VIA MEDICA

ORIGINAL ARTICLE

Disaster and Emergency Medicine Journal
2025, Vol. 10, No. 1, 18–26
DOI: 10.5603/demj.104580

ISSN 2451–4691, e-ISSN 2543–5957

EVALUATING THE QUALITY OF MEDICAL CONTENT ON YOUTUBE: AN ANALYSIS OF CHEST TUBE PROCEDURES

Ömer Faruk Turan

Ankara Etlik City Hospital, Clinic of Emergency Medicine, Ankara, Türkiye

ABSTRACT

INTRODUCTION: Chest tube insertion is a vital procedure for managing pneumothorax, haemothorax, and pleural effusion, requiring precise training for effective outcomes. Platforms like YouTube provide accessible educational content, but their unregulated nature raises concerns about accuracy. Evaluating the quality and relevance of these videos is essential to determine their value as training tools. This study assesses YouTube's potential as an educational resource for chest tube insertion, a critical interventional procedure.

MATERIAL AND METHODS: A cross-sectional analytical study was conducted, analysing 136 English-language videos on chest tube insertion published between 2016 and 2024. Videos were selected using predefined inclusion and exclusion criteria, categorized based on their source, and evaluated for procedural accuracy and visual representation using a structured 10-point scoring system.

RESULTS: The findings revealed that healthcare professionals and official institutions were the primary producers of the videos. However, video quality did not significantly differ based on the source. Longer videos provided more comprehensive procedural information and visual detail. Metrics such as views, likes, and comments varied widely but showed no correlation with video quality scores.

CONCLUSIONS: This study demonstrates that while YouTube provides an accessible platform for medical education, its unregulated nature presents challenges in ensuring content quality and reliability. Collaborative efforts between healthcare organizations and content creators are crucial for developing standardized guidelines to improve the educational value of online resources. Additionally, integrating media literacy training into medical education programs is essential to equip healthcare professionals with the skills needed to critically evaluate and effectively utilize online content.

KEYWORDS: chest tube; pulmonary surgical procedures; medical education; health literacy; YouTube

Disaster Emerg Med J 2025; 10(1): 18–26

INTRODUCTION

In the contemporary era, medical professionals have access to an extensive range of educational tools. The increasing accessibility of the Internet has transformed medical education, making digital platforms an essential component of learning. The recent global shift toward distance and hybrid learning models has further accelerated the adoption of online resources for professional training [1, 2]. Digital technologies continue to revolutionize multiple sectors, including healthcare education, by providing innovative ways to acquire and reinforce essential clinical skills [3, 4]. Among these innovations, video-based learning has become particularly significant, offering medical professionals an opportunity to observe and review interventional procedures in real-time [5–7].

CORRESPONDING AUTHOR:
Ömer Faruk Turan, Ankara Etlik City Hospital, Clinic of Emergency Medicine, Ankara, Türkiye
e-mail: ffarukturan@gmail.com
Received: 20.01.2025 Accepted: 26.02.2025 Early publication date: 13.03.2025

With the growing reliance on digital education, platforms like YouTube have gained prominence as widely accessible resources for healthcare training [6, 8]. A vast number of procedural videos are now available online, covering essential emergency interventions. One such critical procedure is chest tube insertion, which is routinely performed in life-threatening conditions such as pneumothorax, haemothorax, and massive pleural effusion [9–11]. Given the high-stakes nature of these scenarios, where immediate and precise action is required, clinicians must develop strong procedural competencies. While traditional medical education emphasizes hands-on training, video-based learning can serve as a valuable supplementary tool, particularly for reinforcing step-by-step procedural techniques [5].

Despite the widespread use of YouTube as an educational platform, concerns have been raised regarding the quality and accuracy of its medical content. Unlike peer-reviewed academic sources, YouTube videos are uploaded without formal validation, leading to significant variations in content reliability [12, 13]. The absence of quality control mechanisms allows for the dissemination of outdated, incomplete, or even misleading information, posing a potential risk to medical education and clinical practice [14, 15]. As procedural training requires adherence to established clinical guidelines, an objective evaluation of available educational videos is necessary to determine their educational value.

