Scientific Accuracy and Reliability Analysis of YouTube Videos on Exosome Therapy: Content and Quality Assessment

Ekzozom Terapisine İlişkin Youtube Videolarinin Bilimsel Doğruluk Ve Güvenilirlik Analizi: İçerik Ve Kalite Değerlendirmesi

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Abstract

Background: This study aimed to assess the accuracy, reliability, and quality of YouTube videos on exosome therapy and their consistency with current scientific evidence and clinical guidelines.

Materials and Methods: This study utilized a descriptive cross-sectional design and systematically examined YouTube content related to "exosome therapy." A total of 100 videos were initially identified, of which 58 met the inclusion criteria. Each video was categorized by source, content type, and audience engagement indicators, while quality evaluation was independently performed by two reviewers using the DISCERN and JAMA benchmark tools. Statistical analyses were applied to assess group differences and correlations between variables, ensuring methodological rigor and reproducibility.

Results: Among 58 analyzed videos, most were uploaded by physicians (53.4%) or health organizations (39.7%) and mainly offered general educational content. Videos from physicians scored higher on DISCERN and JAMA criteria than those from patients (p = 0.032). A moderate positive correlation existed between video duration and quality (ϱ = 0.356, p = 0.007), while popularity metrics such as views or likes showed no significant association with reliability.

Conclusions: The quality of YouTube content on exosome therapy varies considerably. Videos from physicians and health organizations are generally more accurate, yet gaps remain in transparency and disclosure. These results emphasize the need for collaboration among healthcare professionals, academics, and platform managers to provide reliable and transparent health information. Improved regulation, quality content creation, and user education may help reduce misinformation and support informed decision-making.

Keywords: Exosomes, Cell-Derived Microparticles, Regenerative Medicine, Social Media, Health Education

ÖZ

Amaç: Bu çalışmanın amacı, eksozom tedavisine ilişkin YouTube videolarının doğruluk, güvenilirlik ve bilimsel kalite düzeyini değerlendirmek ve mevcut literatür ile klinik kılavuzlarla uyumunu incelemektir.

Gereç ve Yöntem: Bu araştırma tanımlayıcı ve kesitsel bir tasarımda yürütülmüştür. "Exosome therapy" anahtar sözcüğü kullanılarak YouTube platformunda sistematik bir tarama yapılmış ve ilk 100 video değerlendirmeye alınmıştır. Uygulanan dâhil edilme ölçütlerini karşılayan 58 video analiz kapsamına girmiştir. Videolar; kaynağı, içerik türü ve izleyici etkileşimi göstergeleri açısından sınıflandırılmış, içerik kalitesi iki bağımsız değerlendirici tarafından DISCERN ve JAMA kriterleri kullanılarak incelenmiştir. Gruplar arası farklar ve değişkenler arasındaki ilişkiler uygun istatistiksel yöntemlerle analiz edilerek bulguların bilimsel geçerliliği ve güvenilirliği sağlanmıştır.

Bulgular: Analiz edilen 58 videonun çoğu hekimler (%53,4) ve sağlık kuruluşları (%39,7) tarafından yüklenmiş olup, içeriklerin büyük bölümü genel bilgilendirme niteliğindeydi. Hekimler tarafından hazırlanan videoların DISCERN ve JAMA puanları, hastalar tarafından yüklenen videolardan anlamlı derecede yüksek bulunmuştur (p = 0,032). Video süresi ile içerik kalitesi arasında orta düzeyde pozitif ilişki saptanırken (ϱ = 0,356; p = 0,007), izlenme ve beğeni sayısı gibi popülerlik göstergeleriyle kalite arasında anlamlı bir ilişki görülmemiştir.

Sonuç: Eksozom tedavisine ilişkin YouTube içeriklerinin kalitesi değişkenlik göstermektedir. Hekimler ve sağlık kuruluşları tarafından hazırlanan videolar genellikle daha doğru bilgiler içerse de, açıklık ve şeffaflık açısından eksiklikler mevcuttur. Bu sonuçlar, doğru ve güvenilir sağlık bilgisinin halka ulaştırılabilmesi için sağlık profesyonelleri, akademik kurumlar ve dijital platform yöneticilerinin iş birliği yapması gerektiğini göstermektedir. İçerik denetimi ve kullanıcı eğitiminin güçlendirilmesi, çevrimiçi bilgi kalitesini artırarak bilinçli karar verme süreçlerine katkı sağlayabilir.

