top policy priorities in the present assessment. Although these measures are widely recognised

as effective strategies for improving food environments and are increasingly implemented across many countries [35], their absence among the highest-ranked actions in this study may reflect contextual considerations related to perceived feasibility, political acceptability, and policy readiness in Türkiye. Experts may therefore have prioritised actions that were considered more immediately implementable within existing institutional and regulatory structures. Overall, these priority areas are consistent with recommendations identified in other countries that have conducted Food-EPI assessments [32, 36] and align with the WHO's recommended 'best buys' for the prevention of NCDs [37].

The Food-EPI framework offers an evidence-based approach for identifying policy gaps and guiding the development of stronger food environment policies in Türkiye. Reapplying the Food-EPI tool in Türkiye would be valuable for assessing policy effectiveness over time and monitoring advancements in improving food environments. Its continued use in future evaluations could offer important insights into the long-term effects of policy changes on the prevention of nutrition-related NCDs. Nonetheless, conducting long-term monitoring studies poses various challenges that demand thoughtful attention. One of the primary hurdles is financial, as sustained funding is necessary to maintain evaluation efforts over extended periods. This issue is especially pronounced in settings with limited resources, where competing health demands may restrict the availability of funds for thorough policy assessment. To support the continuity of the evaluation process, strategic coordination and partnerships with international bodies, donor institutions, and local authorities are vital. These efforts will help establish a reliable and ongoing monitoring framework to evaluate the effectiveness of policies aimed at fostering healthier food environments in Türkiye.

Strengths and limitations

This study marks the first implementation of the Food-EPI tool in Türkiye, providing a structured approach to evaluate the extent of policy implementation and to support the development of healthier food environments. To enhance the representativeness of the findings, experts from all geographical regions of Türkiye were invited to participate. Of the 65 experts invited, 38 completed the implementation questionnaire (yielding a response rate of 58.4%), and 30 participated in the policy prioritization process. This level of participation is comparable to, and in some cases higher than, participation rates reported in other national Food-EPI applications [32].

An additional strength of the study was the multidisciplinary composition of the expert panel, including professionals from nutrition and dietetics, public health, food engineering, and primary health care. However, the majority of participating experts were from nutrition and dietetics backgrounds, with more limited representation from other disciplines such as public health and food systems governance. This disciplinary concentration may have influenced the prioritization of certain actions, particularly those related to workforce development, nutrition monitoring, and health service–based interventions. While government officials and the food industry were not directly involved in the rating process, this was a deliberate methodological decision to maintain independence and minimize potential conflicts of interest. The Food-EPI framework emphasizes the importance of independent expert assessment to ensure objective benchmarking of government policy implementation. Nonetheless, representatives from relevant ministries attended workshops as observers, which allowed for transparency and contextual clarification without influencing scoring decisions.

Nonetheless, the study faced certain limitations. Due to limited financial resources and Türkiye's large geographic scale, it was not feasible to organize an in-person workshop for all participants. To address this, four online workshops were conducted, and additional briefing sessions were held to ensure that all participants were well-informed and that the review of the evidence documents was conducted thoroughly.

In contrast to other applications of the Food-EPI, the IRR in this study was comparatively low (Gwet's AC2 = 0.244), pointing to variability in expert ratings. Some participants reported that they found the benchmarking process challenging during the assessment. This issue may have influenced their responses, potentially due to fatigue or limited time available to complete the survey. Similar to our findings, the Food-EPI study conducted in Norway also reported a lower IRR (Gwet AC2 = 0.37) [38]. In contrast, a study comparing the results of Food-EPI assessments across 11 non-European countries reported higher IRR values (Gwet AC2 = 0.6–0.8) [36]. Furthermore, in a study combining data from 11 European countries, while some countries demonstrated lower IRR, most yielded comparable or higher values [32].