This study aims to systematically assess the quality, reliability, and clinical applicability of YouTube videos on chest tube insertion. By evaluating their adherence to current guidelines and identifying potential gaps in content accuracy, this research seeks to provide insight into the effectiveness of video-based learning in procedural training. Given the increasing reliance on online resources by medical professionals, ensuring the credibility of these materials is critical to maintaining high standards of patient care [16, 17].

MATERIAL AND METHODS

This study was conducted using a cross-sectional analytical design. A search was performed on the YouTube platform (YouTube©, https://www.youtube.com; YouTube, LLC, San Bruno, CA, USA) using the keyword "chest tube insertion". In accordance with previous literature, the search results were ranked based on "relevance" to better reflect typical user search behaviour [15, 18].

To ensure a broad and representative sample while mimicking common user habits, included were the first 200 English-language videos published between 2016 and 2024 [18]. During the screening process, no videos were excluded due to language constraints. All videos were evaluated by a board-certified emergency medicine specialist at two separate time points, with a one-week interval between assessments. The test-retest reliability was calculated as 0.83. The study was completed on 31 December 2024.

Recorded were the duration, number of views, number of likes, and publication year of the videos. The sources of the videos were categorized into the following groups:

- **official medical organizations:** universities, medical associations, and similar entities;
- **health professionals:** physicians, nurses, paramedical personnel, *etc.*;
- **private institutions**;
- **patients or patient relatives**;
- **news outlets**;
- **unidentified sources:** uploaders that could not be classified into the above groups and/or those using unknown aliases.

The content was assessed for consistency with current practices and guidelines [13, 19–21]. In alignment with the literature, the videos were scored on a scale of 0 to 10 based on the quality and comprehensiveness of their medical content [15].

Scoring criteria

Each criterion was assigned a score of 1 point, with a maximum possible score of 10 points. The evaluation was divided into two main categories.

1. **Preliminary information about the procedure:**
   - indications,
   - contraindications,
   - complications,
   - tube removal.
2. **Visual information for the procedure:**
   - medical equipment used,
   - anatomical landmarks (like the safety triangle, defined by the latissimus dorsi, pectoralis major, base of the axilla and fifth intercostal space),
   - analgesia (administration over the rib with an appropriate dose),

- incision (marked parallel to the intercostal space where local anaesthesia is applied),
- suturing (to secure the tube without causing obstruction),
- drainage system (description and setup).

Criteria for evaluation

Videos were assessed based on the presence of the following elements.

1. **Preliminary information:** mention of indications, contraindications, potential complications, and tube removal.
2. **Visual information:**
   - description of the medical equipment used,
   - identification of anatomical landmarks, including the safety triangle (bounded by the latissimus dorsi, pectoralis major, the base of the axilla, and the fifth intercostal space),
   - administration of analgesia (appropriate dose, administered over the rib),
   - marking and placement of the incision parallel to the intercostal space where local anaesthetic is to be injected,
   - use of sutures (ensuring the tube is secured without causing obstruction),
   - explanation of the drainage system.

Inclusion and exclusion criteria

Videos available on the YouTube platform that did not meet exclusion criteria were included. Videos meeting at least one of the following exclusion criteria were excluded:

- non-medical content (for example: advertisements, news, interviews),
- videos published in languages other than English,
- videos containing advertisements,
- live-action footage lacking educational value, including comedic or entertainment-focused videos not intended for education,
- duplicate videos,
- videos unrelated to the chest tube procedure,
- videos without procedural information,
- videos not published in 2024,
- content requiring membership or payment,
- YouTube "shorts" (short video format).

Statistical analysis

Statistical analyses were performed using SPSS (Statistical Package for the Social Sciences) version 22.0. The Kolmogorov–Smirnov test was employed to evaluate the normality of data distribution. For non-normally distributed numerical data, descriptive statistics included frequency (n), percentage (%), median, and interquartile range (IQR: Q25–Q75, representing the 1st and 3rd quartiles). Comparative analyses of non-normally distributed qualitative variables were conducted using the Mann–Whitney U test. Correlations between variables were assessed using Spearman's rank correlation test. A p value of < 0.05 was set as the threshold for statistical significance.

