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Evaluation of the Quality, Reliability, and Popularity of YouTube Videos on Thoracic Outlet Syndrome: A Critical Analysis

Torasik Outlet Sendromu ile İlgili Youtube Videolarının Kalite, Güvenilirlik ve Popülerliğinin Değerlendirilmesi: Eleştirel Bir Analiz

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ABSTRACT Objective: This study aimed to evaluate the quality and reliability of YouTube videos related to thoracic outlet syndrome (TOS). **Material and Methods:** The most searched TOS-related keywords were identified via Google Trends, and a YouTube search was conducted using 5 selected keywords. A total of 150 videos were reviewed, ranked by views, and assessed based on type, duration, upload time, views, daily views, likes, daily likes, dislikes, and comments. Video popularity was measured using the Video Power Index (VPI), while quality and reliability were evaluated using the Journal of the American Medical Association (JAMA) criteria, the modified DISCERN (mDISCERN), the Global Quality Scale (GQS), and the Patient Education Materials Assessment Tool for Audiovisual Materials (PEMAT-A/V). Videos were categorized by source and GQS scores. **Results:** After applying the exclusion criteria, 42 videos were analyzed. Most were uploaded by physicians or healthcare personnel (n=37, 88%). Videos from these sources had significantly higher PEMAT-A/V A scores than those from websites (p=0.012, p=0.016), but no significant differences were found in other parameters. Based on GQS, 38.1% (n=16) of the videos were of low quality, 26.2% (n=11) were of moderate quality, and 35.7% (n=15) were of high quality. Video duration, views, daily views, dislikes, comments, daily likes, and VPI did not differ by quality. However, time since upload, likes, PEMAT-A/V A and U, JAMA, and mDISCERN scores showed significant differences (respectively, p=0.006, p=0.036, p=0.003, p=0.002, p=0.005, and p<0.01). **Conclusion:** Most YouTube videos on TOS are of low to moderate quality, which may mislead viewers seeking health information. Efforts should focus on improving the quality and reliability of online health content.

Keywords: Thoracic outlet syndrome; YouTube; video; quality assessment

ÖZET Amaç: Bu çalışma, torasik outlet sendromu (TOS) ile ilgili YouTube videolarının kalitesini ve güvenilirliğini değerlendirmeyi amaçladı. **Gereç ve Yöntemler:** Google Trends kullanılarak en çok aranan TOS ile ilgili anahtar kelimeler belirlendi ve seçilen 5 anahtar kelime ile YouTube araması yapıldı. Toplamda 150 video incelendi, izlenme sayısına göre sıralandı ve türü, süresi, yüklenme tarihi, izlenme sayısı, günlük izlenme sayısı, beğeni sayısı, günlük beğeni sayısı, beğenmeme sayısı ve yorum sayısına göre değerlendirildi. Video popülerliği Video Güç Endeksi [Video Power Index (VPI)] ile ölçülürken, kalite ve güvenilirlik "Journal of the American Medical Association (JAMA)" kriterleri, modifiye DISCERN (mDISCERN), Global Kalite Skalası [Global Quality Scale (GQS)] ve Görsel-İşitsel Hasta Eğitimi Materyalleri Değerlendirme Aracı [Patient Education Materials Assessment Tool for Audiovisual Materials (PEMAT-A/V)] kullanılarak değerlendirildi. Videolar, kaynaklarına ve GQS puanlarına göre kategorize edildi. **Bulgular:** Dışlama kriterleri uygulandıktan sonra 42 video analiz edildi. Çoğu video hekimler veya sağlık personeli tarafından yüklenmişti (n=37, %88). Bu kaynaklardan gelen videolar, web sitelerinden gelen videolara kıyasla anlamlı olarak daha yüksek PEMAT-A/V A puanlarına sahipti (p=0,012, p=0,016), ancak diğer parametrelerde anlamlı bir fark bulunmadı. GQS'ye göre videoların %38,1'i (n=16) düşük, %26,2'si (n=11) orta ve %35,7'si (n=15) yüksek kalitedeydi. Video süresi, izlenme sayısı, günlük izlenme sayısı, beğenmeme sayısı, yorum sayısı, günlük beğeni sayısı ve VPI kaliteye göre farklılık göstermedi. Ancak yüklenme süresi, beğeni sayısı, PEMAT-A/V A ve U, JAMA ve mDISCERN puanlarında anlamlı farklar gözlendi (sırasıyla p=0,006, p=0,036, p=0,003, p=0,002, p=0,005 ve p<0,01). **Sonuç:** TOS ile ilgili YouTube videolarının çoğu düşük ile orta kalitededir ve sağlık bilgisi arayan izleyicileri yanıltabilir. Çevrim içi sağlık içeriklerinin kalite ve güvenilirliğini artırmaya yönelik çabalar artırılmalıdır.