Conclusion

This study provides the first comprehensive application of the Food-EPI framework in Türkiye and demonstrates that none of the assessed food environment policy indicators reached a high level of implementation when benchmarked against international best practices. The majority of indicators were classified as low or very low, indicating substantial structural gaps across regulatory, fiscal, and governance domains.

Through a structured prioritization process, 26 policy actions and 28 infrastructure support actions were identified as key areas for reform. Priority domains included

fiscal measures to improve the affordability of healthy foods, strengthened regulation of unhealthy food marketing, greater alignment between agricultural systems and public health objectives, product reformulation strategies, and enhanced nutrition monitoring and service capacity. Leadership visibility and sustainable funding mechanisms were also identified among the top infrastructure support priorities, highlighting the importance of political commitment and long-term institutional support.

These findings suggest that while foundational policy structures exist, translating them into effective action will require stronger regulatory enforcement, multisectoral coordination, and governance coherence. Embedding an explicit equity focus within future reforms will be critical to addressing social disparities and ensuring that policy actions effectively improve population-level dietary outcomes. The Food-EPI framework, therefore provides a practical roadmap to guide the development, implementation, and monitoring of healthier and more equitable food environments in Türkiye.

Abbreviations

ERA4Health	Partnership Fostering a European Research Area for Health
Food-EPI	Healthy Food Environment Policy Index
FOODPATH	FOOD systems and policy PATHways for equal population nutrition in Europe
INFORMAS	Network for Food and Obesity/Noncommunicable Diseases Research, Monitoring and Action Support
IRR	Inter-Rater Reliability
NCDs	Noncommunicable Diseases
PEN	Policy Evaluation Network
STOP	Science & Technology in Childhood Obesity Policy
WHO	World Health Organization

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-026-27312-5.

Supplementary Material 1.

Supplementary Material 2.

Supplementary Material 3.

Acknowledgements

The Food-EPI Türkiye study is being conducted by Prof. Dr. Gülşah Kaner from the Department of Nutrition and Dietetics at İzmir Kâtip Çelebi University. This research is being carried out as part of Work Package 3 of the project "Food Systems Policy Pathways for Equal Population Nutrition in Europe (FOODPATH)": https://www.ucc.ie/en/foodpath/ourresearch/workpackage3/. FOODPATH is funded under the ERA4Health Health Equity call. We would like to thank the FOODPATH coordination team at University College Cork (Ireland) and Prof. Janas Harrington for their leadership and support. The authors are also grateful to Prof. Piotr Romaniuk and Dr. Sanne Djojosoeparto for their valuable contributions during the initial phase of the study. We would also like to thank all Turkish government officials who reviewed and verified the accuracy and completeness of the evidence document. We express our sincere appreciation to the Turkish Expert Panel for their engagement and contributions throughout the process, including their input during the workshop, participation in the online rating process, involvement in the action-setting meeting, and prioritization of the final list of recommendations. This study was supported by the Scientific and Technological Research Council of Türkiye (TUBITAK) under project number 223N180. We gratefully acknowledge TUBITAK's scientific and financial support. The content of this publication is solely the responsibility of the authors.

Authors' contributions

GK: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review & editing, Project administration. TY: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review & editing. GYD: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review & editing. BD: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation. EB: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation. MK: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Visualization. JH: Writing – review & editing, Supervision. All authors read and approved the final manuscript.

Funding

The Food-EPI Türkiye study within the framework of the ERA4Health funded FOODPATH Project. This study was supported by the Scientific and Technological Research Council of Türkiye (TUBITAK) under project number 223N180.

Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study was granted ethical approval by the Izmir Kâtip Celebi University, Health Research Institutional Review Board (Application Number and Date #0050/ 18.07.2024). All procedures performed in this study involving human participants were conducted in accordance with relevant guidelines and regulations and with the Declaration of Helsinki and its subsequent amendments. All participants provided informed consent prior to participation in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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Received: 7 October 2025 / Accepted: 2 April 2026
Published online: 18 April 2026

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