Journal of Health, Population and Nutrition

RESEARCH

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# Validation and reliability of the Turkish version of the food insecurity experience scale (FIES) among adults

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## Abstract

**Background** Food insecurity is a global public health problem characterised by the inability of individuals and households to regularly access sufficient, safe and nutritious food. The objective of this study was to investigate the reliability and validity and reliability of the Turkish adaptation of Food Insecurity Experience Scale (FIES) in the adult population.

**Methods** A total of 536 individuals (357 females, 179 males) with an average age of 30.1 ± 10.2 years were involved. Questionnaire consisted of two sections including socio-demographic characteristics and FIES. For the adaptation of the scale to Turkish, the translation-back translation method was employed, involving expert translators for both English-to-Turkish and Turkish-to-English translations. The validation process included confirmatory factor analysis (CFA) to assess the model fit. Data were analyzed using fit indices, descriptive statistics, and CFA for model validation.

**Results** The Cronbach's alpha for the FIES was 0.85, indicating good reliability. In the fit index results, excellent fit was obtained for all indices except the SRMR value, which showed a good fit. The outcomes of the excellence of fit indices were as follows: CMIN/df = 1.261, AFGI = 0.985, GFI = 0.991, IFI = 0.995, CFI = 0.995, RMSEA = 0.031, SRMR = 0.069.

**Conclusions** These results show that Turkish version of FIES has structural validity and reliability, internal consistency, and construct validity and reliability in assessing food insecurity in Turkish adult population. The strong psychometric properties of the scale suggest that it can be used in research and policy development processes related to food insecurity. Future studies can further strengthen the findings by evaluating the applicability of the FIES across different socioeconomic groups.

**Clinical trial number** Not applicable.

**Keywords** Food insecurity, FIES, Turkish adaption, Psychometric evaluation

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## Introduction

According to the latest data, over two billion people do not regularly have access to enough food that is safe, nourishing, and sufficient, and about 821 million individuals do not consume enough food to meet their basic nutritional needs [1, 2]. By 2030, the second Sustainable Development Goal of the UN aims to eradicate hunger and all types of malnutrition, but hunger has been increasing in recent years, reversing the previous declines [3]. A condition in which all people, at all times, have physical, social, and financial access to enough safe, nourishing food that satisfies their dietary needs and food choices for an active and healthy life is known as food security [2]. Food insecurity (FI) is defined as reduced food intake or disrupted dietary patterns due to lack of financial or other resources [4].

Food security is a multifaceted concept that includes dimensions such as availability, accessibility, utilization, and stability. While food availability ensures that sufficient food of adequate quality is available through local production or imports, accessibility refers to having the financial and physical means to obtain it. Utilization relates to individuals' ability to maintain proper nutrition through access to clean water, sanitary conditions, and healthcare. Stability, on the other hand, ensures that availability and access to food remain consistent over time. Various economic, environmental, and social factors—including job loss, climate change, and pandemics—can disrupt these dimensions, making food security a pressing global concern [5–7].

Although food insecurity is more prevalent in low-income and developing nations, it also affects wealthier countries, where prevalence ranges from 8 to 20% [8]. In Turkey, food insecurity is rising due to factors such as climate change, population growth, economic instability, and the lingering effects of the COVID-19 pandemic, which has exacerbated unemployment and income inequality, limiting access to adequate nutrition [9–11]. In Turkey, food insecurity has become an increasingly important issue in recent years due to economic difficulties, inflation, fluctuations in food prices and income inequalities. Rising living costs, especially combined with rising prices of basic food items, negatively affect low- and middle-income households [12]. Food inflation makes it difficult for consumers to access nutritious and healthy food, while increasing the pressure on the purchasing power of fresh vegetables, fruits, dairy products and protein sources [13]. Low-income households, those living in rural areas and refugee communities are among the groups most affected by this situation. Due to their limited budgets, low-income individuals and families are often forced to turn to processed foods that are less costly but have low nutritional value. This situation can lead to an increase in nutritional deficiencies and related health problems in the long term [14]. Individuals living in rural areas feel the risk of food insecurity more due to the decrease in agricultural production due to climate change, difficulties in accessing the market and limited employment opportunities [15]. Small-scale farmers in particular experience difficulties in production due to reasons such as rising input costs and inadequate agricultural support, which negatively affects food access in rural areas [16]. In addition, refugee communities, which have a significant population in Türkiye, are one of the most vulnerable groups in terms of food insecurity. Limited work permits and employment opportunities, low income levels and obstacles to accessing social support mechanisms limit the opportunities for adequate and balanced nutrition of these groups. While the demand for food banks and social assistance increases in regions with a dense immigrant and refugee population, the inadequacy of resources further deepens the problem of food insecurity [17]. Considering all these factors, the causes of food insecurity in Turkey are multidimensional and are under the influence of economic, social and environmental dynamics. Given the complexity of food insecurity, accurate measurement is essential for effective policy development. However, with nearly 200 definitions of food insecurity and its various dimensions, comprehensive assessment remains challenging [18, 19]. To address this, several tools have been developed [20–24], including the Food Insecurity Experience Scale (FIES), which has been implemented globally by the FAO since 2014. Since 2017, FIES has been used as a complementary indicator for tracking moderate and severe food insecurity alongside malnutrition rates [25, 26]. While the scale has been validated in over 150 countries, regional validation is crucial to ensure its applicability in specific contexts [27].

