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RESEARCH ARTICLE / ARAŞTIRMA MAKALESI

Evaluation of the Quality and Reliability of Plyometric Exercise Videos on YouTube

YouTube'da Yer Alan Pliometrik Egzersiz Videolarının Kalite ve Güvenilirlik Açısından Değerlendirilmesi

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ABSTRACT

Objective: The aim of this study is to systematically investigate the reliability and quality of plyometric exercise videos on YouTube.

Materials and Methods: Data were collected from the YouTube platform. A one-time search was conducted in English using the terms “plyometric exercises”, “plyometric workout” and “plyometric drills”. In this study, videos shorter than 2 minutes, YouTube Shorts videos, videos in languages other than English, irrelevant content, and those with poor audio or visual quality were excluded. A total of 200 videos were listed, and the first 50 videos meeting the inclusion criteria were evaluated using three validated tools (GQS, JAMA and mDISCERN) to assess their quality and reliability. According to the GQS, the videos were categorized into three groups: low, moderate, and high quality and the same data were compared across these groups.

Results: Based on the Global Quality Scale (GQS), 60% of the videos were classified as high quality, while 32% and 8% were categorized as moderate and low quality, respectively. No statistically significant differences were found among the groups in terms of video metrics and JAMA scores ($p > 0.05$). Videos classified as high quality also demonstrated significantly higher mDISCERN scores.

Conclusion: YouTube videos related to plyometric exercises were generally found to be of high quality. This is particularly important for athletes and fitness enthusiasts seeking to improve their performance through online platforms. In the context of the digital age and the rapidly increasing spread of online misinformation, it is crucial that high-quality educational video content be produced by qualified professionals.

Keywords: Health education, internet videos, plyometric exercise

ÖZ

Amaç: Bu çalışmanın amacı, YouTube'da yer alan pliometrik egzersiz videolarının güvenilirliğini ve kalitesini sistematik olarak incelemektir.

Gereç ve Yöntem: Veriler YouTube platformundan elde edilmiştir. İngilizce olarak “plyometric exercises”, “plyometric workout” ve “plyometric drills” anahtar kelimeleri kullanılarak tek seferlik bir tarama gerçekleştirilmiştir. Çalışmada 2 dakikadan kısa videolar, YouTube Shorts videoları, İngilizce dışındaki dillerde hazırlanmış videolar, konuyla ilgisiz içerikler ve ses veya görüntü kalitesi düşük olan videolar dışlanmıştır. Toplam 200 video listelenmiş ve dahil edilme kriterlerini karşılayan ilk 50 video, kalite ve güvenilirliklerini değerlendirmek amacıyla doğrulanmış üç ölçüm aracı (GQS, JAMA ve mDISCERN) kullanılarak incelenmiştir. GQS'ye göre videolar düşük, orta ve yüksek kaliteli olmak üzere üç gruba ayrılmış ve aynı veriler bu gruplar arasında karşılaştırılmıştır.

Bulgular: Global Kalite Ölçeği (Global Quality Scale, GQS) sonuçlarına göre videoların %60'ı yüksek kaliteli, %32'si orta kaliteli ve %8'i düşük kaliteli olarak sınıflandırılmıştır. Video metrikleri ve JAMA puanları açısından gruplar arasında istatistiksel olarak anlamlı bir farklılık bulunmamıştır ($p > 0,05$). Buna karşılık, yüksek kaliteli olarak sınıflandırılan videoların mDISCERN puanlarının da anlamlı düzeyde daha yüksek olduğu belirlenmiştir.

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Sonuç: YouTube'da pliometrik egzersizlerle ilgili videoların genel olarak yüksek kalitede olduğu belirlenmiştir. Bu durum, çevrimiçi platformlar aracılığıyla performanslarını geliştirmeyi amaçlayan sporcular ve fiziksel uygunlukla ilgilenen bireyler açısından özellikle önemlidir. Dijital çağda ve çevrimiçi yanlış bilginin hızla yaygınlaştığı günümüzde, nitelikli eğitim videolarının alanında yetkin profesyoneller tarafından hazırlanması büyük önem taşımaktadır.