Anahtar Kelimeler: Eksozomlar; Hücre Kaynaklı Mikropartiküller; Rejeneratif Tıp; Sosyal Medya; Sağlık Eğitimi

> **Highlights**
> - This study evaluated the accuracy, reliability, and quality of YouTube videos on exosome therapy.
> - Videos uploaded by physicians showed significantly higher reliability and quality scores.
> - Video popularity metrics such as views and likes were not associated with information reliability.

Introduction

Exosomes, nanoscale extracellular vesicles with a lipid bilayer, have garnered interest in the biomedical community because of their involvement in cellular communication. As research has expanded in recent years, there has also been an increasing interest in the possible role of exosomes in certain biologic processes (1). Their ability to carry a wide array of biomolecules, including proteins, lipids, and nucleic acids, has led to the consideration of their use as therapeutic tools in certain biologic and therapeutic processes, including the regeneration of tissues, immunomodulation, and the treatment of conditions of the nervous system (2). Their ability to suppress inflammation, participate in the process of tissue regeneration, and act as targeted delivery vehicles for drugs has all been demonstrated in preclinical studies DYSDYS (3–5).

Despite such potential, exosome therapies are still in the early stages of development as a treatment approach. The key areas, such as production methods, purification methods, and dosages, are not clearly established and, as such, adequate clinical practices are not established (6). It is imperative to note the importance of accurate, up-to-date, and evidence-based information for both health professionals and the public. With the current state of information technology, the internet and social media sites are now the key resources for health care information, as such, they provide fast and widespread access (7,8).

YouTube has become a popular platform for sharing information about emerging and complex medical issues such as exosome therapy, owing to reasons of wide reach, free accessibility, and availability of elaborate audiovisual displays (9). However, being a platform wherein information presented is neither reviewed and showed in advance, nor peer-checked, most of this content tends to be incomplete, misleading, and even non-evidence-based (8,10,11). Analysis of previous studies has indicated that most medical information highlighted through videos on the YouTube platform has neither subscribed to scientific medical literature, nor tends to conform to medical guidelines (12–14). There exists considerable diversity in this regard, and this tends to be even more worrisome in emerging medical fields, wherein establishing any standard clinical procedures has yet to be achieved (15,16).

Although numerous studies have evaluated the quality of YouTube content related to established diseases and well-standardized treatments, to our knowledge, no prior YouTube-based analysis has specifically focused on exosome therapy—an emerging and rapidly expanding therapeutic domain—within the context of evolving regulatory frameworks and international extracellular vesicle guidelines such as MISEV2018. Unlike established medical fields with clearly defined clinical pathways, exosome therapy remains in a transitional stage characterized by heterogeneous indications, limited high-quality clinical evidence, and growing commercial promotion. This unique combination creates a distinct vulnerability to misinformation and makes systematic evaluation of publicly available content methodologically and clinically relevant.

The current research aimed to systematically assess the scientific accuracy, reliability, and quality of videos uploaded on YouTube related to exosome therapy as well as their alignment with existing literature and guidelines.

Material and Methods

Study design

This research was conducted using a descriptive cross-sectional design to evaluate the reliability, scientific accuracy, and informational quality of YouTube videos related to exosome therapy.

Ethical approval

The analysis was limited to openly accessible online video content and did not involve direct interaction with individuals, identifiable personal data, or experimental procedures involving human or animal subjects. Therefore, formal approval from an institutional ethics committee was not required (17,18). Despite the absence of a requirement for ethical approval, the study adhered to established ethical principles applicable to research utilizing publicly available digital materials, ensuring responsible handling, objective evaluation, and appropriate reporting of online content.

Video Selection

The search for scientific data on the topic of exosome therapy was conducted on the YouTube website on January 15, 2025, using the search term "exosome therapy." The search terms were conducted in the usual search mode used by this platform, which is the "relevance" search, as detailed in previous research (7). The search is done in incognito mode and logged-off condition to remove the effect of personalization.

The first 100 videos listed in the search results. The selection of the first 100 videos was based on established methodology in digital health communication research, which indicates that users rarely proceed beyond the first few result pages. This approach enhances ecological validity by replicating real-world user behavior rather than constructing an artificially expanded dataset. Furthermore, performing the search in incognito mode minimized algorithmic personalization bias and improved methodological reproducibility (8,9).

Inclusion criteria were:

1.Primarily concentrating on exosome therapy definition, mechanisms, and use, or scientific evidence

2.English audio or subtitles.

