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The Effect of Relative Age on Competitive Performance: An Analysis of Regular Starters in the U-17 Elite Development Football League

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Abstract

The aim of this study is to examine the impact of relative age on both team selection rates and league performance in the 2024–2025 season of the Turkish Football Federation's Elite U17 B Development League, focusing specifically on players who regularly start in the first eleven. The study was designed using a basic qualitative research model. Document analysis was employed as the data collection method, and the data were analyzed using the descriptive analysis approach based on the Miles and Huberman technique. The population of the study consists of players registered in the Elite Development Leagues, while the sample includes players from U17 Elite B League teams. According to the findings, 43% of the regular starters were born in the first quarter of the year (January–March). While the top three ranked teams demonstrated a more balanced distribution of birth dates, teams ranked in the bottom three showed a concentration of Q1 and Q3 births. Players born in Q4 were found to be the least represented across the league and more prevalent in the lowest-performing teams. These results suggest that relative age not only affects player selection but may also influence overall team performance.

Keywords: Football, Relative Age Effect, Success

INTRODUCTION

Identifying talented athletes at an early age is critically important across various sports disciplines (Baikoğlu, 2016). Football clubs play a central role in recognizing talent and providing high-quality training environments for promising athletes (Carling, 2009). In addition to offering proper development opportunities, clubs are also responsible for ensuring a fair and competitive environment. To achieve this, youth football players are typically grouped based on chronological age (Helsen et al., 2005), often using annual age categories (Musch & Grondin, 2001). However, such groupings may fail to ensure equity, as those born in the early months of the same year can be nearly a full year older than their peers born later (Vincent & Glamser, 2006).

Although a 12-month age difference may have limited impact among adults in terms of academic or athletic performance, the same discrepancy can lead to significant developmental differences among children—particularly in physical, cognitive, and motor skills (Cobley et al., 2009). Early-maturing children are more likely to be perceived as talented, increasing their chances of being selected for training, matches, and elite teams (Rummenich & Rogol, 1995; Helsen et al., 2005). This phenomenon has led to the concept of the Relative Age Effect (RAE), which refers to the advantage gained by those born earlier in a selection year (Vincent & Glamser, 2006).

The concept of RAE was first introduced in research on elite Canadian ice hockey players, where performance factors such as speed, strength, and coordination were found to be closely

related to age (Barnsley, Thompson & Barnsley, 1985). Since then, the importance of this concept has led to numerous studies by sports scientists (e.g., Kara & Demirsoy, 2023; Bezuglov, 2023). These findings confirm that RAE appears consistently across different sports, age groups, and countries (Cobley et al., 2009).

Rapid biological maturation offers a competitive edge not only in endurance and strength but also in technical attributes (Mülazımoğlu et al., 2013). Players born earlier in the year often show faster maturation rates, reinforcing the influence of RAE on team selection (Malina, 2003).

In assessing player participation objectively, the concept of being a “regular starter” is used. A player is considered a regular starter if they begin in the starting lineup for at least 50% of their team’s total matches in a season (Smith et al., 2018).

The primary objective of this study is to determine the extent to which RAE affects U17 players who regularly start matches in the Elite Development League during the 2024–2025 season, and how this may relate to final league standings. There is limited literature examining the clustering of regular starters within specific birth quarters and their potential link to team success. In this regard, the study aims to fill a gap in the existing research.

METHOD

Research Design

This study was conducted in accordance with the Basic Qualitative Research design, one of the qualitative research approaches. This design aims to understand how individuals interpret their life experiences, the meanings they attribute to those experiences, and how they perceive and structure their environments (Yıldırım & Şimşek, 2013; Merriam, 2013). Throughout the research process, the aim was to deeply understand the phenomenon by focusing on the participants' experiences within real-life contexts.

Data Collection Method

The document analysis method was employed for data collection. Within this scope, publicly available license data, birth dates, and starting eleven records of football players competing in the 2024–2025 season of the Turkish Football Federation (TFF) U17 Elite Development League were reviewed. The accuracy of the data was verified through the official TFF website and club communication sources.

Study Group

The population of the study consisted of all licensed players in the U17 B teams competing in the Turkish Football Federation’s Elite Development Leagues during the 2024–2025 season. The sample included players from 16 teams in the U17 age category who regularly started matches in the first eleven (n = 193).