FIES measures food insecurity based on individuals' lived experiences, capturing how they access food within their economic and social environments [28–30]. This experience-based approach provides more precise insights for designing nutrition and development policies compared to broader assessments. Therefore, validating this globally recognized scale at the national level is essential for ensuring its reliability and providing policymakers with accurate data. Further, adaptation of FIES is a critical step in determining food insecurity in Turkey and creating a scientific basis for studies in this area. Thanks to this scale, it will be possible to develop effective intervention strategies for food insecurity in Turkey by obtaining data that are in line with international standards and comparable. In this context, this study aims to assess the reliability and validity and reliability of FIES in the adult population of Turkey, contributing to the development of more effective food security policies.

## Materials and methods

### Study subjets

Research was conducted face-to-face in Ankara between March–June 2024, with a total of 536 adults aged 19–64 who read and agreed to participate by signing the informed consent form, using a random sampling method. The survey was applied to the participants by the researchers. Individuals outside specified age range or who did not have the cognitive ability answer the scale questions were not included in the research. In addition to age and cognitive abilities, individuals with diagnosed eating disorders, those with serious psychiatric disorders, pregnant and breastfeeding mothers, individuals who filled out the questionnaire incompletely or gave contradictory answers, or individuals who refused to participate in the study were also excluded from the study. Participants included in the study met the following criteria: They were adults aged between 19 and 64, residing in Ankara, and had the cognitive ability to understand and respond to the scale questions. Additionally, individuals who voluntarily agreed to participate by reading and signing the informed consent form were included in the study. The sample size was established to be five to ten times the scale's item count in accordance with recommendations for validity and reliability analyses [31, 32]. Regarding the scale's conversion to Turkish, target sample size for assessing validity and reliability was initially set between 40 and 80 participants. However, the sample size was increased to 536 attendees. The Ankara University Non-Interventional Clinical Research Ethics Committee gave its approval to the project. (approval number: 11/84). Communication regarding the validity and reliability of FIES was carried out with e-mail, necessary permissions for scale adaptation were obtained. The purpose and protocol of this study were explained to all participants, and written informed consent was obtained. The tenets of the Declaration of Helsinki were adhered to throughout this research.

### FIES

FIES has been collecting data on food insecurity since 2014 and has been validated over 150 countries [22, 33]. FIES consists of eight questions, each of which is answered with simple binary responses such as 'yes' or 'no'. Participants were asked whether they had encountered food insecurity at any time in past twelve months. The scale captures experiences of food insecurity at several intensities. Examples include 'worrying about not having enough food for the day' and 'going hungry' due to lack of money or other resources. Overall score varies from 0 to 8, based on answers to the FIES questions. For analysis purposes, the total score was divided into three categories: food secure (0–3), moderately food insecure (4–6) and severely food insecure (7–8).