Anahtar Sözcükler: Sağlık eğitimi, internet videoları, pliometrik egzersiz

INTRODUCTION

Plyometric exercise involves a stretch-shorten cycle in which high-intensity eccentric contraction is followed by rapid concentric contraction, which increases the ability of neuromuscular and muscle-tendon systems to generate maximum force in the shortest possible time (1,2). The aim of plyometric exercise is to increase the power of subsequent movements by utilizing the elastic components of the muscle-tendon unit and the stretch reflex. This training is used in various sports (3,4). Plyometric exercises generate vertical ground reaction forces ranging from 2 to 6 times body weight (5,6). Furthermore, plyometric training leads to positive adaptation in neuromuscular and musculoskeletal systems in healthy individuals (7). Although eccentric loads are necessary for this performance enhancement, they can pose a risk for musculoskeletal injuries when performed with improper technique and insufficient supervision (2,4). For this reason, the accuracy and precision of educational content presented in online videos is particularly important.

With the evolving patterns of digital behavior, digital health technologies have increasingly been adopted for maintaining and improving health (8). YouTube is one of the most popular websites globally and serves as a primary internet platform for accessing health information (9). Approximately 95% of internet users utilize YouTube, which hosts the world's largest video archive (10). It is known that 81% of all internet users currently search for health-related information (9). As individuals frequently seek detailed information about recommended exercises, the authorship, quality, and validity of the information presented in videos should be carefully considered (11).

Various studies have investigated the quality and reliability of YouTube content related to different exercise types (12,13). While the quality of videos related to certain exercise groups has been evaluated in the literature, to our knowledge, no study has systematically assessed YouTube videos specifically about plyometric exercises; therefore, the purpose of this study was to clarify whether YouTube videos offering plyometric exercises provide sufficiently reliable and appropriate information for safe and effective use in practice.

MATERIAL AND METHODS

Two independent assessors (a Physical Medicine and Rehabilitation specialist and an experienced physical therapist) independently evaluated all videos. They reviewed 200 YouTube videos featuring plyometric exercises. Those that did not meet the inclusion criteria were excluded. The 50 selected videos were divided into three groups: general plyometric exercises, sport-specific plyometric exercises, and plyometric exercises designed for ACL (Anterior Cruciate Ligament) rehabilitation.

Study Design and Ethics

This study is a cross-sectional observational study and was carefully reported in accordance with the STROBE guidelines. This study did not involve any human or animal subjects and consisted of an analysis of publicly available online videos. Therefore, ethical approval was not required in accordance with institutional research ethics guidelines (14).

Data Collection

A systematic, one-time search was conducted on the YouTube platform (https://www.youtube.com/) on May 11, 2025. To minimize algorithmic biases, the entire search history was cleared prior to entering the keyw-

ords. The search terms used were "plyometric exercises," "plyometric workout," and "plyometric drills," all in English. Videos shorter than 2 minutes, YouTube Shorts, videos in languages other than English, irrelevant videos, and those with poor audio or visual quality were excluded. A total of 200 videos were listed, and the first 50 videos meeting the inclusion criteria were numbered and compiled in a file for evaluation (Figure 1).