Anahtar Kelimeler: Torasik outlet sendromu; YouTube; video; kalite değerlendirmesi

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Thoracic outlet syndrome (TOS) is a clinical condition caused by compression of the neurovascular structures-typically the brachial plexus, subclavian artery, or vein-within the thoracic outlet. It is classified into neurogenic, venous, and arterial types, with neurogenic TOS being the most prevalent. Symptoms such as pain, paresthesia, weakness, and vascular changes in the upper extremities can significantly affect the quality of life. Due to its heterogeneous presentation and lack of standardized diagnostic criteria, TOS often remains underdiagnosed or misdiagnosed, making patient education and awareness especially important.[1-4]

With the increasing reliance on digital platforms, many individuals turn to online sources-particularly YouTube-for health-related information. As one of the most visited websites globally, YouTube hosts millions of health videos; however, the lack of peer review or quality control raises concerns about the reliability and accuracy of its content. Misleading or incomplete videos may negatively influence patient understanding and decision-making.[5,6]

To address these concerns, several standardized tools have been developed to assess the quality and reliability of online video content. The Journal of the American Medical Association (JAMA) benchmark criteria evaluate authorship, attribution, disclosure, and currency; the DISCERN instrument assesses the reliability and quality of treatment information; the Global Quality Score (GQS) provides a subjective rating of overall educational value; and the Video Power Index (VPI) reflects popularity based on user engagement metrics such as views and likes.[7,8]

Although the volume of health-related content on YouTube continues to expand, the evaluation of TOS-related videos remains limited. While a small number of previous studies have assessed the reliability and educational value of such content, comprehensive analyses that incorporate multiple validated tools and consider different dimensions of video quality are still scarce.[9,10] Our study addresses this gap by systematically evaluating YouTube videos related to TOS using the JAMA, DISCERN, GQS, VPI, and Patient Education Materials Assessment Tool for Audiovisual Materials (PEMAT-A/V) tools. By offering a more nuanced perspective on both the reliability and the understandability/actionability of the available content, we aim to underscore the need for high-quality digital health resources that support patient education and informed healthcare decisions.

MATERIAL AND METHODS

This cross-sectional study evaluated English YouTube (Google LLC, ABD) videos related to TOS and was conducted at our University's' Faculty of Medicine Hospital on April 22, 2024. Publicly available videos were assessed, and no human participants or animals were involved in this study. Therefore, no ethical approval was required, following the precedent set by similar studies in the literature.[6,11-13]

The most frequently searched keywords related to TOS were identified using Google Trends (Google LLC,ABD) (https://trends.google.com). Before starting the searches, all browser-related data were completely cleared to ensure no influence on the results. The search criteria included worldwide and YouTube search subheadings from 2008 to the present. Relevant queries were identified from the search results section, and the top 10 most commonly used queries in English terms were examined. After removing the repeated and irrelevant terms among the top 10 queries, the remaining 5 queries were recorded.

The recorded 5 queries were as follows: TOS surgery, test for thoracic outlet syndrome, TOS treatment, TOS stretches, TOS symptoms.

The emerged key terms were used to perform searches on YouTube. The searches were conducted using a web browser with cleared history and cookies. Searches were performed without logging into YouTube, opting for the "most viewed videos" option, and for each search term, the first 30 videos obtained were saved for further examination. A total of 150 videos were reviewed. Taking comparable research in the literature into consideration, the quantity of videos to be examined was decided.[6,11-13]

The inclusion criteria for videos in the study were as follows: being in the English language, uploaded before April 22, 2024, and containing content related to thoracic outlet syndrome. The exclusion

criteria were as follows: non-English videos, videos with silent or low-quality visuals, videos containing advertisements, videos not related to thoracic outlet syndrome, and videos with repetitive content.

VIDEO PARAMETERS

For each video, data were recorded regarding the type of video (live-action/animation), video length (seconds), time elapsed since upload (days), view count, daily view count (view count/time elapsed since upload), like count, daily like count (like count/time elapsed since upload), dislike count, and comment count.

In the literature, video sources have been categorized under different headings.[11,12] Videos were classified into 4 categories: physician, non-physician healthcare personnel, website, and TV program.

EVALUATION OF THE VIDEOS

For assessing the reliability and quality of the videos, the JAMA criteria, mDISCERN, and GQS were used. The popularity of the videos was measured using the VPI. Additionally, the PEMAT-A/V was used to evaluate the clarity and quality of the videos.

