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# Varicocele on YouTube: an evaluation of reliability, quality and actionability of the most-viewed videos

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## Abstract

**Background**: Varicocele is a common cause of male infertility, and many patients seek information about it online. YouTube has become a widely used platform for medical education, but concerns persist regarding the accuracy and quality of its content. **Methods**: This cross-sectional study evaluated the 50 most-viewed English-language YouTube videos related to varicocele. Videos were assessed using four validated tools: DISCERN, the Patient Education Materials Assessment Tool for Audiovisual Materials (PEMAT A/V), Global Quality Score (GQS), and the Journal of the American Medical Association (JAMA) benchmark criteria. Additionally, the accuracy of the medical content was rated using a 5-point Likert scale based on the European Association of Urology's patient guidelines. **Results**: The 50 videos accumulated 15,706,250 views, with the top 10 accounting for 73% of the total view count. The average information level was intermediate (Likert score: $2 \pm 1.19$). Surgical treatment was the most commonly presented option (76%), followed by traditional medicine (18%). Videos with higher information quality were significantly longer ($p = 0.049$) and had higher DISCERN, GQS, JAMA and PEMAT scores ($p < 0.05$). The strongest correlation was found between information quality and PEMAT-Understandability ($r^2 = 0.687$, $p < 0.001$). Although the top 10 videos had higher view counts, they did not differ significantly in quality, except for a higher PEMAT-Actionability score ($p = 0.024$). **Conclusions**: Most highly viewed YouTube videos on varicocele offer only moderate-quality information. Popularity does not equate to educational value. There is a need for healthcare professionals to produce and promote accurate, actionable and high-quality online educational materials for patients.

## Keywords

Varicocele; Patient education; Videos; Internet; Quality of health care


  

## Varicocele en YouTube: una evaluación de la fiabilidad, calidad y aplicabilidad de los vídeos más vistos


### Resumen

**Antecedentes**: El varicocele es una causa frecuente de infertilidad masculina, y muchos pacientes buscan información sobre esta afección en línea. YouTube se ha convertido en una plataforma ampliamente utilizada para la educación médica, pero persisten preocupaciones sobre la precisión y calidad de su contenido. **Métodos**: Este estudio transversal evaluó los 50 vídeos en inglés más vistos en YouTube relacionados con el varicocele. Los vídeos fueron analizados utilizando cuatro herramientas validadas: DISCERN, la Herramienta de Evaluación de Materiales Educativos para Pacientes en Formato Audiovisual (PEMAT A/V), la Puntuación Global de Calidad (GQS) y los criterios de referencia de Journal of the American Medical Association (JAMA). Además, se evaluó la exactitud del contenido médico mediante una escala Likert de 5 puntos, basada en las guías para pacientes de la Asociación Europea de Urología. **Resultados**: Los 50 vídeos acumularon un total de 15,706,250 visualizaciones, y los 10 más vistos representaron el 73% del total. El nivel promedio de información fue intermedio (puntuación Likert: $2 \pm 1.19$). El tratamiento quirúrgico fue la opción más comúnmente presentada (76%), seguido de la medicina tradicional (18%). Los vídeos con mayor calidad informativa fueron significativamente más largos ($p = 0.049$) y obtuvieron puntuaciones más altas en DISCERN, GQS, JAMA y PEMAT ($p < 0.05$). La correlación más fuerte se encontró entre la calidad de la información y la comprensibilidad del PEMAT ($r^2 = 0.687$, $p < 0.001$). Aunque los 10 vídeos más populares tuvieron un mayor número de visualizaciones, no presentaron una calidad significativamente superior, salvo por una puntuación más alta en la aplicabilidad según PEMAT ($p = 0.024$). **Conclusiones**: La mayoría de los vídeos más vistos en YouTube sobre varicocele ofrecen información de calidad moderada. La popularidad no garantiza valor educativo. Es necesario que los profesionales de la salud produzcan y promuevan materiales educativos en línea que sean precisos, aplicables y de alta calidad para los pacientes.