Regular Starting Eleven Player Criterion

In this study, a "regular starting eleven player" is defined as a player who started in at least 50% of the official matches played by their team throughout the season. This criterion was based on definitions used in prior studies (Smith et al., 2018). Based on this definition, the official match records of each team were examined, and eligible players were identified accordingly.

Data Analysis

The collected data were analyzed using a descriptive analysis approach. The analysis process was guided by the Miles and Huberman (1994) content analysis-based data interpretation model. Players' birthdates were classified into quarterly periods across the calendar year: Q1 (January–March) Q2(April–June) Q3: (July–September) Q4: (October–December) Team success levels were analyzed comparatively based on their ranking in the league: top 8 teams, bottom 8 teams, top 3 teams, and bottom 3 teams.

Ethical Considerations

All data used in this research were obtained from publicly accessible sources, and personal information regarding the players has been kept confidential. Although the study did not involve direct intervention with human participants, ethical approval was obtained to ensure full compliance with ethical standards. The study was approved by the Academic Research and Publication Ethics Committee of Istanbul Topkapı University with the decision dated September 8, 2023, and numbered 2023/09 E-49846378-050.01.04-2300010577.

FINDINGS

Table 1. Teams and Number of Regular Starting Players in the 2024-2025 U17 Elite B Football Development League

Teams	Regular Starting Players	First Quartile (Q1: January–March)	Second Quartile (Q2: April–June)	Third Quartile (Q3July-September)	Fourth Quartile (Q4: October–December)
1 Kasımpaşa	12	4	3	2	3
2 Fatih Karagümrük	12	5	3	3	1
3 Kocaelispor	12	3	4	2	3
4 Çaykur Rizespor	12	5	3	3	1
5 Esenler Erokspor	12	4	4	3	1
6 Sakaryaspor	11	4	5	0	2
7 Bucaspor 1928	12	7	3	1	1
8 Kayserispor	14	6	4	3	1
9 Ümraaniyespor	14	8	2	4	0
10 Boluspor	14	7	3	3	1
11 Altınordu	11	5	3	3	0
12 Sarıyer	10	4	4	0	2
13 Altay	10	6	2	1	1
14 Ankara Keçiörengücü	14	7	3	1	3
15 Sultanbeyli Belediyespor	11	2	3	6	0
16 Giresunspor	12	4	2	4	2
Total	193	81	51	39	22

In Table 1, the distribution of birth months of a total of 193 players who regularly started in the first 11 during the 2024-2025 season of the U17 Elite B League, organized by the Turkish

Football Federation, is examined. The collected data were evaluated by categorizing the players' birth dates into quarterly periods of the year. Accordingly, the number of players born between January and March was 81 (41.97%), those born between April and June numbered 51 (26.42%), players born between July and September totaled 39 (20.21%), and those born between October and December were only 22 (11.40%).

These findings indicate that the vast majority of players regularly selected for the starting eleven were born in the first half of the year, particularly in the first quarter. The relatively low proportion of players born in the last quarter of the year may be indicative of the Relative Age Effect.

Table 2. 2024-2025 U17 Elite B Football Development League Top 8 Teams and the Number of Regular Starting 11 Players

Teams	Regular Starting Players	First Quartile (Q1: January–March)	Second Quartile (Q2: April–June)	Third Quartile (Q3July-September)	Fourth Quartile (Q4: October–December)
1 Kasımpaşa	12	4	3	2	3
2 Fatih Karagümrük	12	5	3	3	1
3 Kocaelispor	12	3	4	2	3
4 Çaykur Rizespor	12	5	3	3	1
5 Esenler Erokspor	12	4	4	3	1
6 Sakaryaspor	11	4	5	0	2
7 Bucaspor 1928	12	7	3	1	1
8 Kayserispor	14	6	4	3	1
Total of the Top 8 Teams	97	38	29	17	13

In Table 2, within the same league, the distribution of players who regularly started in the first 11 was analyzed specifically for the top 8 ranked teams. A total of 97 players were identified. The distribution of these players according to their birth quarters throughout the year is as follows: 38 players (39.18%) were born in January–March (Q1), 29 players (29.90%) in April–June (Q2), 17 players (17.53%) in July–September (Q3), and only 13 players (13.40%) in October–December (Q4).