GQS evaluates the usefulness quality for patients based on the interpretation of videos and the flow of information presented. This measurement tool consists of 5 questions aimed at assessing the quality, flow, and user-friendliness of the examined videos. As seen in similar studies, GQS scores of 1-2 represent low quality (insufficient in terms of patient information, containing incomplete information), while 3 indicates medium quality (weak video flow, some information available but important topics not addressed). Scores of 4-5 are considered high quality (providing sufficient, useful, and helpful information for patients) (Table 1).[14]

The 5-item mDISCERN scale is a tool designed to assess the dependability of the videos. For each "yes" answer, 1 point is awarded, and for each "no" answer, 0 points are deducted. The sum of the scores on the 5 items yields a final score between 0-5, with higher values indicating greater reliability (Table 2).[15]

The JAMA criteria evaluate the source of the video based on authorship, references, copyright, and currency, with each criterion scored as "0" if not met and "1" if met. A score of 4 indicates the highest level of source reliability.[16]

The PEMAT-A/V was used to evaluate the clarity and quality of the patient education materials. Video and audio content was assessed to determine whether the information was communicated to patients in a clear, understandable, and actionable manner. The tool consists of 13 items in the understandability domain (PEMAT-A/V U) and 4 items in the actionability domain (PEMAT-A/V A). The percentage scores for each domain were calculated and reported using this validated instrument.[17]

The videos'' popularity was evaluated using the view rate and VPI. The ratio between the quantity of views and the time since upload is used to determine the view rate. The formula to determine the like ratio is (number of likes×100)/(number of likes+number of dislikes). The formula (such as ratio×view rate/100) is used to determine VPI.[18]

The evaluation of the videos was conducted by 2 physical medicine and rehabilitation specialists (İlhan Celil ÖZBEK, Ali AYDIN). In case of any discrepancies, the evaluation was reassessed, and a consensus was reached between the experts to find a solution. The Declaration of Helsinki's' guiding principles were followed in the conduct of this study.

TABLE 1: The global quality score

1	Poor quality; not useful for patient education
2	Poor quality; minimal relevant information. Limited utility to patients
3	Suboptimal quality; some useful information present, but missing key topics. Somewhat useful to patients
4	Good quality; most important topics discussed. Useful to patients
5	Excellent quality; all topics covered in a clear manner. Highly useful to patients

TABLE 2: DISCERN reliability tool	
1	Is the video clear, concise, and understandable?
2	Are valid sources cited? (from valid studies, physiatrists)
3	Is the information provided balanced and unbiased?
4	Are additional sources of information listed for patient reference?
5	Does the video address areas of controversy/uncertainty?

STATISTICAL ANALYSIS

The SPSS version 27.0 (IBM Corp., Armonk, NY) was used to analyze the study data. For variables with a normal distribution, descriptive statistics were shown as mean±standard deviation; for variables with a non-normal distribution, they were presented as median (minimum-maximum). Histograms and probability plots were used to visually assess the normality of the variables, and the Kolmogorov-Smirnov test was used to analyze the data analytically.

When comparing variables between more than 2 groups that did not follow a normal distribution, the Kruskal-Wallis test was employed. The Mann-Whitney U test was used for pairwise comparisons, and the Bonferroni correction was used. The Spearman correlation test was used for the correlation analysis of the numerical data. When $p<0.05$, the results were deemed statistically significant.

RESULTS

Based on the evaluation conducted according to the exclusion criteria, 42 videos were analyzed, as shown in Figure 1.

Analyses including the general characteristics and reliability-quality scores of the videos related to TOS are presented in Table 3.

The majority of the video sources were provided by physicians and non-physician healthcare personnel (n=37, 88%), and most of the videos consisted of real-life footage (n=36, 85.7%). According to the GQS classification, it was determined that 38.1% of the videos (n=16) were of low quality, 26.2% (n=11) were of medium quality, and 35.7% (n=15) were of high quality. None of the videos shared by the physicians were of low quality, and 75% (n=6) of the videos uploaded by the physicians were of high quality (Table 4).