3.Full-length accessibility without restrictions.

Exclusion criteria were:

•Content in other languages, but does not.

•Duplicate videos.

•Admittedly, commercial or promotional videos with no essential educational and scientific content.

•60-second or less video lengths were considered not suitable for inclusion, as these types of videos tend to contain a small amount of information and do not bring forward an unbiased coverage of signs, risks, and evidence. There was no limit on the length of the video, as it could provide more information (11).

•A total of 58 videos were left to analyze after applying this criterion (Figure 1).

Data Extraction

Inclusion criteria for the videos analyzed were the following:

•Title and URL

•Upload date and total days online

•Duration (minutes)

•No. of views, likes, dislikes (if available), and comments

•Scope or type of source: (a) Physician or healthcare professional, (b) Healthcare or related organization, or (c) independent creator/patient (14)

•Form of content: general information presentation, research presentation, patient testimony

Quality and Reliability Assessment

Two validated instruments were used:

1.DISCERN Instrument – This is a research tool that helps measure the quality of written or audiovisual health consumer information on treatment choices (19). It has 15 items covered in three areas: the reliability of the information, the quality of the treatment information provided, and the overall score. All the items are measured using a scale of 1-5. Total scores are interpreted using a scale that depicts excellent (63-75), good (51-62), fair (39-50), poor (27-38), or very poor (<27) scores (19,20).

2.JAMA Benchmark Criteria – It is a set of guidelines created to determine the authenticity of medical and health-related information found on the internet, including issues of authorship and currency (21). A total of 1 mark is awarded for each criterion, and a total of 4 is possible (21).

Two reviewers who are proficient in evidence-based medicine and medical education rated all video material. Any disagreements were resolved by consensus. The inter-rater reliability was calculated by Cohen's kappa coefficient.

Statistical analysis

All the procedures for the analysis of the data were conducted using the IBM SPSS Statistics version 25.0 software. The mean ± SD, median (minimum-maximum), or frequencies (%) were employed to summarize the descriptive data. For normality testing, the Shapiro-Wilk test was employed. To evaluate more than two groups, the Kruskal Wallis test was employed. To identify the variances between the groups, the Dunn Bonferroni test was employed.

To determine the association between the continuous variables, such as the length of the videos, number of views, and quality, Spearman's rank correlation coefficient test was employed. The results were considered significant if the p-value was <0.05.