### Palabras Clave

Varicocele; Educación del paciente; Videos; Internet; Calidad de la atención en salud


## 1. Introduction

Varicocele is a prevalent urological condition characterized by the abnormal dilatation of the pampiniform venous plexus within the spermatic cord, and is recognized as a leading cause of male infertility. It affects approximately 15% of the general male population and up to 35% of men presenting with primary infertility [1, 2]. While varicocele can be asymptomatic, it may also result in scrotal pain, testicular atrophy and impaired spermatogenesis, thus making timely diagnosis and appropriate patient education essential to clinical care [3].

The internet has increasingly become a prominent source of medical information, with YouTube being one of the most widely accessed platforms for health-related content. Patients frequently watch YouTube videos to understand their diagnosis, treatment options and postoperative expectations [4]. However, the unregulated nature of video uploads poses serious concerns regarding the accuracy, comprehensiveness and quality of the disseminated information [5, 6]. This is particularly significant in conditions like varicocele, where misconceptions or misleading content can influence patient decisions and delay appropriate treatment and management.

Previous studies assessing the educational value of YouTube videos across various medical specialties have shown that many videos lack scientific rigor and fail to meet established health communication standards [7, 8]. Despite a growing body of literature evaluating YouTube content on topics such as nephrolithiasis, prostate cancer and urinary tract infections, limited research has been conducted focusing specifically on varicocele-related videos.

To bridge this gap, the current study aims to systematically evaluate the quality, reliability, and educational usefulness of the 50 most-viewed YouTube videos related to varicocele. To achieve this, four validated scoring tools were utilized: DISCERN, a standardized instrument for assessing the quality of consumer health information; Patient Education Materials Assessment Tool for Audiovisual Materials (PEMAT A/V), designed to measure understandability and actionability; Global Quality Score (GQS), a subjective rating tool for overall educational quality; and the Journal of the American Medical Association (JAMA) benchmark criteria, which assess authorship, attribution, currency and disclosure of online medical content [9–12].

This study aims to highlight potential shortcomings in available online resources and contribute to developing more accurate, accessible, and high-quality patient education materials in urology by providing a comprehensive evaluation of the current state of YouTube videos on varicocele.

## 2. Materials and methods

This cross-sectional observational study aimed to evaluate the reliability, quality and educational content of the most-viewed YouTube videos related to varicocele. A quantitative flowchart describing the video selection process has been added for transparency as Fig. 1. Additionally, a full list of the 50 analyzed video URLs is provided in the **Supplementary material** to enhance reproducibility. A search was conducted on the YouTube platform on February 2025, using the keyword "varicocele". To minimize search history bias, the search was performed in incognito mode and with cache cleared, using the platform's default "relevance" sorting algorithm. From the initial pool of results, the 50 most-viewed videos were selected