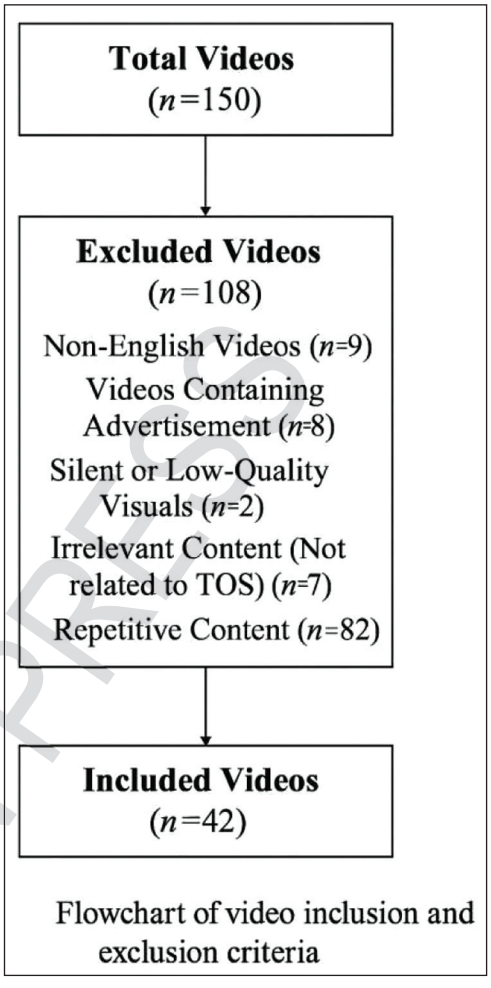

FIGURE 1: Analysis scheme of YouTube videos

TABLE 3: Video general characteristics and reliability-quality scores

	X̄±SD	Median	Minimum-maximum
Duration (seconds)	4421.47±344.41	341	30-1738
Elapsed time since upload (days)	2846.14±1415.31	3019	60-6225
Daily view count	305.98±1263.17	75.66	15.35-8263.73
Number of likes	3347.9±4214.06	2100	148-23000
Daily like count	3.41±10.26	0.87	0.04-65
Number of dislikes	87.28±126.03	50	7-582
Number of comments	185.66±234.26	109	0-1051
VPI	296.4±1222.17	72.02	15.13-7995.18
mDISCERN	2.64±1.0	2	1-5
JAMA	2.95±1.18	2	1-5
GQS	2.14±0.97	3	1-4
PEMAT-A/V U	69.20±16.34	72	20-100
PEMAT-A/V A	56.87±31.29	75	0-100

SD: Standard deviation; VPI: Video Power Index; mDISCERN: Modified quality criteria for consumer health information; JAMA: Journal of the American Medical Association Criteria; GQS: Global Quality Scale; PEMAT-A/V U: Patient education materials assessment tool for audiovisual materials-understandability domain; PEMAT-A/V A: Patient education materials assessment tool for audiovisual material-actionability domain

TABLE 4: Classification of video sources and types

		Low quality n (%) n=16	Medium quality n (%) n=11	High quality n (%) n=15	Total n=42)
Source	Physician	0 (0)	2 (25)	6 (75)	8
	Non-physician healthcare personnel	14 (48)	8 (28)	7 (24)	29
	Website	1 (25)	1 (25)	2 (50)	4
	TV program	1 (100)	0 (0)	0 (0)	1
Type	Real	16 (44)	10 (27)	10 (28)	36
	Animation	0 (0)	1 (16)	5 (84)	6

The basic characteristics and reliability-quality scores of the videos according to their sources are presented in Table 5. Regarding the PEMAT-A/V A, a statistically significant difference was discovered between the video sources (p=0.028). In pairwise group comparisons, after Bonferroni correction, the actionability scores of videos uploaded by physicians and non-physician healthcare personnel were found to be statistically significantly higher than those uploaded by websites (p=0.012, p=0.016, respectively). No significant difference was found in the other evaluated parameters (Figure 2).

When videometric, reliability, and quality features were compared according to the quality of the videos, no significant differences were found in terms of duration, view count, daily view count, dislike count, comment count, daily like count, and VPI. However, statistically significant differences were observed in terms of the time elapsed since upload (days), such as count, PEMAT-A/V A, PEMAT-A/V U, JAMA, and mDISCERN scores (respectively, p=0.006, p=0.036, p=0.006, p=0,003, p=0.002, p=0.005, and p<0.01) (Table 6, Figure 3).

In pairwise group comparisons, after Bonferroni correction, it was found that the time elapsed since upload was statistically significantly higher for low-quality videos compared to high-quality videos (p=0.008). In comparisons of mDISCERN scores, it was determined that high-quality videos were statistically significantly higher than both low-quality and medium-quality videos (p=0.001, p=0.003).

TABLE 5: Comparison of video characteristics by sources

	Physician (n=8)	Non-physician healthcare personnel (n=29)	Website (n=4)	TV program (n=1)	p value
Median (Minimum-maximum)					
Duration (seconds)	400 (288-592)	307 (30-1738)	173 (128-307)	379	0,228
Elapsed time since upload (days)	2448 (1561-4221)	3255 (60-6225)	2362 (1281-3225)	1964	0,626
Daily view count	87,58 (27,16-597,31)	76,25 (15,35-8263,73)		181,93	0,649
Number of likes	2400 (518-23000)	2100 (148-14000)	891 (325-2600)	2500	0,651
Daily like count	0,79 (0,16-13,89)	0,91 (0,04-65)		1,27	0,831
Number of dislikes	80 (13-548)	46 (8-582)	26 (7-61)	116	0,378
Number of comments	95 (1-864)	99 (0-1051)	110 (43-178)	716	0,476
VPI	84,70 (26,49-583,41)	74,59 (15,13-7995,18)	63,59 (17,87-144,55)	173,87	0,659
$\bar{X}$±SD median (Minimum-maximum)					
mDISCERN	3,25±0,31 3 (2-5)	2,48±0,19 2 (1-5)	3±0,17 3 (2-4)	1	0,84
JAMA	2,34±0,18 2 (2-3)	2,65±0,18 2 (1-4)	3,5±0,85 2 (1-3)	1	0,390
GQS	4,12±0,29 4 (3-5)	2,10±0,20 3 (1-4)	0,25±0,47 3 (1-5)	1	0,07
PEMAT-A/V U	78,50±16,15 76 (63-100)	69,99±11,54 73 (50-100)	56,69±24,71 63 (20-75)	22	0,310
PEMAT-A/V A	71,87±31,16 75 (25-100)[a]	58,80±28,87 50 (0-100)[a]	27,10±20,83 33 (0-50)[b]	0	**0,028**