Results

In total, 100 videos were found through the initial search. Starting with the application of inclusion and exclusion criteria, 42 videos were excluded because of being non-English with no subtitles, being duplicates, with a purely promotion focus, or being less than 60 seconds long. This resulted in 58 videos being selected to be included in the final examination **(Figure 1).**
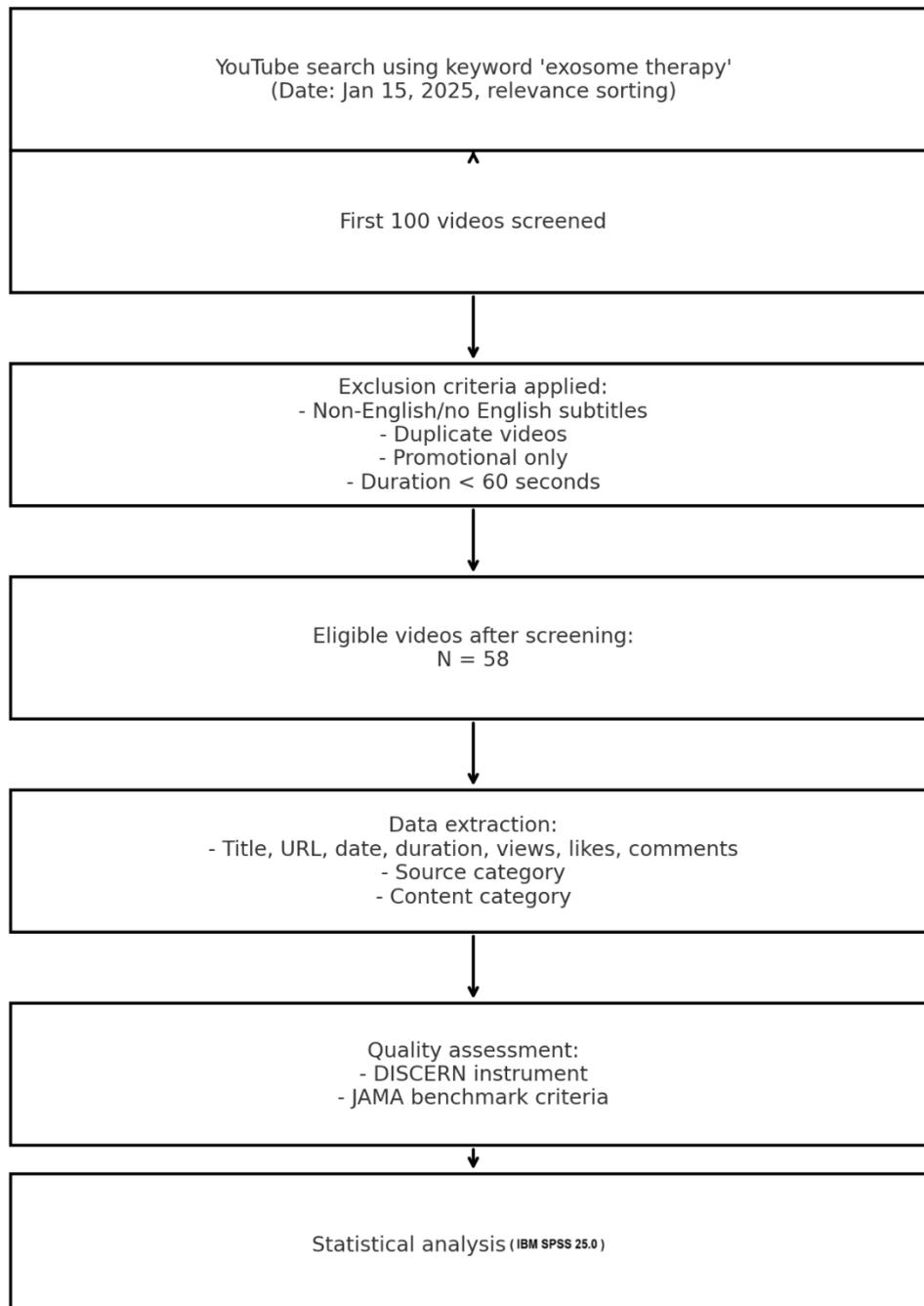
**Figure 1. Flow diagram illustrating the identification, screening, eligibility assessment, and final inclusion of YouTube videos related to exosome therapy according to predefined inclusion and exclusion criteria.**

Source and Content Characteristics

Of the analyzed videos, 53.4% (n = 31) were uploaded by physicians, 39.7% (n = 23) by health-related organizations, and 6.9% (n = 4) by patients or independent creators. In terms of content, the vast majority (87.9%, n = 51) provided general information on exosome therapy—covering definitions, indications, mechanisms, and potential benefits and risks. A smaller proportion featured patient experiences (6.9%, n = 4) or presented scientific/procedural demonstrations (5.2%, n = 3) **(Table 1) (Figure 2).**

Table 1. Source and content distribution of YouTube videos on exosome therapy (n = 58)