Table 3. 2024–2025 U17 Elite B Football Development League Bottom 8 Teams and Number of Regular Starting 11 Players

Teams	Regular Starting Players	First Quartile (Q1: January–March)	Second Quartile (Q2: April–June)	Third Quartile (Q3July-September)	Fourth Quartile (Q4: October–December)
9 Ümraaniyespor	14	8	2	4	0
10 Boluspor	14	7	3	3	1
11 Altınordu	11	5	3	3	0
12 Sarıyer	10	4	4	0	2
13 Altay	10	6	2	1	1
14 Ankara Keçiörengücü	14	7	3	1	3
15 Sultanbeyli Belediyespor	11	2	3	6	0
16 Giresunspor	12	4	2	4	2

Total of the Bottom 8 Teams	96	43	22	22	9

In Table 3, within the same league, the distribution of players who regularly started in the first 11 for the bottom 8 ranked teams was examined. It was determined that a total of 96 players were included. The distribution of these players by birth quarters throughout the year is as follows: The number of players born in the January–March (Q1) period was 43 (44.79%), those born in the April–June (Q2) period were 22 (22.91%), those born in the July–September (Q3) period were also 22 (22.91%), and those born in the October–December (Q4) period were only 9 (9.37%).

When this distribution is examined, it is observed that the majority of players in the bottom 8 teams were also born in the first half of the year, with a particularly high proportion of players in the Q1 group. Moreover, the notably low representation of players born in the Q4 period suggests that the Relative Age Effect may influence not only the selection of players for successful teams but also general player selection across all teams.

Table 4. Regular Starting Line-up Players of the Top 3 Teams in the 2024–2025 U17 Elite B Football Development League

Teams	Regular Starting Players	First Quartile (Q1: January–March)	Second Quartile (Q2: April–June)	Third Quartile (Q3July-September)	Fourth Quartile (Q4: October–December)
1 Kasımpaşa	12	4	3	2	3
2 Fatih Karagümrük	12	5	3	3	1
3 Kocaelispor	12	3	4	2	3
Total of the Top 3 Teams	36	12	10	7	7

In Table 4, the distribution of players who regularly started in the first 11 within the top three teams of the 2024–2025 U17 Elit B Football Development League was examined. A total of 36 players were identified. Among them, one-third (33.33%) were born in the first quarter (January to March), while 27.78% were born in the second quarter (April to June). Players born in the third (July to September) and fourth (October to December) quarters each accounted for 19.44% of the total.

This distribution indicates a relatively balanced spread of regularly starting players across all birth quarters in the top three teams. Although players born in the first half of the year (Q1 and Q2) still make up the majority, the relatively high representation of players born in the latter half (Q3 and Q4) suggests that factors other than relative age may also have influenced the success of these teams.

Table 5. Regular Starting 11 Players of the Bottom 3 Teams in the 2024–2025 U17 Elit B Football Development League

Teams	Regular Starting Players	First Quartile (Q1: January–March)	Second Quartile (Q2: April–June)	Third Quartile (Q3July-September)	Fourth Quartile (Q4: October–December)
14 Ankara Keçiörengücü	14	7	3	1	3
15 Sultanbeyli Belediyespor	11	2	3	6	0
16 Giresunspor	12	4	2	4	2

Total of the Bottom 3 Teams	37	13	8	11	5

In Table 5, the distribution of players who regularly started in the first 11 for the bottom 3 teams in the same league was examined. A total of 37 players were identified. Their distribution according to birth quarters within the year is as follows: 13 players (35.14%) were born between January and March (Q1), 8 players (21.62%) between April and June (Q2), 11 players (29.73%) between July and September (Q3), and only 5 players (13.51%) between October and December (Q4).

These findings indicate that, similar to the top-ranked teams, players born in the first quarter of the year are also predominant among the regular starters of the bottom 3 teams. However, the proportion of players born between July and September (Q3) is also notably high. While the relative age effect persists in this group, it appears to be less pronounced and more evenly distributed in teams with lower performance levels.