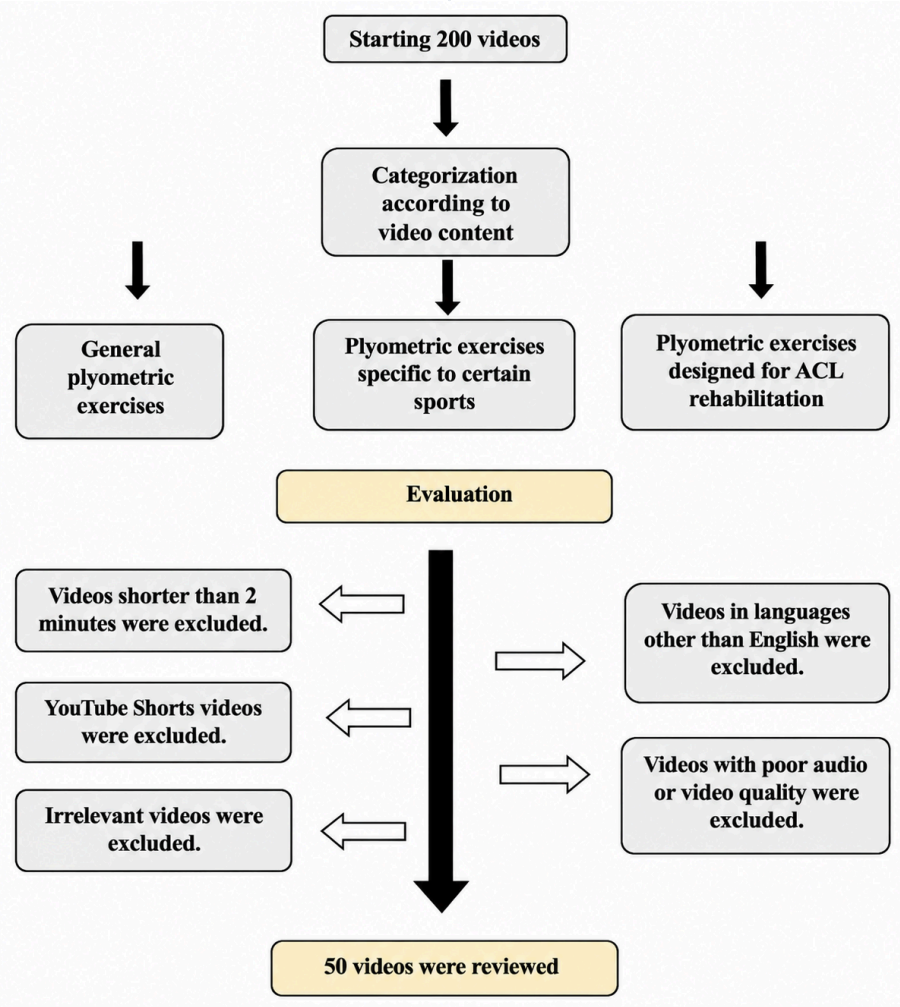

Figure 1. Flowchart of data collection process

Video Parameters

For each video, data were collected on the video duration in seconds, the elapsed time since upload in days, number of views, number of likes, uploader's identity, video resolution in pixels, and video topic. Uploaders were categorized into four groups: healthcare professionals, athletes, sports trainers, and others. Additionally, videos were classified into three categories based on their content: general plyometric exercises, plyometric exercises tailored for specific sports branches, and plyometric exercises designed for ACL (Anterior Cruciate Ligament) rehabilitation.

Assessment of the Reliability and Quality of Videos

To assess the reliability and quality of the videos, the Modified Quality Criteria for Consumer Health Information (mDISCERN), Global Quality Scale (GQS) and Journal of the American Medical Association (JAMA) benchmark criteria were used (15-18).

Statistical Analysis

All statistical analyses were performed using IBM SPSS Statistics version 22.0 (IBM Corp., Armonk, NY, USA). Because the sample size was insufficient for normality testing, non-parametric methods were applied. The

Kruskal–Wallis test was used to compare continuous variables between groups, whereas the Chi-square test was employed for categorical variables. The mean total score of each evaluation tool was used for statistical comparisons. A p-value of less than 0.05 was considered statistically significant.

Two evaluators independently assessed all 50 videos using the mDISCERN, GQS, and JAMA scales. In cases where there was disagreement between the two evaluators on at least one video (n = 32, 64%), a third independent evaluator reviewed the videos and determined the final score. Intraclass Correlation Coefficient (ICC) analysis was applied to determine inter-rater reliability. A single measure ICC (ICC(2,1)) based on a two-way random effects model and absolute fit principle was used. The classification criteria proposed by Koo and Li were used in interpreting the ICC values. Measurement precision was evaluated using the standard error of measurement (SEM), and the minimal detectable change (MDC) was calculated to determine the smallest real change beyond measurement error (19,20).

RESULTS

The median time elapsed since the videos were uploaded was 1,228 days (range: 431.75–1,911.50 days), the median video duration was 499 seconds (range: 346.25–769.5 seconds). The majority of the videos (64%) provided general information on plyometric exercises. Regarding the identity of video uploaders, 32% were athletes, 42% were sports trainers, 14% were healthcare professionals, and 12% were other users. According to the Global Quality Scale (GQS) classification, 60% of the videos were of high quality, 32% were of moderate quality, and 8% were of low quality (Table 1).