[a,b]Indicate the difference between groups. There is no difference between groups with the same letter. VPI: Video Power Index; SD: Standard deviation; mDISCERN: Modified quality criteria for consumer health information; JAMA: Journal of the American Medical Association criteria; GQS: Global Quality Scale; PEMAT-A/V U: Patient education materials assessment tool for audiovisual materials-understandability domain; PEMAT-A/V A: Patient education materials assessment tool for audiovisual materials-actionability domain

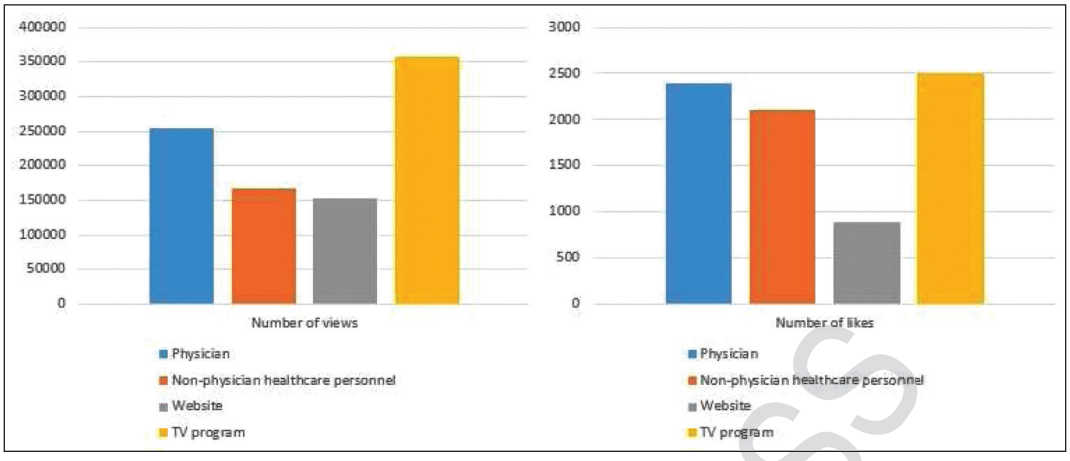

FIGURE 2: Comparison of views and likes by source

TABLO 6: Comparison of video characteristics according to GQS classification

	Low quality	Medium quality	High quality	p value
Median (Minimum-maximum)				
Duration (seconds)	276 (30-1738)	351 (123-1098)	407 (128-823)	0.679
Elapsed time since upload (days)	3692 (60-6225)[a]	2697 (463-4389)[a,b]	1656 (895-3505)[b]	0.006
Daily view count	46.77 (15.35-8263.73)	99.04 (36.21-350.38)	99.69 (27.16-597.31)	0.211
Number of likes	1083 (148-4700)[a]	3700 (1000-7800)[b]	2600 (518-23000)[a,b]	0.036
Daily like count	0.26 (0.04-65)	0.99 (0.27-5.18)	1.38 (0.16-15.64)	0.19
Number of dislikes	42 (7-131)	54 (11-202)	61 (13-582)	0.558
Number of comments	71 (0-716)	178 (79-566)	109 (1-1051)	0.052
VPI	43.21 (15.13-7995.18)	96.5 (35.83-348.06)	97.8 (26.46-583.41)	0.184
$\overline{X}$±SD median (Minimum-maximum)				
mDISCERN	2.06±0.26 2 (1-4)[a]	2.36±0.20 2 (2-4)[a]	3.46±0.21 3 (2-5)[b]	<0.001
JAMA	1.75±0.29 1 (1-4)[a]	2±0.23 2 (1-4)[a,b]	2.66±0.15 3 (2-4)[b]	0.005
PEMAT-A/V U	59.70±18.60 66 (20-75)[a]	70.86±11.22 75 (55-90)[a]	78.12±11.45 80 (63-100)[b]	0.003
PEMAT-A/V A	30.75±24.59 33 (0-75)[a]	64.89±24.97 75 (25-100)[b]	79.21±20.35 75 (25-100)[b]	0.002