Ethics

The study evaluated publicly available videos on the YouTube platform. No interventions were conducted, and no participants were involved. Consequently, in accordance with similar studies, ethics committee approval was not deemed necessary [23–25].

RESULTS

Following a comprehensive review of 200 videos included in the screening list, no repetitive or non-English videos were identified. Videos that did not pertain to chest tube placement were excluded from further analysis, resulting in a final dataset of 144 videos. Eight videos were excluded due to their lack of educational content ($n = 1$) or their classification as advertisements or entertainment. As a result, the final analysis included a total of 136 videos (Fig. 1).

Healthcare professionals uploaded 104 videos (76.5%), while official institutions accounted for 10 videos (7.4%). Twenty-two videos (16.2%) came from private institutions, while the source of 17 videos (12.5%) could not be determined. Notably, no videos were identified with news content or those produced by patients and their relatives. A single video may involve contributions from multiple types of content creators.

Table 1 presents detailed information about the duration, number of views, number of likes, and other characteristics of the included videos.

No significant differences were observed in the video features based on whether they were published by healthcare professionals ($p > 0.05$) (Tab. 2).

Video attributes were categorized, such as duration, number of views, likes, and time since publication, based on their median values. Analysis

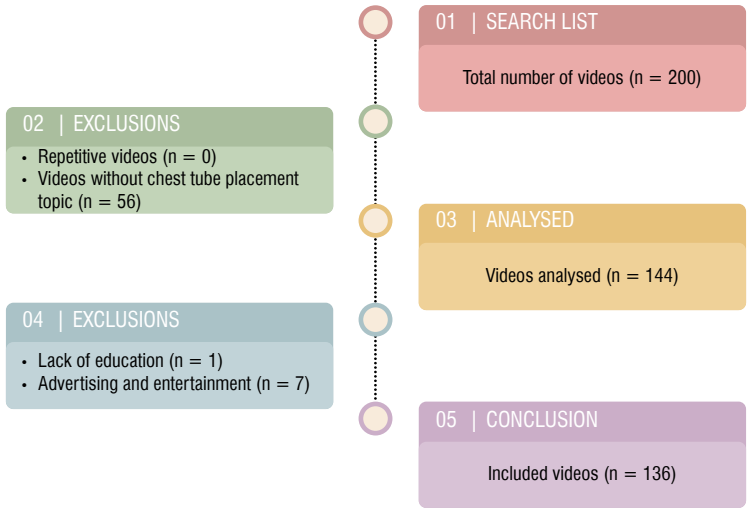

FIGURE 1. Study flow diagram

Table 1. **Characteristics of included videos: duration, number of views, likes, and time since upload**

	Median	Q25–Q75*
Duration (seconds)	386	240–625
Views	4550	527–37000
Likes	44	6–242
Time since upload (years)	4	3–6

*Q25–75 — 1st and 3rd quartile values

Table 2. **Evaluation of video characteristics based on publication by healthcare professionals**

	Healthcare professionals median (Q25–Q75)*		p†
	No	Yes	
Duration (seconds)	464 (188–632)	381 (262–625)	0.739
Views	3950 (384–17500)	5150 (662–41000)	0.235
Likes	23 (4.5–185)	48 (7–380)	0.238
Time since upload (years)	5 (3–7)	4 (3–6)	0.184

*Q25–75 — 1st and 3rd quartile values; †Significance values determined using the Mann–Whitney U test

revealed no significant differences in evaluations of videos uploaded by healthcare professionals versus others concerning their duration on air ($p > 0.05$). However, videos with longer durations were associated with significantly higher preliminary knowledge scores, visual scores for practice, and total scores ($p < 0.001$, $p = 0.015$, and $p < 0.001$, respectively). Additionally, videos with fewer views and likes exhibited higher visual scores for practice ($p = 0.047$ and $p = 0.045$, respectively) (Tab. 3).