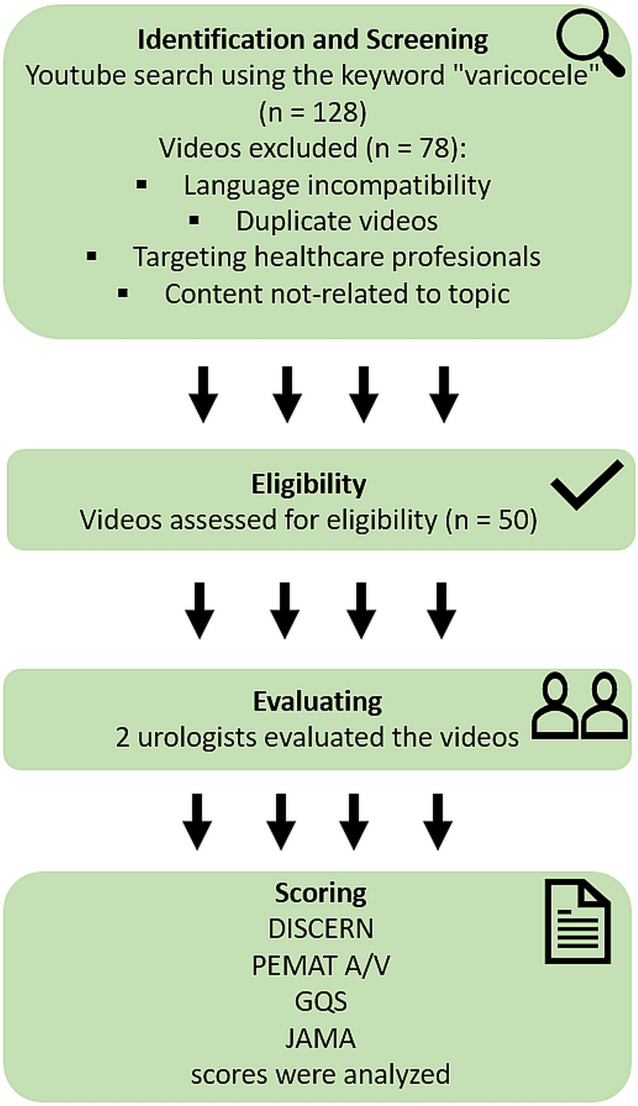


**FIGURE 1. Study design.** PEMAT A/V: Patient Education Materials Assessment Tool for Audiovisual Materials; GQS: Global Quality Score; JAMA: Journal of the American Medical Association.

for analysis. Videos were included if they were in English (*i.e.*, the primary audio language was English at first access), contained audiovisual content specifically about varicocele (definition, symptoms, diagnosis, treatment or patient experiences), did not rely on subtitles or dubbing in other languages for comprehension, and had no significant technical problems (*e.g.*, inaudible audio, corrupted video). Exclusion criteria were: duplicate videos, non-English language content, videos intended solely for medical professionals (*e.g.*, un-narrated surgical procedures), advertisements, and silent animations or slideshows without voiceover or explanatory subtitles.

The following parameters were recorded for each included video: title, URL, duration, upload date, number of views, likes, dislikes, comments and uploader type.

## 2.1 Evaluation tools

All videos were independently evaluated by two urologists experienced in digital health communication. Both of the reviewers have over 10 years of clinical experience in urology. Although English is not their first language, they have an advanced level of English proficiency with extensive experience of academic publication in international journals. Any discrepancies between the reviewers were resolved through consensus, and a third evaluator was consulted when necessary. The DISCERN tool is a validated 16-item questionnaire designed to assess the quality and reliability of health information, particularly treatment options [9]. Each item is rated on a scale from 1 (low) to 5 (high), with higher scores reflecting higher information quality. PEMAT A/V tool evaluates audiovisual health materials in terms of understandability (13 items) and actionability (4 items). Each item was rated dichotomously as “agree” (1) or “disagree” (0). The sum of points was then divided by the total possible score for each subdomain (understandability or actionability) and expressed as a percentage (%) [10]. GQS provides an overall assessment of video quality and educational value on a 5-point Likert scale, where a score of 1 represents poor quality and 5 indicates excellent content for patients [11]. The JAMA tool includes four criteria—authorship, attribution, disclosure, and currency—to assess the accountability and transparency of online health content.

Each criterion receives one point, with a total possible score of 4 [12]. In addition, to objectively evaluate the scientific content of the information contained in the videos, it was evaluated with a Likert scale of 1–5 concerning the European Association of Urology Patient Information Booklet (see at: https://patients.uroweb.org/condition/varicocele).

### 2.2 Statistical analysis

IBM SPSS Statistics version 25 (IBM Co., Armonk, NY, USA) was used to evaluate data. The Shapiro-Wilk test was conducted to evaluate the fitness of the numerical variables to a normal distribution, and then, the Mann-Whitney U test, Chi-squared test, and Kruskal-Wallis test were used for data comparison. Relationships between the variables that were normally distributed were analyzed using the Pearson correlation coefficient. Statistical significance was set at $p < 0.05$.