### FIES language adaptation, validity and reliability analyses

To adapt the scale to Turkish, the 8-item FIES was translated by five expert dietitians, each with expertise in their respective fields and a good command of English, and a sworn translator and interpreter with experience in the health field. The translation process followed the translation-back method, first translating the scale English-Turkish and then back Turkish-English, over a period of approximately two weeks. After evaluating the items from these three separate translations for meaningfulness and understandability, the most appropriate translations were selected, Turkish scale version was finalised. After translation of FIES was completed, a preliminary pilot test was conducted with 10 adult individuals who had similar characteristics to those in study. This test aimed to determine any expressions or items in the scale that were not clearly understood. Pilot test showed that scale took an average of 10–15 min to complete and that there were no problems with comprehension. In addition, model fit indicators for the Turkish-adapted FIES were used and interpreted according to guidelines in the literature [34, 35]. In scale validation studies, if the reliability coefficient exceeds 0.60, scale is considered reliable. A coefficient between 0.61 and 0.80 indicates an acceptable moderate level of reliability, while a coefficient between 0.81 and 1.00 indicates a significantly high level of reliability. Between 0 and 1, Cronbach's alpha internal consistency coefficient indicates how reliable the scale is; values nearer 1 indicate excellent reliability.

### Statistical analysis

The scale was evaluated using exploratory factor analysis (EFA), and reliability (internal consistency) was assessed using the Cronbach's α coefficient. The confirmatory structural validity and reliability of the FIES was tested using confirmatory factor analysis (CFA), verifying its one-factor structure. CFA was conducted using the diagonal weighted least squares (DWLS) method due to the categorical nature of the scale data. R Studio was used for CFA and model fit analysis. The analysis was conducted in R Studio using the lavaan package for structural equation modeling (SEM) with categorical data. R was preferred over AMOS and Mplus due to its flexibility, reproducibility, and open-source nature. The DWLS estimator in lavaan was used for CFA. Model fit was assessed using standard criteria: CFI and TLI values $\geq 0.95$ indicate excellent fit, RMSEA $\leq 0.05$ for close fit, SRMR $\leq 0.08$ for acceptable fit, which are widely accepted in SEM literature. The relationship between the fitted scale scores was further examined using an independent samples t-test. SPSS version 27 was used for generating tables and analyzing descriptive statistics [36].

**Table 1** The research participants' basic demographic attributes

| Variables | *n* (%) or X̄ ± SD |
|---|---|
| Age (years) | 30.10 ± 10.19 |
| **Gender** | |
| Male | 179 (33.4) |
| Female | 357 (66.6) |
| **Marital status** | |
| Single | 364 (67.9) |
| Married | 172 (32.1) |
| **Education status** | |
| Elementary and secondary school | 10 (1.8) |
| High school | 77 (14.4) |
| Undergraduate | 396 (73.9) |
| Postgraduate | 53 (9.9) |
| **Smoking status** | |
| Yes | 173 (32.3) |
| No | 293 (54.6) |
| Quit | 70 (13.1) |
| **Alcohol use** | |
| Yes | 194 (36.2) |
| No | 342 (63.8) |

The values were presented as mean ± SD or n (%). X̄: Mean, SD: Standard Deviation, n: Number, %: Percentage

**Table 2** The reliability analysis of FIES

| Variable | X̄ ± SD | Cronbach alpha if item deleted | Corrected item-total correlation | Cronbach alpha |
|---|---|---|---|---|
| Q1 | 1.59 ± 0.49 | 0.84 | [0.54, 0.72] | 0.85 |
| Q2 | 1.56 ± 0.50 | 0.83 | | |
| Q3 | 1.60 ± 0.49 | 0.82 | | |
| Q4 | 1.74 ± 0.44 | 0.83 | | |
| Q5 | 1.70 ± 0.46 | 0.83 | | |
| Q6 | 1.75 ± 0.43 | 0.84 | | |
| Q7 | 1.84 ± 0.37 | 0.83 | | |
| Q8 | 1.91 ± 0.29 | 0.85 | | |

The information was displayed as mean ± standard deviation, X̄: Mean, SD: Standard Deviation

## Results

Among the participants, 33.4% ($n = 179$) were male and 66.6% ($n = 357$) were female. Participants' average age was 30.1 ± 10.2 years (Table 1).

Q8 had the highest mean score of all the items, while Q2 had the lowest mean score. The corrected correlation fort the Food Insecurity Experience Scale items, along with their lower and upper bounds, were reported as part of the reliability analysis, and all corrected correlations were found to be positive. Cronbach's alpha coefficient fort he scale was 0.85. Furthermore, no item were removed from the FIES, as there was no significant change in reliability or coefficient when an item was removed (Table 2).

The CFA results indicated that each item was statistically significantly grouped into a single dimension ($p < 0.05$) (Table 3).