Further analysis demonstrated that as video duration increased, preliminary knowledge scores, visual practice scores, and total scores also increased ($p < 0.001$). Conversely, an increase in the number of views was associated with a decrease in the visual practice score, although it corresponded to increases in the number of likes and time on air ($p < 0.001$, $p < 0.001$, and $p = 0.025$, respectively). Similarly, a longer duration of stay on air was associated with an increase in the number of likes ($p = 0.005$). Higher scores for prior knowledge about the procedure were positively correlated with both visual practice scores and total scores ($p = 0.032$ and $p < 0.001$, respectively). Finally, greater visual practice scores were strongly associated with higher total scores ($p < 0.001$) (Tab. 4).

DISCUSSION

This study presents a comprehensive evaluation of YouTube as an educational resource for chest tube insertion, highlighting its strengths and limitations in providing quality medical education. The findings emphasize key aspects of video content, including procedural accuracy, visual representation, and alignment with current clinical guidelines. Given the increasing reliance on YouTube for

Table 3. **Evaluation of videos by professional status, length, views, likes, and availability**

	Video evaluations		
	Information about the procedure	Visual for the practice	Total score
Healthcare professionals			
No	1 (0–1.5)	3 (2–5)	4.5 (2–6)
Yes	0 (0–1)	3 (2–5)	4 (3–6)
p*	0.385	0.645	0.858
Duration (seconds)			
Short	0 (0–1)	3 (2–4)	4 (2–5)
Long	1 (0–2)	4 (2–6)	5 (3–7)
p*	< 0.001	0.015	< 0.001
Views			
Low	0 (0–1)	4 (3–5)	4 (3–6)
High	0 (0–2)	3 (1–5)	4 (2–6)
p*	0.414	0.047	0.282
Likes			
Less	0 (0–1)	4 (3–5)	4 (3–6)
More	0 (0–2)	3 (1–5)	4 (2–6)
p*	0.497	0.045	0.132
Time since upload (years)			
Short	0 (0–1)	3.5 (2–5)	4 (3–6)
Long	0 (0–1)	3 (2–5)	4 (2–6)
p*	0.750	0.560	0.708

*Significance values determined using the Mann–Whitney U test

Table 4. **Correlation analysis between video characteristics and assessments**

		Duration (seconds)	Views	Likes	Time since upload (years)	Information about the procedure	Visual for the practice	Total score
Duration (seconds)	r	1						
	p*	.						
Views	r	0.010	1					
	p*	0.910	.					
Likes	r	0.048	0.824	1				
	p*	0.575	**< 0.001**	.				
Time since upload (years)	r	0.020	0.320	0.241	1			
	p*	0.821	**< 0.001**	**0.005**	.			
Information about the procedure	r	0.389	0.023	0.084	0.081	1		
	p*	**< 0.001**	0.792	0.331	0.348	.		
Visual for the practice	r	0.273	–0.192	–0.161	–0.035	0.184	1	
	p*	**< 0.001**	**0.025**	0.062	0.686	**0.032**	.	
Total score	r	0.373	–0.148	–0.107	0.018	0.545	0,911	1
	p*	**< 0.001**	0.084	0.216	0.831	**< 0.001**	**< 0.001**	.

*Significance values determined using Spearman correlation analysis

medical education, particularly in high-stakes fields, greater scrutiny, and quality assurance mechanisms are essential.

The analysis of content producers revealed a significant contribution from healthcare professionals and government agencies. This aligns with previous studies reporting a wide range of contributions from these groups, varying between 40% and 80% [16, 18, 22, 23]. This study notably identified no videos produced by patients, their relatives, or news outlets. In contrast, earlier research has shown that up to 50% of videos on certain topics featured news content [23, 24]. This discrepancy may be due to differences in public awareness and media coverage of chest tube insertion compared to other medical topics. The high proportion of healthcare professionals

and institutional content in this study likely reflects the specialized nature of chest tube insertion as an interventional procedure. This highlights the critical role of specialized content in enhancing procedural accuracy, as interventional techniques like chest tube insertion require a detailed understanding of both anatomy and clinical guidelines.