Table 1. Descriptive characteristics of the included videos

	Median (IQR)
Duration (second)	499 (346.25-769.5)
View number	69780.5 (1918.75-262551.25)
Total likes	1650 (80.25-8325)
Time since upload (day)	1228 (431.75-1911.50)
Video content	**n (%)**
General plyometric exercises	32 (64)
Plyometric exercises prepared for specific sports branches	15 (30)
Plyometric exercises prepared for ACL rehabilitation	3 (6)
Uploader	**n (%)**
Athlete	16 (32)
Sports Instructor	21 (42)
Health Professional	7 (14)
Other	6 (12)
The image quality of the videos (pixels)	**n (%)**
480px	1 (2)
720px	25 (50)
1080px	15 (30)
1440px	1 (2)
2160px	8 (16)
GQS score	4 (3-4)
The quality of the video (according to GQS)	**n (%)**
Low	4 (8)
Medium	16 (32)
High	30 (60)
mDISCERN score	2 (2-3)
JAMA score	2 (1-2.25)

Data are presented as median (IQR) and n (%).
IQR: interquartile range (25%-75%).
n: number; px: pixels; ACL: Anterior Cruciate Ligament; GQS: Global Quality Scale; JAMA: Journal of the American Medical Association; mDISCERN: Modified Quality Criteria for Consumer Health Information.

The same variables were compared across these groups, and no statistically significant differences were found in duration, view number, total likes, time since upload, video content, image quality, uploader identity, and JAMA score (p-values were 0.086, 0.424, 0.300, 0.254, 0.690, 0.777, 0.263, and 0.239 respectively). mDISCERN scores increased in parallel with GQS classification (p = 0.011) (Table 2).

Table 2. Comparison of video characteristics according to GQS classification

	GQS score, mean±SD			*p*
	Low	Medium	High	
Duration (second)	319.8 ± 97.8	515.1 ± 230.4	628.7 ± 325.9	0.086[1]
View number	132992 ± 195423	816288 ± 1852236	255057 ± 690504	0.424[1]
Total likes	3201 ± 5267	22992 ± 56994	5469 ± 11266	0.300[1]
Time since upload (day)	2151 ± 1014	1360 ± 1075	1150 ± 1051	0.254[1]
Video content	**n**	**n**	**n**	
General plyometric exercises	3	11	18	0.690[2]
Plyometric exercises prepared for specific sports branches	1	5	9	
Plyometric exercises prepared for ACL rehabilitation	0	0	3	
Uploader	**n**	**n**	**n**	
Athlete	2	6	8	
Sports Instructor	1	7	13	0.263[2]
Health Professional	0	0	7	
Other	1	3	2	
The image quality of the videos (pixels)				
480px	0	1	0	
720px	2	7	16	0.777[2]
1080px	1	5	9	
1440px	0	1	0	
2160px	1	2	5	
mDISCERN score				
1	1	8	0	
2	2	3	13	**0.011[2]**
3	1	5	13	
4	0	0	3	
5	0	0	1	
JAMA score				
1	2	7	6	
2	2	7	14	0.239[2]
3	0	2	10	

[1]: Statistical analysis was conducted using the Kruskal–Wallis test for group comparisons.

[2]: Statistical analysis was conducted using the Chi-Square test for group comparisons.

n: number; px: pixels; p: p-value; SD: standard deviation; ACL: Anterior Cruciate Ligament; GQS: Global Quality Scale; JAMA: Journal of the American Medical Association; mDISCERN: Modified Quality Criteria for Consumer Health Information.

p < 0.05 was considered statistically significant.

When videos were grouped based on the identity of the uploader as athlete, sports instructor, health professional, and other, no statistically significant differences were found in duration, view number, total likes, time since upload, image quality, mDISCERN score or JAMA score (p-values were 0.268, 0.133, 0.172, 0.249, 0.839, 0.427, and 0.096 respectively). All videos created by healthcare professionals (n = 7) were classified in the high-quality group (Table 3).