## 3. Results

Among the 50 most-viewed videos, the total number of views was 15,706,250, with the top 10 videos accounting for 11,468,750 views. These top 10 videos comprised approximately 73% of the total view count. The general characteristics of all included videos are summarized in Table 1. To address the potential influence of video age on view counts, we examined the upload dates of the included videos. The majority (68%) were uploaded between 2020 and 2024, with a notable concentration during 2021–2023. This suggests that most analyzed content was relatively recent, and that the dataset is not dominated by disproportionately old videos. Overall, the videos were found to provide an intermediate level of information (mean Likert score: $2 \pm 1.19$). The majority of the videos (76%) presented surgical treatment as the primary therapeutic option, while traditional medicine approaches were discussed in 18% of the content.

The categorization of the videos based on informational content, as well as the quality scores obtained from the top 10 and the remaining videos, are summarized in Table 2. When grouped according to the level of information provided, there was no statistically significant difference in median view counts among the groups ($p = 0.327$). However, videos that offered a higher level of information were significantly longer in duration, and this intergroup difference was statistically significant ($p = 0.049$).

Across all quality assessment tools, videos classified as having a higher information level achieved significantly higher scores, and intergroup comparisons confirmed these differences as statistically significant. Among the Likert-based content groups, the strongest correlation was observed with the PEMAT-Understandability score ($r^2 = 0.687$, $p < 0.001$), while the weakest, yet statistically significant, correlation was noted with the JAMA score ($r^2 = 0.419$, $p = 0.002$).

There was no statistically significant difference in information level between the top 10 most-viewed videos and the remaining 40 videos ($p = 0.154$). Among the quality metrics, only the PEMAT-Actionability score was significantly higher in the top 10 videos compared to the others ($p = 0.024$); no significant differences were observed for the remaining scoring systems ($p > 0.05$). PEMAT-Actionability scores are calculated and reported as percentages, the mean score was $66.67 \pm 30.62\%$ for the top 10 videos, significantly higher than the $47.34 \pm 20.52\%$ observed in the remaining videos ($p = 0.05$).

**TABLE 1. General characteristics of Top 50 videos on varicocele.**

| Characteristics | Result* |
|---|---|
| Video length | 271 (562) (8–1257) sec |
| Total views | 96,600 (297,825) (10,800–3,998,000) |
| Views per day | 102 (421) (9.2–3618) |
| Days on platform | 990 (765) (90–4440) d |
| Thumbs up | 706 (3632) (39–24,000) |
| Thumbs up per view (%) | 1.02 (1.37) (0.05–12.41) |
| Number of comments | 92 (355) (0–1922) |
| Likert scale, mean | $2 \pm 1.19$ |
| Format of the video | |
| • Doctor's speech | 18 (36%) |
| • Animation | 15 (30%) |
| • Surgery | 12 (24%) |
| • Other | 3 (6%) |
| • Patient experience | 2 (4%) |
| Treatment recommendation of the video | |
| • Surgical | 38 (76%) |
| • Traditional medicine | 9 (18%) |
| • No recommendation | 2 (4%) |
| • Medical | 1 (2%) |
| Who uploads the video | |
| • Doctor | 27 (54%) |
| • University/hospital/health institution | 15 (30%) |
| • Individual/health channel | 7 (14%) |
| • Non-physician healthcare professional | 1 (2%) |

**Numerical values are expressed as median (IQR) (min–max) and categorical variables are presented as n (%). sec: seconds.*

## 4. Discussion

This study provides a comprehensive assessment of the most-viewed YouTube videos on varicocele using four validated instruments: DISCERN, PEMAT A/V, GQS and JAMA criteria. Our findings reveal a considerable disparity between video popularity and educational quality, echoing the concerns raised in earlier research regarding the reliability of online health information.