**Table 3** The confirmatory factor analyzes of the FIES

| Item | β | STD (β) | z<br>*P* |
|---|---|---|---|
| Q1 | 1.000 | 0.28 | |
| Q2 | 1.312 | 0.36 | 11.50<br>< 0.001 |
| Q3 | 1.219 | 0.34 | 11.32<br>< 0.001 |
| Q4 | 1.047 | 0.29 | 10.74<br>< 0.001 |
| Q5 | 1.162 | 0.32 | 11.04<br>< 0.001 |
| Q6 | 1.037 | 0.29 | 10.65<br>< 0.001 |
| Q7 | 0.842 | 0.23 | 10.11<br>< 0.001 |
| Q8 | 0.511 | 0.14 | 8.56<br>< 0.001 |

β: Regression coefficient, STD (β): Standardized beta coefficient, z: Z-statistic, P: p-value ($p < 0.05$ is considered statistically significant)

**Table 4** Model fit indexes

| Index | Perfect fit measure | Good fit measure | Research finding | Conclusion |
|---|---|---|---|---|
| CMIN/df | 0–3 | 3–5 | 1.261 | Perfect |
| IFI | 0.95 ≤ IFI ≤ 1.00 | 0.90 ≤ IFI < 0.95 | 0.995 | Perfect |
| CFI | 0.95 ≤ CFI ≤ 1.00 | 0.90 ≤ CFI < 0.95 | 0.995 | Perfect |
| RMSEA | 0.00 ≤ RMSEA ≤ 0.05 | 0.05 < RMSEA ≤ 0.10 | 0.031 | Perfect |
| SRMR | 0.00 ≤ SRMR ≤ 0.05 | 0.05 < SRMR ≤ 0.08 | 0.069 | Good |

CMIN/df: Chi-square ($x^2$/df), IFI: Incremental fit index, CFI: Comparative fit index, RMSEA: Root mean square error of approximation, SRMR: Standardized root mean square residual

There are several model fit indices commonly used in the literature. In this study, the most commonly used indices were the relative chi-square ($\chi^2$/df), the incremental goodness of fit (IFI), the comparative goodness of fit (CFI), the root mean square error of approximation (RMSEA) and the standardised root mean square residual (SRMR). The fit index results showed a perfect fit for all indices except the SRMR, for which a good fit was obtained. In addition, the adjusted goodness of fit index (AGFI) was 0.985 and the goodness of fit index (GFI) was 0.991. These values, which were ≥ 0.90, indicate that the model was a good fit (Table 4) [37, 38].

According to these results, 18.7% of participants were moderately food insecure, while 7.8% were severely food insecure (Table 5).

## Discussion

The aim of this study was to adapt the FIES for use with adults in Turkish society. It represents the first attempt to validate the Turkish translation of the original FIES. The Turkish version of the measure was administered

**Table 5** The comparison of FIES scores based on food insecurity

| Item | Group | *n* (%) |
|---|---|---|
| Q1 | Yes | 182 (34.0) |
| | No | 354 (66.0) |
| Q2 | Yes | 206 (38.4) |
| | No | 330 (61.6) |
| Q3 | Yes | 191 (35.6) |
| | No | 345 (64.4) |
| Q4 | Yes | 129 (34.1) |
| | No | 407 (75.9) |
| Q5 | Yes | 146 (27.2) |
| | No | 390 (72.8) |
| Q6 | Yes | 131 (24.4) |
| | No | 405 (75.6) |
| Q7 | Yes | 79 (14.7) |
| | No | 457 (85.3) |
| Q8 | Yes | 46 (8.6) |
| | No | 490 (91.4) |
| FIES classification | Food secure | 394 (73.5) |
| | Moderately FI | 100 (18.7) |
| | Severely FI | 42 (7.8) |

FIES: Food Insecurity Experience Scale, n: Number, %: Percentage

face-to-face to adult participants, and data from 536 respondents were analysed.