Table 3. Comparison of GQS, JAMA, MDISCERN scores and selected video metrics according to video uploader

	Uploader (mean±SD)				*p*
	Athlete	Sports Instructor	Health Professional	Other	
Duration (second)	600 ± 305	577 ± 326	624 ± 231	382 ± 208	0.268[1]
View number	86955 ± 198123	213092 ± 378805	54740 ± 88720	412231 ± 664178	0.133[1]
Total likes	22434 ± 57785	5777 ± 9195	1561 ± 2456	8926 ± 12155	0.172[1]
Time since upload (day)	1577 ± 1275	1018 ± 793	912 ± 697	1980 ± 1381	0.249[1]
Video content	**n**	**n**	**n**	**n**	
General plyometric exercises	8	15	3	6	**<0.001[2]**
Plyometric exercises prepared for specific sports branches	8	6	1	0	
Plyometric exercises prepared for ACL rehabilitation	0	0	3	0	
GQS score					
1	0	0	0	0	**0.037[2]**
2	2	1	0	1	
3	6	7	0	3	
4	2	12	4	2	
5	6	1	3	0	
The image quality of the videos (pixels)					
480px	1	0	0	0	0.839[2]
720px	7	10	3	5	
1080px	5	7	2	1	
1440px	0	1	0	0	
2160px	3	3	2	0	
mDISCERN score					
1	3	5	0	1	0.427[2]
2	6	7	2	3	
3	5	9	3	2	
4	2	0	1	0	
5	0	0	1	0	
JAMA score					
1	3	7	1	4	0.096[2]
2	8	11	2	2	
3	5	3	4	0	

[1]: Statistical analysis was conducted using the Kruskal–Wallis test for group comparisons.

[2]: Statistical analysis was conducted using the Chi-Square test for group comparisons.

n: number; px: pixels; p: p-value; SD: standard deviation; ACL: Anterior Cruciate Ligament; GQS: Global Quality Scale; JAMA: Journal of the American Medical Association; mDISCERN: Modified Quality Criteria for Consumer Health Information.

$p < 0.05$ was considered statistically significant.

The agreement between the two evaluators was found to be at a good level for all scales. ICC(2,1) values were determined as 0.761 for GQS, 0.822 for JAMA and 0.799 for mDISCERN ($p < 0.001$ for all). The highest agreement was observed in the JAMA scale (Table 4). With corresponding SEM and MDC values presented in Table 4.

Table 4. Inter-rater reliability of GQS, JAMA and mDISCERN scores

Variable	Rater 1 (mean ± SD)	Rater 2 (mean ± SD)	ICC (2,1)*	*p* value	SEM**	MDC***	Level of agreement
GQS	3.72 ± 0.88	3.62 ± 0.90	**0.761**	**<0.001**	0.43	1.20	Good
JAMA	1.94 ± 0.74	1.90 ± 0.76	**0.822**	**<0.001**	0.31	0.87	Good
mDISCERN	2.38 ± 0.92	2.36 ± 0.92	**0.799**	**<0.001**	0.41	1.14	Good

ICC (2,1): Two-way random-effects model, absolute agreement, single measures. SEM** (standard error of measurement) reflects measurement precision. MDC*** (minimal detectable change) indicates the smallest real difference beyond measurement error. p values were calculated to test the statistical significance of ICC coefficients.*
An ICC value >0.75 was considered indicative of good reliability.
ICC values were interpreted as follows: <0.50 poor, 0.50–0.75 moderate, 0.75–0.90 good, >0.90 excellent.

DISCUSSION

This study assessed the reliability and quality of YouTube videos on plyometric exercises using three validated assessment tools (GQS, mDISCERN, and JAMA). The inter-rater reliability observed in all three instruments strengthens the methodological rigor of the study, demonstrating that the applied evaluation protocol yielded consistent and reproducible results. The findings indicate that most videos were of high quality according to the GQS classification (n=30, 60%). This finding is generally consistent with previous studies evaluating online exercise-related content reporting medium to high-quality training material (21,22). However, these results should be carefully considered, especially in the context of athletic performance and injury risk.

The findings indicated that high-quality videos were generally longer in duration, but this difference was not statistically significant. The tendency for higher-quality videos to be longer may stem from attempts to provide more comprehensive information on topics such as exercise rationale, correct technique, and safety precautions. Similar findings were observed in a previous YouTube evaluation study based on different exercise-based methods, where more detailed videos were generally associated with higher perceived training value (22,23). On the other hand, the lack of a statistically significant difference indicates that video length alone does not guarantee high content quality (12). However, no statistically significant differences were observed between the groups regarding other metrics such as the number of likes, time since upload, and number of views. This finding is consistent with previous studies in the literature evaluating various exercise types and diseases. This finding highlights the need to raise awareness among viewers that exercise and rehabilitation videos should be evaluated based on evidence-based quality criteria rather than popularity criteria (12,24,25). This is particularly concerning in the context of plyometric training, as athletes and recreational exercisers may choose videos based on popularity rather than training quality, potentially increasing the risk of incorrect exercise practice and injury.