[a,b]Indicate the difference between groups. There is no difference between groups with the same letter. VPI: Video Power Index; SD: Standard deviation; mDISCERN: Modified quality criteria for consumer health information; JAMA: Journal of the American Medical Association criteria; GQS: Global Quality Scale; PEMAT-A/V U: Patient education materials assessment tool for audiovisual materials-understandability domain; PEMAT-A/V A: Patient education materials assessment tool for audiovisual materials-actionability domain

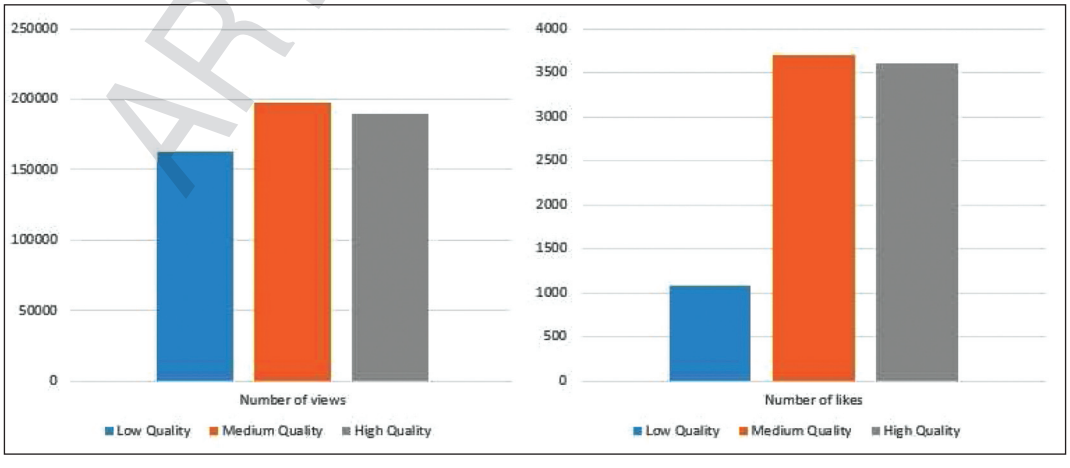

FIGURE 3: Comparison of views and likes by quality characteristics

Similar to the mDISCERN scores, the PEMAT-A/V U scores of high-quality videos were significantly higher than those of both low-quality and medium-quality videos ($p<0.001$ and $p=0.006$, respectively). Additionally, in the PEMAT-A/V A, the scores of high-quality and medium-quality videos were significantly higher than those of low-quality videos ($p<0.001$ and $p=0.014$, respectively). Additionally, it was found that the JAMA score of high-quality videos was significantly higher than that of low-quality videos ($p=0.016$).

According to the correlation analysis results, a negative, moderately statistically significant relationship was found between the video duration and mDISCERN ($r=-0.414$, $p=0.006$). A negative, moderately statistically significant relationship was found between the time elapsed since the upload date and GQS ($r=-0.494$, $p=0.001$). In addition, a negative, moderately statistically significant relationship was observed between the time elapsed since the upload date and PEMAT-A/V A ($r=-0.425$, $p=0.005$). A positive, moderately statistically significant relationship was found between the number of likes and PEMAT-A/V A ($r=0.334$, $p=0.030$) (Table 7).

DISCUSSION

Our study revealed that most videos related to TOS on YouTube are of low or moderate quality. While there are a limited number of studies evaluating TOS-related content on YouTube, our work stands out by providing a more comprehensive assessment through the combined use of content analysis, established reliability tools (JAMA and mDISCERN), and for the 1st time in this context, the PEMAT-A/V tool. By incorporating understandability and actionability into the evaluation, our study offers a broader perspective on the overall quality of online patient education materials concerning TOS.

Nowadays, patients frequently turn to the Internet to explore their medical conditions, treatment options, and preventive measures. This shift is also emphasized in the literature; for example, Erdmann highlighted that social media platforms and online support groups have become essential sources of information and peer support for patients, particularly in conditions such as thoracic outlet syndrome.[19] As the most widely used video-sharing platform and the 2nd most-visited website globally after Google (USA), YouTube holds significant potential as a resource for health-related information. However, the platform lacks effective mechanisms to filter or prevent the dissemination of inaccurate or misleading content.[20] For instance, a study on YouTube videos related to psoriasis revealed that 2-3rd of the videos contained misleading or even harmful information. Additionally, low-quality videos often receive more positive ratings from viewers than high-quality ones, highlighting a discrepancy in the user perception of content reliability.[21] Similar to our findings, these observations underscore the urgent need for quality control mechanisms in health-related video content. The absence of such oversight poses a risk of misinformation, which could adversely affect patients and their families.