Conclusions of the study demonstrated the psychometric strength of the FIES model. After analysing the total correlation values and Cronbach alpha coefficients between the FIES items, it was found that the Cronbach alpha coefficient of the scale was 0.85. The literature states that the Cronbach alpha coefficient has a range of values from 0 to 1. The scale is in pristine condition as this number gets closer to 1. Furthermore, there is a positive relationship, greater than 0.50, between each item and the total score. In this case, the scale was shown to be capable of measuring overall food security. In conclusion, the results of this research show that the FIES provides sufficient empirical evidence of validity and reliability to support it. The FIES provides a unique opportunity to obtain the prevalence of FI across countries using a single measurement [33, 39–41]. In one study, the Cronbach alpha coefficient of the FIES was found to be 0.759 [41]. In a similar study, the statistics of the FIES items were found to be within acceptable norms for all countries, except for Sudan and Syria, and the lowest agreement values were found for the 'concerned' items [33]. In our findings, the lowest agreement was found for the "anxious" items. High or low agreement ratings have been interpreted in the literature as indicating items that some participants repeatedly misunderstand. They may also reflect careless responses or errors recorded by interviewers or data managers [33]. According to this research, the FIES met Nunnally's acceptable reliability criteria with a reliability coefficient above 0.70 [42]. These findings indicate that the FIES is a trustworthy FI assessment instrument for Turkish society. Food insecurity is a major public health problem affecting almost one in ten people worldwide, particularly children and the elderly [43].

Food insecurity affects food consumption and can lead to the development of chronic diseases such as diabetes, hypertension and obesity [44–46]. According to the United Nations, food insecurity has increased from 23.3% in 2014 to 26.4% in 2018 [47]. The African continent has been found to have food insecurity rates that were almot double the global average. In 2019, 19.1% of the population in Africa was found to be food insecure. The Asian continent has lower rates of food insecurity compared to other continents [48, 49]. In Turkey, the most recent data on food insecurity was from 2019. According to the results of the Turkey Nutrition and Health Survey (TBSA), the rate of people who were worried about not being able to find enough food due to lack of money and other resources in the past year was 23.4%, the rate of those who cannot consume healthy and nutritious food was 22.7%, the rate of those who have reduced the variety of food they consume was 22.8%, the rate of those who have to skip meals was 13.1%, the rate of those who have to consume less food than they need was 16.5%, and the rate of those who cannot eat despite being hungry was 8.4% [50]. Therefore, food security is a very important concept to be addressed and the household food insecurity access scale (HFIAS), the household hunger scale (HHS), Global Food Security Index (GFSI), Global Hunger Index (GHI), Household Food Security Survey Module (HFSSM), FIES and the measurement of food use are among the scales used to assess food insecurity [51]. In this study, the proportion of those experiencing severe food insecurity measured by FIES was found to be 7.8%, while 73.5% of individuals were determined to be food secure. In a study conducted in Turkey, food insecurity of 420 volunteers between the ages of 18–25 was assessed using the household food ınsecurity access scale (HFIAS), and 59.2% of men and 54.5% of women were determined to have food security [52]. In another study conducted in Turkey, according to the results of the HFIAS, 79.6% of the participants were determined to be in the food secure group, 12.4% in the mild food insecurity group, 4% in the moderate food insecurity group, and 4% in the severe food insecurity group [53]. As a result of the evaluation with HFIAS, 21.6% of adult individuals in Turkey were found to have food insecurity and 5.2% to have severe food insecurity [54]. In a study evaluating the food insecurity of Syrian immigrants in Turkey, the household food insecurity rate was 90.3%, 88.4% for adults and 84.8% for children [55]. As a result of the validity and reliability study of FIES in Bangladesh, the prevalence of moderate or severe food insecurity was found to be 18.92% [56]. In a study conducted in Southern Ethiopia using HFIAS, the prevalence of household

food insecurity was found to be 63.4%. Household food insecurity was also categorized according to severity, with 15.4% of individuals having mild, 28.5% moderate and 19.42% severe food insecurity [57]. As expected, this rate has been reported in the literature at a rather high level with FIES in African and Middle Eastern countries [58]. While our study demonstrates the validity and reliability of FIES in Turkey, it also makes it important to discuss the impact of using different scales on the results. Various scales such as FIES, HFIAS and HHS are used in measuring food insecurity, and the fact that each scale focuses on different dimensions can lead to methodological differences in comparisons between countries and groups. For example, while some studies conducted in Turkey report higher food insecurity rates using HFIAS, lower rates can be found in assessments conducted with FIES. However, it is seen that scale differences play an important role in international comparisons. This situation shows that the scales used in the studies can not only detect food insecurity, but also address different aspects related to food access and dietary habits in a regional context. Future studies that use different food insecurity scales together to conduct comparative analyses can contribute to obtaining more reliable and comparable data at both national and international levels. In addition, multidimensional approaches are needed to more comprehensively assess the impact of socioeconomic differences, vulnerable groups (e.g., immigrants, low-income households), and regional factors on food insecurity in Turkey. In conclusion, it is seen that FIES is a valid scale for assessing food insecurity among adults in Turkey. However, it is important to conduct future studies with larger samples and different food insecurity scales together to better understand the methodological differences of the scales and their effects in cultural context. Another striking finding in this study is the low level of agreement with the expressions "anxious". While food insecurity scales generally assess individuals' concerns about accessing sufficient food, the low responses to such items in Turkey may be related to cultural factors. The strong social solidarity networks in Turkey may cause individuals to express temporary food access concerns less. Similarly, the fact that individuals experiencing economic difficulties tend to primarily report physical food deficiencies may also explain this result. It is recommended that future qualitative studies be conducted to better understand how cultural factors shape the perception of food insecurity. While this study demonstrates the validity and reliability of the FIES in Turkey, it also makes it important to discuss the impact of using different scales on the results. Although the findings show that the FIES is an appropriate scale for the adult population in Turkey, they also reveal that scale adaptations should be evaluated more thoroughly in the cultural context.