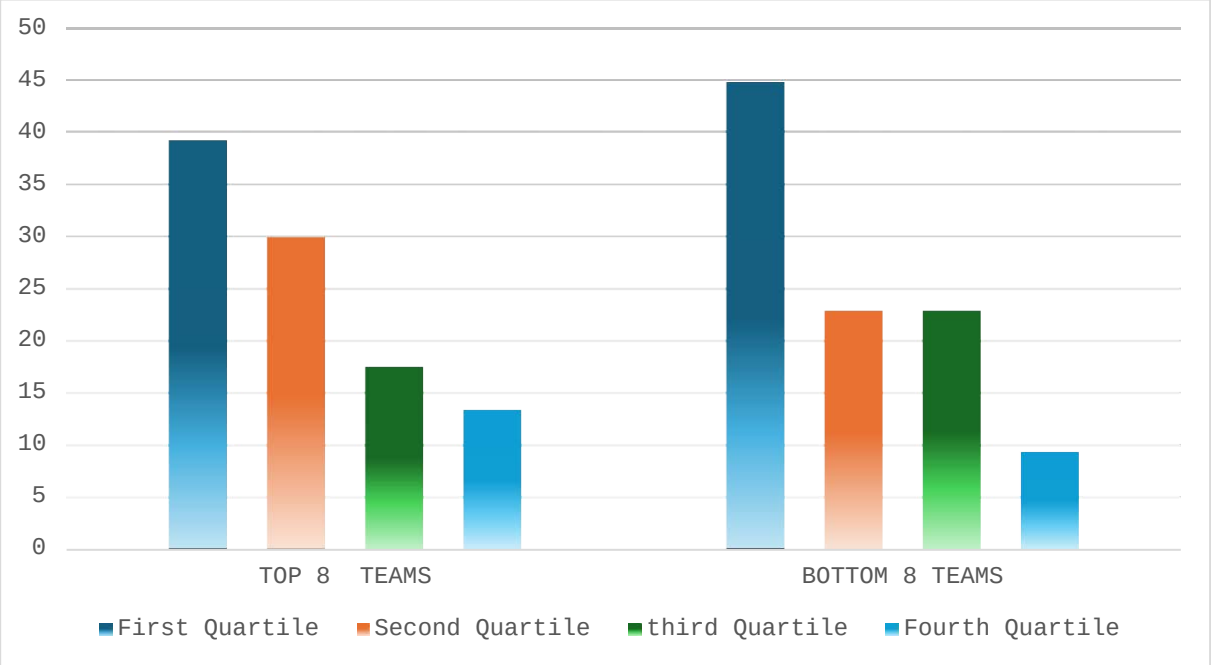

Figure 1. Percentage Distribution of Birth Dates of Regular Starting XI Players from the Top 8 and Bottom 8 Teams

Figure 1 illustrates the distribution of regular starting players according to their birth quarters throughout the year, compared between the top 8 and bottom 8 teams in the league standings. The data show that for both groups, players born in the first quarter of the year (Q1) constitute a higher proportion compared to other quarters. The proportion of Q1-born players is 39.18% for the top 8 teams, while it is 44.79% for the bottom 8 teams. This indicates that the Relative Age Effect is present in both high-performing and lower-ranked teams.

Furthermore, the proportion of players born in the second quarter (Q2) is higher in the top 8 teams (29.90%) compared to the bottom 8 teams (22.91%). Similarly, players born in the fourth quarter (Q4) represent a larger share in the top 8 teams (13.40%) than in the bottom 8

teams (9.37%). The proportion of players born in the third quarter (Q3) is comparable between the two groups, at 17.53% and 22.91%, respectively.

This comparison reveals that the top-ranked teams have a more balanced distribution of players across birth quarters, whereas the bottom-ranked teams exhibit a more pronounced dominance of Q1-born players. These differences suggest that alongside the Relative Age Effect, factors such as player selection policies, training quality, and development strategies may also significantly influence team success.