From the perspective of video uploaders, the majority of videos were uploaded by sports trainers and athletes, while a small percentage were uploaded by healthcare professionals. This suggests that plyometric exercises are particularly favored among athletes due to their benefits in activities such as speed, performance, and vertical jump. On the other hand, videos from healthcare professionals were rated as high quality, indicating that professional background plays a significant role in providing accurate and comprehensive content. The lack of significant differences in JAMA scores among uploader groups can be attributed to the structural nature of the JAMA criteria, which emphasize transparency, authorship, and citation practices. Many YouTube content creators, regardless of their professional background, tend to omit author details or reference information, leading to relatively homogeneous JAMA scores across categories. In contrast, higher mDISCERN scores ob-

y and consistency of information, supporting the importance of this scale in assessing the accuracy of online health-related content. While the majority of videos are high-quality (a positive development for exercise learning and practice), the absence of significant differences in structural criteria like JAMA suggests that these videos should undergo expert review. Therefore, increasing the amount of professionally produced and cited educational content is crucial.

Eccentric exercises have been reported to increase the risk of muscle damage and injury, especially when performed with incorrect technique by untrained individuals (26). In addition, Chimera et al. showed that female athletes are at higher risk of anterior cruciate ligament (ACL) injuries compared to male athletes, especially during high-impact activities such as jumping, which are frequently included in plyometric exercise programs (27). Furthermore, general contraindications for plyometric exercises, such as acute and subacute sprains and injuries, the early postoperative period, and joint instability, are clearly defined in the literature (28). In this context, although most videos are classified as high quality, insufficient attention to injury risk, limited measures to prevent injury, and inadequate emphasis on contraindications reveal a significant shortcoming in online resources.

To our knowledge, this study is one of the first to systematically assess the quality and reliability of YouTube videos specifically focusing on plyometric exercises, which are widely used to improve athletic performance. More comprehensive studies investigating the quality of online resources affecting athletic performance are needed. Furthermore, developing standardized scales to measure elements such as the educational value, applicability, quality, and impact on sports performance of such content will guide future studies in this field.

The scoring systems used in this study demonstrated high reliability when administered by different evaluators. The agreement level of >0.75 observed in technical content such as plyometric exercise videos suggests that the GQS, JAMA, and mDISCERN scales can be used reliably and that observer bias is low (16,17,19,20).

LIMITATIONS

Our study has several limitations. First, only English videos were analyzed, which limits the generalizability of the findings to all populations. Second, recommended YouTube videos may vary depending on location, search history, and device information. Furthermore, due to the dynamic nature of the YouTube platform, view counts, like rates, and video rankings fluctuate, limiting the reproducibility of our study with the same data. Another limitation is the small number of videos related to ACL rehabilitation (n = 3), which led to a limited sample size in this subgroup.

CONCLUSION

This study found that most YouTube videos related to plyometric exercises were of high quality. High-quality YouTube videos can serve as easily accessible and beneficial educational materials. However, considering the potential risk of sports injuries for those exercising at home or sedentary individuals, it is crucial that videos with low-quality content are monitored and reviewed by experts in the field to provide accurate guidance.

Ethics Committee Approval / Etik Komite Onayı
This study did not involve any human or animal subjects and consisted of an analysis of publicly available online videos. Therefore, ethical approval was not required in accordance with institutional research ethics guidelines.

Conflict of Interest / Çıkar Çatışması
The authors declared no conflicts of interest with respect to authorship and/or publication of the article.

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Author Contributions / Yazar Katkıları

Concept: İA, ÖK; design: İA; supervision: İA; materials: İA, ÖK; data collection and/or processing: İA, ÖK; analysis and interpretation: İA, ÖK; literature review: İA, ÖK; writing manuscript: İA; critical reviews: İA, ÖK. All authors contributed to the final version of the manuscript and discussed the results and contributed to the final manuscript.

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