TABLE 7: Correlation coefficients between content quality scores and video analytics

	mDISCERN		JAMA		GQS		PEMAT A/V-U		PEMAT A/V-A	
	r value	p value	r value	p value	r value	p value	r value	p value	r value	p value
Duration (seconds)	-0,414	0,006	-0,257	0,100	-0,21	0,894	0,54	0,734	0,254	0,104
Elapsed time since upload (days)	-0,93	0,557	-0,231	0,141	-0,494	0,001	-0,147	0,354	-0,425	0,005
Number of views	0,139	0,381	0,268	0,86	-0,008	0,957	-0,057	0,719	0,57	0,718
Number of likes	0,127	0,422	0,181	0,252	0,301	0,53	0,202	0,200	0,334	**0,030**
Number of dislikes	0,86	0,588	0,89	0,576	0,242	0,123	0,114	0,473	0,206	0,191
Number of comments	-0,81	0,611	-0,108	0,498	0,97	0,540	-0,069	0,663	0,169	0,284
VPI	-0,228	0,147	-0,003	0,983	-0,103	0,516	-0,025	0,874	-0,010	0,951

mDISCERN: Modified quality criteria for consumer health information; JAMA: Journal of the American Medical Association criteria; GQS: Global Quality Scale; PEMAT-A/V U: Patient education materials assessment tool for audiovisual materials-understandability domain; PEMAT-A/V A: Patient education materials assessment tool for audiovisual materials-actionability domain; VPI: Video Power Index

In this study, based on the GQS classification, 38.1% (n=16) of the analyzed videos were categorized as low quality, 26.2% (n=11) as moderate quality, and 35.7% (n=15) as high quality. Studies in the literature examining the quality of YouTube videos present varied findings. While some report that most videos are of high quality, others highlight that most are of low quality. Looking at other studies in the literature, Kocyigit et al. showed that YouTube videos about coronavirus disease-2019 (COVID-19) and rheumatic diseases contained a mixture of low, medium and high quality content.[22] Uz et al. evaluated most of the videos (58.8%) about spasticity as high quality.[23] However, Bağcıer et al. found only 46.2% of the videos to be of high quality, while 78.6% of the videos were classified as low quality in Kılınç Kamacı et al. study. Similarly, 75.7% of the videos were found to be of low quality in Bayram and Pınar study.[9,10,24] Additionally, several studies focusing specifically on peripheral nerve disorders also reported predominantly low-quality content. Tarihci Cakmak and Celik found that most YouTube videos related to meralgia paresthetica were of low quality. Engin et al. similarly reported that videos about facial paralysis exercises were mostly of low to moderate quality. Mert and Bozgeyik identified poor overall quality in videos concerning carpal tunnel syndrome, and Lama et al. reported comparable findings for cubital tunnel syndrome videos.[25-28] This inconsistency in video quality could stem from multiple factors, including the diversity of diseases or conditions being assessed, differences in video sources, the number of videos analyzed, and variations in the evaluation criteria used. Our findings indicate that YouTube offers a heterogeneous mix of low-, moderate-, and high-quality content, underscoring the need for standardized measures to ensure consistent quality in health-related videos.

The reliability of the videos was assessed using the JAMA criteria and the mDISCERN scale. High-quality videos scored significantly higher on both tools compared with moderate- and low-quality videos, reinforcing their superior reliability. These findings are consistent with those of Yurttutmuş Tatlı and Ferahman, who also reported that high-quality TOS-related videos achieved the highest reliability scores on both mDISCERN and JAMA, highlighting a consistent association between video quality and trustworthiness.[29] In addition to these traditional reliability measures, our study uniquely incorporated the PEMAT-A/V tool to evaluate understandability and actionability. The results showed that high-quality videos also outperformed others in terms of the PEMAT-A/V U scores, and both high- and moderate-quality videos had significantly higher PEMAT-A/V A scores than low-quality ones. Since PEMAT-A/V was not employed in previous studies, its inclusion in our analysis introduces a different dimension to the evaluation of TOS-related patient education content and allows for a more comprehensive assessment of health information quality.

In our study, no significant differences were observed among the quality groups concerning the basic characteristics of the videos, except for the time elapsed since the upload date and the number of likes. Moderate-quality videos received the highest number of likes, while low-quality videos had the longest elapsed times. This finding suggests that there may not be a direct correlation between video quality, reliability, and interaction parameters, as viewer criteria for watching, liking, or disliking videos on YouTube lack clear standards. However, contrary to our findings, several studies in the literature have reported a positive correlation between video duration and content quality. For instance, Ozsoy Unubol et al. found that longer YouTube videos on fibromyalgia had higher quality scores.[30] Similarly, studies on shoulder instability, lateral epicondylitis, complex regional pain syndrome, and cardiac rehabilitation also emphasized a positive association between video duration and quality.[31-34] This discrepancy highlights the variability in video characteristics across different medical topics and suggests that content engagement and quality assessment may be influenced by condition-specific factors.