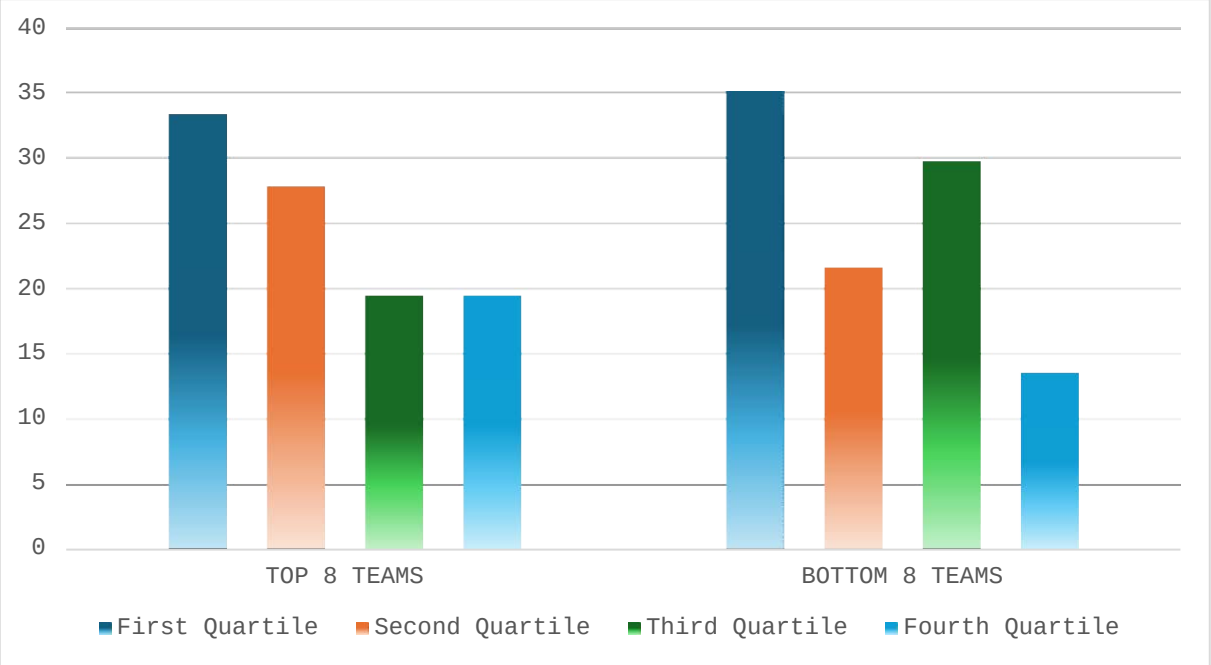

Figure 2. Percentage Distribution of Birth Dates of Regular Starting XI Players in the Top 3 and Bottom 3 Ranked Teams

Figure 2 presents a comparative analysis of the distribution of regular starting players according to their birth quarters, focusing on the top 3 and bottom 3 teams in the league standings. The proportion of players born in the first quarter (Q1) is 33.33% for the top 3 teams, while it is 35.14% for the bottom 3 teams. Although Q1 represents the highest percentage in both groups, the distribution is notably more balanced among the top 3 teams.

Specifically, players born in Q2, Q3, and Q4 comprise 27.78%, 19.44%, and 19.44% of the top 3 teams, respectively. In contrast, in the bottom 3 teams, players born in Q3 account for a significantly higher proportion at 29.73%, with Q2 and Q4 proportions recorded as 21.62% and 13.51%, respectively.

This comparison indicates that the highest-ranking teams exhibit a more homogeneous distribution of birth dates, whereas the lowest-ranking teams display a more uneven profile. These findings suggest that not only the Relative Age Effect but also developmental differences and selection criteria associated with team success should be considered.

DISCUSSION AND CONCLUSION

In this study, the distribution of players regularly starting in the first 11 according to their birth quarters was analyzed 8onitör 2024-2025 season of the Turkish Football Federation U17 Elite B League, and this distribution was comparatively evaluated based on the teams' league standings.

The findings revealed a clear dominance of players born in the first quarter of the year (Q1) (41.97%) compared to other periods, indicating that the Relative Age Effect (RAE) is prevalent throughout the league. Particularly, the proportion of players born in the last quarter (Q4) was only 11.40%, suggesting that younger players within the age group have limited opportunities to participate in a high-level competitive environment.

Similar trends were observed in sub-analyses based on league rankings. Among the squads of the top 8 teams, 39.18% of the players were born in Q1, whereas this rate increased to 44.79% 8onitör bottom 8 teams. This finding suggests that the Relative Age Effect is effective not only among successful teams but across the league in general. However, notably, the higher proportion of Q1-born players in the lower-ranked teams indicates that the Relative Age Effect alone does not have a linear relationship with performance. While an earlier birthdate may provide an advantage in 8onitör selection, it does not solely determine team success.