Variable	n	%
Source		
Physicians	31	53.4
Health-related orgs	23	39.7
Patients	4	6.9
Content type		
General information	51	87.9
Patient experiences	4	6.9
Procedural/scientific	3	5.2
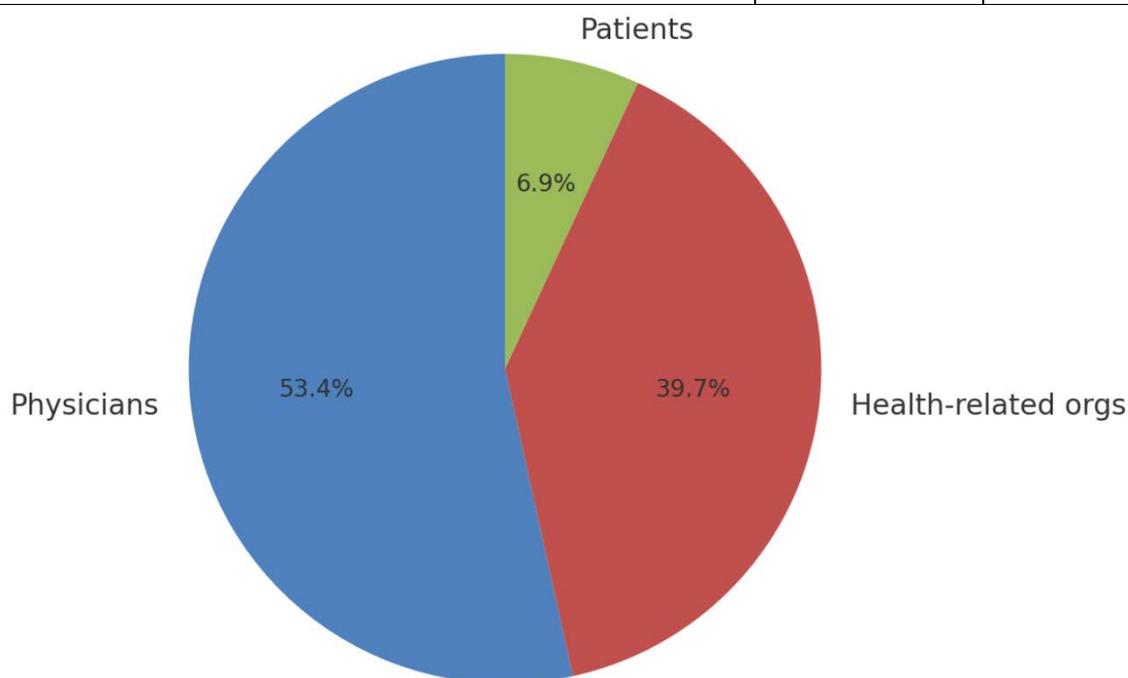
Figure 2. Distribution of YouTube videos on exosome therapy according to source category (physicians, health-related organizations, patients/independent creators), expressed as percentage of total included videos (n = 58).

Video Metrics

The average video length in seconds was 564 ± 744 seconds, with a range of 60 to 5,483 seconds. The average views were 34,215.8 ± 58,421.7, with a range of 120 to 251,043 views, whereas the median number of likes was 212, with an interquartile range of 46 to 689. The median number of comments posted per video was 18, with an interquartile range of 4 to 52. The video length and engagement values for videos from physicians were found to be higher compared to other sources but were not significant (p-value > 0.05).

Quality Assessment

On the other hand, based on the DISCERN classification, the results showed that 12.1% (n = 7) of the videos were described as poor, 44.8% (n = 26) were described as fair, 27.6% (n = 16) were described as good, and 15.5% (n = 9) were described as excellent. The total mean DISCERN score was 48.7 ± 10.9. Videos posted on the site by physicians were found to be associated with significantly higher DISCERN scores than the videos posted on the site by patients (p = 0.032) **(Table 2) (Figure 3).**