One of the key findings was that although the top 10 videos accounted for nearly three-quarters of all views, they did not

**TABLE 2. Level of information and quality assessment of the top 10 and remaining videos.**

| | Level of Information | | | *p*-value | Top 10 Videos | Beyond Top 10 Videos | *p*-value |
|---|---|---|---|---|---|---|---|
| | Poor (Likert 1) n = 23 | Intermediate (Likert 2–3) n = 21 | Good (Likert 4–5) n = 6 | | | | |
| Total views, median (IQR) | 737,000 (213,100) | 957,000 (325,250) | 229,500 (1,311,475) | 0.327 | 751,850 (788,200) | 65,300 (141,150) | 0.016* |
| Video length (sec) | 100 (505) | 284 (501) | 455 (861) | 0.049* | 250 (623) | 300 (448) | 0.441 |
| Likert scale | - | - | - | - | 2 (1) | 3 (3) | 0.154 |
| Modified DISCERN score | 1 (2) | 3 (2) | 4.5 (1) | <0.001* | 2.56 ± 1.59 | 2.41 ± 1.36 | 0.786 |
| PEMAT-Understandability score (%) | 23 (23) | 46 (19) | 84.0 (14) | <0.001* | 51.67 ± 32.00 | 40.63 ± 22.34 | 0.349 |
| PEMAT-Actionability score (%) | 25 (25) | 50 (25) | 87.5 (31) | <0.001* | 66.67 ± 30.62 | 47.34 ± 20.52 | 0.024* |
| GQS | 2 (1) | 3 (2) | 4.5 (2) | 0.004* | 3.22 ± 0.97 | 3.27 ± 3.63 | 0.944 |
| JAMA score | 2 (2) | 3 (1) | 3.0 (1) | 0.013* | 2.22 ± 0.97 | 2.02 ± 1.12 | 0.601 |

*Continuous variables with a normal distribution are expressed as mean ± standard deviation, whereas variables without a normal distribution are presented as median (interquartile range). For PEMAT scores, values are expressed as percentages as percentages (0–100%), since each domain score is calculated as the proportion of items fulfilled out of the total possible score. Results are presented as mean ± SD for normally distributed data or median (IQR) for non-normally distributed data. IQR: interquartile range; PEMAT: Patient Education Materials Assessment Tool; GQS: Global Quality Score; JAMA: Journal of the American Medical Association; sec: second. *p < 0.05.*

significantly differ in terms of overall information quality compared to the remaining 40 videos. This mirrors prior studies that emphasize the disconnect between visibility and accuracy of medical content on social media platforms [4, 5]. For instance, Loeb *et al.* [5] reported that many highly viewed videos on prostate cancer contained biased or incomplete information, often promoting commercial interests or alternative therapies. Similarly, in the study by Hong *et al.* [13], the majority of varicocele-related videos on YouTube were found to be of low quality, with a mean DISCERN score of 31.34, and 86% of the content was categorized as either "poor" or "very poor". Moreover, the low levels of actionability observed indicate a significant deficiency in guiding viewers toward appropriate actions or decision-making [13].

Interestingly, in our analysis, the PEMAT-Actionability scores were significantly higher in the top 10 videos, suggesting that widely viewed videos may be more effective in delivering practical and implementable advice. This is aligned with previous findings in colorectal cancer and nephrolithiasis video studies, where actionability was positively associated with viewer engagement and satisfaction [14, 15]. However, this advantage did not extend to other metrics such as DISCERN or JAMA scores, indicating that actionable content does not always equate to evidence-based or transparent communication.

The mean DISCERN and JAMA scores in our study were modest, indicating limited reliability and source transparency in most videos. Similar concerns have been raised in other urology-related YouTube content. Tam *et al.* [8] systematically examined 50 YouTube and 50 TikTok videos on urinary tract infections and found that although YouTube videos had higher scientific and credibility scores than TikTok, both platforms featured videos with significant misinformation. Their study highlighted the inverse relationship between popularity metrics (views, likes, comments) and content quality. The observed strongest correlation between the Likert-based information level and PEMAT-Understandability ($r^2 = 0.687$, $p < 0.001$) reinforces the premise that videos perceived as high-quality are often easier to understand. This supports the core tenets of health literacy, which emphasize the importance of clear language, logical organization and concrete recommendations. On the other hand, the weaker correlation with JAMA scores ($r^2 = 0.419$) observed in our study may suggest that patients do not inherently value transparency indicators, such as disclosure or authorship, as much as they do clarity and simplicity, a finding echoed in patient behavior studies [6].