When examining the top 3 and bottom 3 teams specifically, striking differences in the distribution of players by birth quarter were observed. In the top 3 teams, players born in Q1 (33.33%), Q2 (27.78%), Q3 (19.44%), and Q4 (19.44%) were represented relatively evenly. This suggests that these teams do not rely solely on age advantage in their 8onitör selection processes but consider multidimensional criteria such as technical-tactical competence, physical suitability, and developmental potential.

Conversely, in the bottom 3 teams, the distribution was more uneven: 35.14% born in Q1, 18.92% in Q2, 29.73% in Q3, and 16.22% in Q4. This imbalance implies that the Relative Age Effect plays a more prominent role in the selection processes of lower-ranked teams, which may prioritize short-term physical superiority over long-term developmental potential. Additionally, it can be inferred that these teams' technical staff might have a less systematic or less holistic approach to talent identification, development planning, and 8onitör monitoring.

In conclusion, the findings clearly indicate the presence of the Relative Age Effect in the Turkish U17 Elite B League. However, this effect is not directly linked to success; more successful teams demonstrate a more homogeneous and balanced distribution of birth dates. This highlights that success is determined not only by physical development advantages but also by systematic 8onitör development, quality training, and talent-focused selection.

These results align with similar findings in the 8onitör8re. Previous studies have noted that the Relative Age Effect is evident in youth selection processes but does not always correlate directly with performance (Cobley et al., 2009). Related research has also emphasized the underrepresentation of Q4-born athletes among elite young footballers. The current findings similarly reveal that birth quarters influence 8onitör selection but do not directly translate into success (Yılmaz et al., 2020).

In this context, it is recommended that youth football selection processes adopt more holistic and equitable approaches based not only on chronological age but also on individual

developmental potential and performance indicators. This would enable a more sustainable and inclusive 9onitör development system in the long term.

RECOMMENDATIONS

1. Equalizing mechanisms, such as allocating minimum quotas for athletes born in each quarter of the year, should be implemented in development leagues.
2. To reduce the relative age effect in the Elite Development League, players of the same age group should be structured into two separate teams based on their birth months (e.g., in six-month intervals), and this should be applied as a pilot program limited exclusively to teams within the U-14 age category.
3. Awareness of the Relative Age Effect should be incorporated into coach education programs, and selection processes need to be restructured in a multidimensional manner.
4. In athlete monitoring and performance evaluation processes, not only physical criteria but also multiple developmental indicators such as technical skills, tactical understanding, social-emotional, and psychological characteristics should be considered.
5. At the 9onitör level, 9onitör selection processes must regularly 9onitör and analyze birthdate distributions based on intra-year birthdates. Developmental guidance should be provided to clubs exhibiting significant imbalances in birthdate distribution, accompanied by targeted feedback to improve selection policies.
6. The birthdates of the regular starting 11 players in development leagues who achieve successful performance should be systematically reported and made accessible to the federation. In light of these data, the promotion of best practice sharing among clubs, based on the principle of inclusivity in development, is essential.

This study covers only players participating in the Elite Development League within the U17 age category. To comprehensively delineate the scope of the relative age effect, comparative studies involving different age groups and various competition levels are necessary. Additionally, it is recommended that qualitative approaches (e.g., athlete and coach interviews) be employed to provide a more in-depth analysis of the relative age effect on individual experiences, selection processes, and perceptions of development.

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CONTRIBUTION RATE	***EXPLANATION***	***CONTRIBUTORS***
Idea or Notion	*Form the research hypothesis or idea*	Baran KÜPELİ, Tuba KIZILET TOPATEŞ
Design	*To design the method and research design.*	Baran KÜPELİ, Bahadır BAYARSLAN
Literature Review	*Review the literature required for the study*	Baran KÜPELİ, Tuba KIZILET TOPATEŞ
Data Collecting and Processing	*Collecting, organizing and reporting data*	Baran KÜPELİ, Bahadır BAYARSLAN
Discussion and Commentary	*Evaluation of the obtained finding*	Baran KÜPELİ, Tuba KIZILET TOPATEŞ

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No contribution and/or support was received during the writing process of this study.

Statement of Conflict

Researchers do not have any personal or financial conflicts of interest with other people and institutions related to the research.

Statement of Ethics Committee

The study was approved by the Academic Research and Publication Ethics Committee of Istanbul Topkapı University with the decision dated September 8, 2023, and numbered 2023/09 E-49846378-050.01.04-2300010577.