Table 2. Video characteristics and quality scores according to source category

Variable	Physicians (n=31)	Health-related orgs (n=23)	Patients (n=4)	p*
Duration (min)	11.3 ± 13.6	8.2 ± 9.4	4.9 ± 3.7	0.118
Views	41.027 ± 63,418	30.756 ± 51.992	9.123 ± 8,476	0.091
Likes	298 ± 611	184 ± 297	77 ± 52	0.127
Comments	21 ± 35	15 ± 26	8 ± 6	0.142
JAMA score	2.84 ± 0.66	2.57 ± 0.69	2.25 ± 0.50	0.054
DISCERN total	51.2 ± 9.7	46.3 ± 10.2	38.5 ± 8.3	0.032
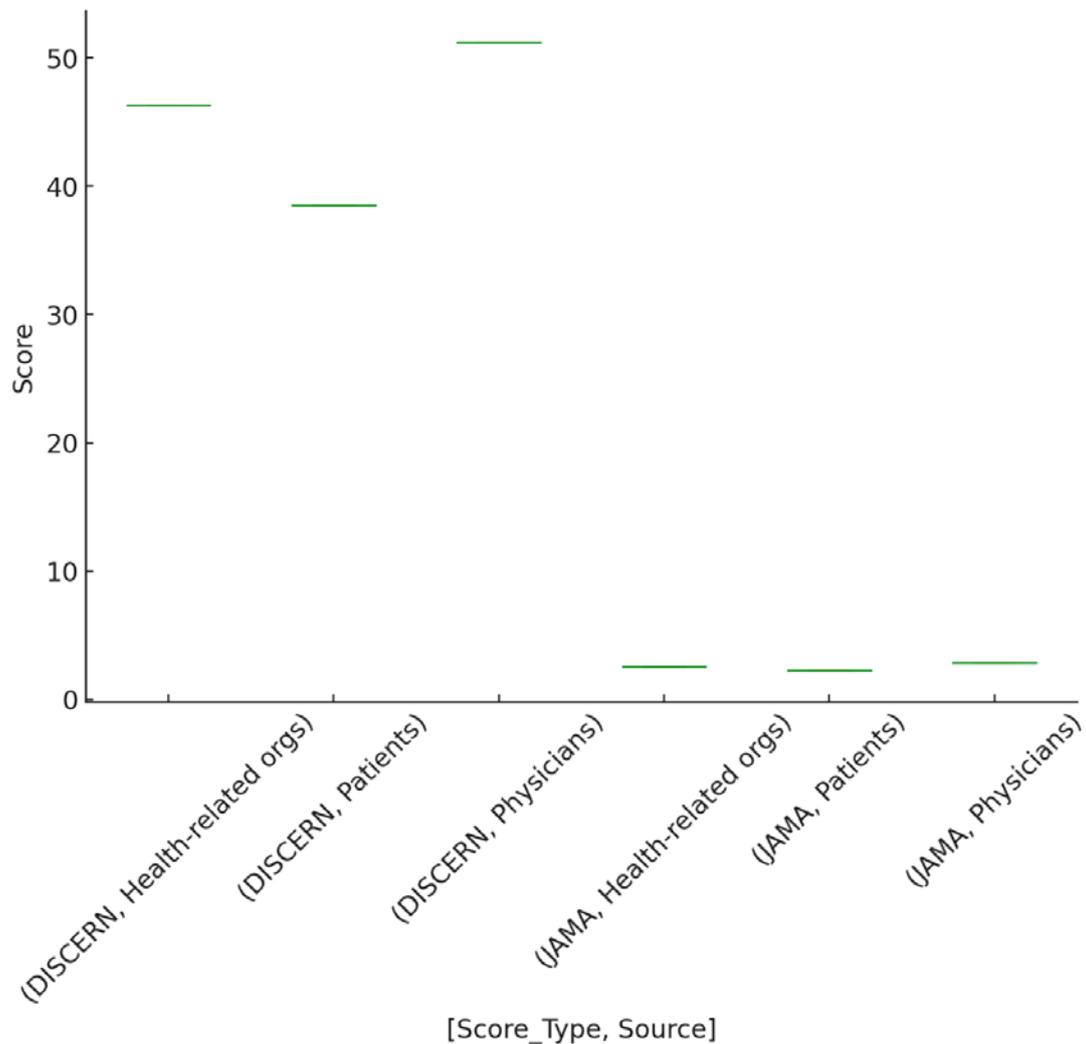
Figure 3. Comparison of DISCERN and JAMA quality scores across video source categories. Higher DISCERN scores indicate greater reliability and quality of treatment-related information, while JAMA scores reflect transparency criteria including authorship, attribution, disclosure, and currency.

Discussion

Beyond applying standardized evaluation tools, this study contributes methodologically by positioning exosome-related digital content within the broader context of regulatory uncertainty and translational research gaps. Evaluating online health information in such a rapidly evolving biomedical domain extends prior YouTube analyses that predominantly focus on well-established diseases with clearly defined clinical guidelines.

This systematic examination of the scientific accuracy, reliability, and quality of YouTube videos on exosome therapy

has shown a great variability according to the source and the nature of the video. Videos uploaded from the perspective of physicians have achieved a significantly higher level of DISCERN quality compared with those from the perspective of patients. This finding supports the notion that professional involvement in the communication of complex and evolving therapeutic fields is associated with higher informational quality, particularly in domains where standardized clinical pathways and regulatory oversight remain limited. (7,10).

Although most of the videos contained general information, a large number lacked important aspects of quality. The average JAMA quality score was 2.68, and the lowest-rated aspect of the videos was the "disclosure" component. This is not surprising, given the finding that online health-related videos tend to lack necessary disclosure statements regarding issues of interest and funding (8).). It should be noted that, given its newness and lack of structured protocols, this area of exosome therapy may lack sufficient disclosure on its videos to enable viewers to properly critique the videos and make determinations free of biases.

A positive correlation between video duration and score in the DISCERN scale has also been established, and this consistent with previous studies in various medical fields, which found that the more comprehensive videos were those related to benefits, risks, and uncertainties (7,8). Yet, quality cannot be absolutely guaranteed with lengthy videos, and some of which were in this study did not mention qualified references and knowledge gaps.