This study may be a pioneering study that proves that FIES serves as a legitimate and reliable global FI assessment tool to investigate the extent of FI among the Turkish population, and more research may be conducted on the Turkish version of FIES as a whole. There were certain limitations to this study, despite the fact that it was a representative sample of the Turkish population as a whole and was reasonably diverse. Firstly, women were over-represented in the study population compared to men (66.6% female). Second, although scale questions was surveyed by the researchers, it relied on self-reported data from participants, introducing the potential for response bias as participants may have provided socially desirable or incorrect answers. In addition, in this study, reliability was evaluated solely through the Cronbach's alpha internal consistency coefficient, and no additional reliability analyses, such as test-retest reliability, were conducted. Future research could consider incorporating other methods to assess the reliability of the scale more comprehensively. Further research could use multiple assessment techniques, such as experimental paradigms and clinical practice. Further research should examine populations -including clinical samples- in more detail. In addition, assessing the food insecurity of different segments of society on a national and international basis will help to provide different perspectives and focus on food security solutions. In this context, future studies could include validating the scale in different socioeconomic or ethnic groups within Turkey. In addition, possible selection bias from face-to-face data collection should also be considered. Future research directions could include validating the scale in different socioeconomic or ethnic groups within Turkey.

## Conclusion

This study has demonstrated that the Food Insecurity Experience Scale (FIES) is an appropriate and reliable tool for assessing food insecurity in Turkey. The strong psychometric properties, confirmed through confirmatory factor analysis (CFA) and goodness of fit indices, underscore the scale's ability to capture the dimensions of food insecurity in this context. From a theoretical perspective, this study contributes to the literature by validating the FIES in a Turkish context, providing a foundation for future research on food insecurity in Turkey and comparable populations. By adapting and testing the scale in Turkey, this work supports the international application of FIES and highlights the cultural and socioeconomic nuances of food insecurity in different regions. Practically, the results of this study can inform policymakers and public health organizations on the prevalence of food insecurity in Turkey, enabling more targeted interventions and policy development aimed at reducing food insecurity, especially in vulnerable groups such

as low-income populations, rural communities, and refugees. Additionally, the scale's use can assist in monitoring food insecurity trends over time, allowing for more data-driven approaches to addressing this critical issue. However, to enhance the generalizability of the findings, future studies should consider including diverse ethnic groups and expand the geographical scope to include both rural and urban areas.

**Acknowledgements**
There is no acknowledgments.

**Author contributions**
Conceptualisation: GEK, YV; Methodology: GEK, YV, AK; Investigation, GEK, YV; Writing: GEK, YV, Review and Editing, GEK, YV, AK; Supervision, AK; Data Provision: GEK, YV. All authors have read and agreed to the published version of the manuscript.

**Funding**
No support was received from funding agencies in the public, commercial, or non-profit sectors during this study.

**Data availability**
No datasets were generated or analysed during the current study.

## Declarations

**Ethical approval**
The Ankara University Non-Interventional Clinical Research Ethics Committee gave its approval to the project. (approval number: 11/84).

**Consent to participate**
The purpose and protocol of this study were explained to all participants, and written informed consent was obtained.

**Consent for publication**
There is no conflict of interest between the authors.

**Competing interests**
The authors declare no competing interests.

Received: 21 February 2025 / Accepted: 8 April 2025
Published online: 23 July 2025

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