Although the country of origin was not explicitly documented for each video, a reanalysis of uploader types revealed meaningful trends. Among videos promoting traditional medicine (18% of the total sample), 64.3% were uploaded by individual or health-channel accounts, whereas only 33.3% came from institutional or physician-affiliated sources.

This distribution suggests that traditional medicine content is disproportionately represented by non-institutional actors, which may reflect higher engagement with complementary health practices in developing regions. These findings align with prior observations that less-regulated online environments are more likely to host such content, potentially influencing patient decision-making in the absence of standardized guidance.

While Szmuda *et al.* [16] reported "fair" quality for stroke-related YouTube videos (DISCERN score ~42), our finding of moderate quality for varicocele videos may reflect differences in content origin. Stroke is a critical condition often covered by institutional sources, whereas varicocele is a less urgent, underrepresented topic mostly addressed by non-institutional creators. These distinctions likely account for the discrepancy in video quality across conditions. Another possible explanation for the generally moderate quality of varicocele-related content may lie in the condition itself. Given that varicocele concerns male reproductive health and is often associated with fertility or "private parts", it can be subject to humor, stigma or even ridicule in online spaces. On YouTube, content creators frequently prioritize engagement and views over accuracy. We observed that some highly viewed videos diverted from an informative medical tone toward comedic or sensationalized presentations, sometimes at the expense of clarity or scientific integrity. This tendency may contribute to lower educational value and reduced viewer trust in such content.

A small number of videos (particularly those uploaded by non-professional sources) included statements that could be considered misleading or potentially harmful, for example, claims that varicocele resolves spontaneously without any intervention, or that surgical treatment inevitably leads to infertility. Such content may discourage viewers from seeking professional care. Additionally, several videos promoted non-surgical options such as herbal remedies, scrotal cooling or yoga-based practices. However, these were typically presented without supporting evidence or clinical context.

Despite its strengths, this study has limitations. The search results on YouTube are dynamic and influenced by the platform's algorithms, user behavior and geographic location. Although we used incognito mode to minimize personalization bias, results may vary over time. Additionally, only English-language videos were included, limiting the applicability of findings to non-English-speaking populations. Finally, although validated tools were used, subjectivity in rating scales such as GQS and DISCERN may introduce inter-observer variability, though we attempted to mitigate this through dual reviewer consensus.

## 5. Conclusions

Our findings highlight the urgent need for credible, high-quality and accessible video content in the field of andrology and reproductive urology. Healthcare professionals and institutions should be encouraged to actively contribute to digital health education, leveraging platforms like YouTube while adhering to established quality standards. Incorporating checklists such as DISCERN or PEMAT into video creation workflows could help improve content quality systematically.

Future studies should investigate interventions to improve digital health literacy and examine whether algorithmic prioritization (*e.g.*, via search engine optimization for quality videos) can enhance the visibility of evidence-based content. Furthermore, developing peer-reviewed YouTube channels or integrating video libraries into institutional websites may serve as trusted alternatives for patient education. Until verified, peer-reviewed and standardized content becomes widespread, healthcare professionals must proactively guide patients toward reliable resources.

### ABBREVIATIONS

PEMAT A/V, Patient Education Materials Assessment Tool for Audiovisual Materials; GQS, Global Quality Score; JAMA, Journal of the American Medical Association.

### AVAILABILITY OF DATA AND MATERIALS

The data presented in this study are available on reasonable request from the corresponding author.

### AUTHOR CONTRIBUTIONS

AS and AE—designed the research study. AS and OA—performed the research. MK—provided help and advice on methodology. AE—analyzed the data. AS, OA and AE—wrote the manuscript. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

### ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

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### CONFLICT OF INTEREST

The authors declare no conflict of interest.

### SUPPLEMENTARY MATERIAL

Supplementary material associated with this article can be found, in the online version, at https://files.intandro.com/files/article/1972830746673332224/attachment/Supplementary%20material.xlsx.

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