Notably, there were no statistically significant correlations between measures of popularity (views, likes, comments) and quality scores. This finding affirms earlier determinations that engagement metrics are inadequate predictors of scientific validity, since various studies have already found that content with greater views or likes tends to be non-compliant with medical guidelines and may provide inaccurate or incomplete medical data (8,10). Furthermore, this finding suggests that the recommendation mechanisms provided on the YouTube platform could be favoring content that rates more highly on entertainment value versus scientific integrity.

Given the cross-sectional and exploratory design of the study, the analytical approach was intentionally limited to non-parametric group comparisons and correlation analyses in order to avoid overfitting or causal inference beyond the scope of the available data. This methodological restraint strengthens the internal validity of the findings and ensures that interpretations remain aligned with the descriptive nature of digital content analysis.

While the finding regarding the superiority of videos produced by physicians in terms of quality score may not come as a shock, it is an important reinforcement of the value of professional production, particularly in new and evolving medical specialties, in which professional clinical advice and authority are currently absent. Of far greater import, however, is the lack of a positive and significant relationship between indicators and measures of popularity and quality scores, which speaks to the stark disconnect between the two. A reading of the data would suggest that the most used measures currently available, including view counts, likes, and comments, are not adequate indicators or measures of evidence-based information, and the proliferation of false information based upon visibility and not evidence is a serious issue.

Study limitations

The present study did not classify cosmetic applications of exosomes as a distinct content variable. Therefore, findings related to cosmetic or aesthetic use are limited to indirect observations and do not allow for detailed quantitative subgroup analysis. Future research should incorporate cosmetic and aesthetic categories as predefined coding variables to enable more comprehensive evaluation.

Another methodological limitation relates to the dynamic and continuously evolving nature of YouTube as a digital platform. Video availability, ranking algorithms, engagement metrics, and content characteristics may change over time due to user interaction patterns, algorithmic updates, or content removal. The present study was intentionally designed as a time-specific cross-sectional digital content analysis reflecting real-world user search behavior on January 15, 2025. Consequently, the findings should be interpreted as a structured snapshot of content available at that time rather than as a longitudinal representation of all exosome-related information on YouTube.

Although this design enhances ecological validity by replicating typical user exposure in relevance-based search mode, future studies employing longitudinal or repeated-sampling methodologies may provide deeper insight into temporal variability and evolving content quality trends.

Cosmetic and Aesthetic Dermatology Context: There exists considerable literature concerning the growing use of exosome-based products for skin rejuvenation, hair reconstruction, pigmentation, and wound healing in the cosmetic and aesthetic dermatology sectors (22). Nonetheless, the available, validating literature predominantly exhibits preclinical level, with a substantial scarcity of high-quality, large-scale clinical studies in this realm of research (23,24). Moreover, currently, there are no cosmetic exosome products considered accepted or approved by

the predominantly recognized global regulatory authorities, rendering the safety and efficacy of the products in question unverified (1,23,24).

With respect to the public health issue, the possible implication of the variations in the quality of information shown in the results of this study is related to the effect on patients seeking information on new treatments such as exosomes. These patients may be presented with information that sets up unrealistic expectations or treatment choices based on the information, which may be unreliable (16). Healthcare providers need to direct patients to credible sources or assist with the preparation of multimedia information.

In conclusion, the current research points to the existence of large disparities in the quality of exosome therapy YouTube resources. The aspect of a lack of transparency, the absence of regulatory control, and the possibility of misinformation concerning high-profile issues such as its cosmetic use makes it imperative to develop mechanisms for enhancing health information on the internet.

Conclusion

From our findings, the quality of information conveyed through YouTube videos on exosomes and their therapy appears to be very inconsistent. While videos produced by professionals, such as those produced by medical professionals and health bodies, were generally seen to have a better-quality score, issues of transparency remained. It was observed that declarations of conflict of interest and funding support were missing in most content forms.

Notably, there was no correlation found with popularity metrics and the quality of content, suggesting the effectiveness of engagement metrics like views, likes, and comments on a posting is not a good indicator of scientific validity. While longer postings were associated with more information, the posting itself was not a good indicator for the standard of evidence-based communication.

Noting that there has been a recent explosion in work related to exosomes, it has become even more important to enhance online health discourse in a positive way. Enhancing collaboration between healthcare professionals and online health community networks could be effective in managing miscommunication and improving informed decision-making among patients and healthcare professionals in relation to relatively new modalities like exosome therapy in healthcare practices.

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