Additionally, the correlation analyses in our study revealed that more recently uploaded videos had higher overall quality scores and PEMAT-A/V A scores. Furthermore, videos with higher PEMAT-A/V A scores tended to receive more likes, suggesting that newer videos may provide more reliable and engaging content, which, in turn, leads to greater

viewer interaction. This finding aligns with the notion that newer content may be more structured, up-to-date, and better tailored to audience needs, making it more appealing and persuasive.

Consistent with these observations, previous studies have also indicated that patients and their families often struggle to distinguish between high- and low-quality videos, frequently gravitating toward popular but lower-quality content. In the study by Örücü Atar and Özcan on De Quervain's tenosynovitis, no significant differences were found among the quality groups in terms of views, daily views, likes, or comments.[12] Similar findings were reported by Özcan and Örücü Atar for plantar fasciitis videos and by Kocyigit et al. for videos on COVID-19 vaccines in rheumatic diseases.[13,35] These results suggest that while quality indicators are crucial, viewer engagement is shaped by a complex interplay of factors, including video presentation style, accessibility, and relevance to the audience.

In this study, the videos were analyzed based on both their sources and quality levels. It was observed that videos uploaded by physician and non-physician healthcare personnel had significantly higher PEMAT-A/V A scores compared with those uploaded by websites. These findings agree with the existing literature, which also highlights the superior actionability of videos created by healthcare professionals, underscoring their potential as more reliable and practical sources of health information.[36,37]

The World Health Organization (WHO) recommends leveraging YouTube as a strategic tool for health communication.[38] Additionally, studies reveal that most health information seekers rely heavily on the top results from search engines.[22] However, our study highlights the quality concerns in YouTube content related to TOS. To address these issues, standardized quality control for medical videos is essential. Verified content from professional healthcare providers should be prioritized in search results through effective content validation mechanisms. Simultaneously, it is critical to identify and remove misleading or inaccurate health-related videos, as these can jeopardize patient safety, hinder treatment processes, and complicate access to reliable information.

Enhancing quality control and monitoring efforts will improve access to dependable health information and contribute to better public health outcomes. Collaborations among healthcare organizations, professional associations, social media platforms, and search engine providers can further facilitate this process.[21] For example, during the severe acute respiratory syndrome-coronavirus-2 outbreak in 2003, Google prioritized the websites of the WHO and the Centers for Disease Control and Prevention, ensuring that accurate information was prominently displayed. This demonstrates the potential of strategic partnerships in mitigating misinformation.[39]

Implementing these recommendations on platforms such as YouTube will support increased health literacy and ensure patient safety. By fostering better awareness of diseases, treatment adherence, and self-management, these measures can empower patients and enhance their engagement in healthcare processes.

Although the number of videos analyzed in our study aligns with similar investigations in the existing literature, the relatively limited sample size may restrict the generalizability of the findings. To avoid subjective bias in keyword selection, we used Google Trends to identify the most frequently searched terms related to thoracic outlet syndrome. This strategy was adopted to ensure that the video sample accurately reflected the public interest and real-world search behavior. As a result, certain potentially informative but less frequently searched phrases-such as "TOSexercises"-were not included in the final keyword set because they did not meet the predefined search volume thresholds. While this approach enhances the ecological validity of our methodology, it may have unintentionally narrowed the scope of the video content included in the analysis.

Additionally, most videos lacked sufficient detail to classify them into TOS subtypes (neurogenic, venous, or arterial), preventing subgroup analysis. Only English-language videos were included, and the study was limited to a specific time frame. Given the dynamic nature of YouTube, future content and search results may differ.

CONCLUSION

This study reveals that most YouTube videos related to TOS are of low or medium quality, posing a risk of misinformation for individuals seeking health-related information. Our findings highlight need to improve the quality and reliability of health-related videos on such platforms.

To address this issue, standardized quality control mechanisms and regulations for medical content on YouTube should be introduced. Internet users must be informed that relying solely on video metrics such as comments, views, or likes is insufficient when assessing the reliability of health-related content. Instead, preference should be given to videos shared by healthcare professionals with proven expertise, both theoretical and practical, in the relevant field.

Collaboration among healthcare organizations, professional associations, and social media or search engine providers is essential to increase the visibility of trustworthy resources and encourage the production of high-quality medical content. Healthcare professionals should also be motivated to create and share accurate, evidence-based videos to guide patients effectively.

These efforts would mark a significant step toward enhancing health literacy, safeguarding patient safety, and fostering more informed health decisions among the public.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

This study is entirely author's own work and no other author contribution

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