Despite the significant presence of healthcare professional contributors, the videos they produced were not statistically more viewed or liked, nor did they achieve higher scores compared to other sources. This finding is consistent with previous research documenting variable quality in online medical videos [6, 18, 25]. For example, Chang et al. [25] reported moderate-quality videos on dysphagia in paediatric cases, whereas Krakowiak et al. [26] and Butler et al. [27] found low-quality videos on carbon monoxide poisoning and burn interventions, respectively. These variations in quality highlight the disparity between content aimed at general audiences and those specifically tailored for healthcare professionals, suggesting a gap that can be addressed through targeted collaboration between content creators and medical institutions. The present findings confirm the persistent variability in the quality of medical content on YouTube, consistent with previous studies.

Metrics such as views, likes, and comments varied widely among the videos; however, no correlation was observed between these engagement metrics and video quality scores. This finding suggests that audience interaction often reflects entertainment value rather than educational rigour. Previous studies have indicated that videos designed for broader audience appeal may prioritize visual presentation and accessibility over scientific accuracy [9, 14, 17, 18, 25]. Interestingly, the lack of correlation between audience engagement metrics — such as views and likes — and educational quality suggests that content popularity may be driven more by presentation style and production quality rather than by clinical accuracy [16, 18, 25].

This highlights the critical need for healthcare professionals to carefully evaluate the reliability and relevance of online medical resources. Moreover, to enhance the visibility and impact of high-quality, evidence-based content, healthcare institutions and professionals should consider adopting more engaging visual strategies in their educational videos. Enhancing visual appeal through well-structured thumbnails, informative titles, and high production quality may improve audience engagement and extend the reach of scientifically accurate content. Additionally, collaboration with media professionals or digital content creators could help healthcare professionals integrate contemporary visual technologies and digital marketing strategies into medical education.

The present analysis identified video length as a significant factor in determining educational quality. Consistent with previous literature, longer videos received higher quality scores, as they were more likely to provide comprehensive procedural details and detailed visual demonstrations, thereby enhancing their educational utility [18, 28]. Given this association, future efforts should prioritize the creation of comprehensive, step-by-step tutorials that emphasize depth and adherence to evidence-based guidelines.

This finding aligns with prior research indicating that structured, sequential instruction in video--based learning improves knowledge retention and skill acquisition among healthcare professionals [5, 6]. For complex procedures such as chest tube insertion, which demand precision and adherence to standardized protocols, in-depth educational content is particularly valuable [20, 21].

Although YouTube's recommendation algorithm prioritizes content with high engagement, which may favour shorter and more broadly appealing videos, the present findings suggest that longer videos tend to offer higher-quality educational content. This highlights the need for educational content creators to balance algorithmic visibility with the delivery of comprehensive and accurate medical information, ensuring that medical professionals have access to detailed, high-quality instructional materials.

However, the lack of regulatory oversight on YouTube raises significant concerns regarding the accuracy and reliability of medical content. To mitigate the risks associated with unregulated educational content, a standardized peer-review process for medical videos on public platforms could be implemented, similar to traditional academic publishing practices. The diversity of content producers and the popularity of certain topics significantly impact content quality [16]. Prior research has similarly highlighted the lack of peer review and standardization as major factors contributing to variability in the quality of online educational materials [14, 22]. For instance, Koçyiğit et al. [22] and Yıldırım et al. [15] reported frequent omissions of critical information in

videos about medical procedures, which could lead to misunderstandings and errors in clinical practice.

This study emphasizes the importance of integrating media literacy into medical education programs. Providing healthcare professionals with the skills to distinguish reliable sources and critically evaluate online content may mitigate the risks associated with unregulated platforms. Additionally, the integration of feedback mechanisms that allow healthcare professionals to rate and comment on the accuracy and utility of videos could provide a dynamic way to enhance the overall quality of online resources. As Cheng et al. [29] noted, developing critical evaluation skills is essential for enabling students and professionals to navigate the vast array of digital resources effectively.

The accessibility and global reach of YouTube present a valuable opportunity for disseminating medical education. However, to ensure the accuracy and reliability of online medical content, collaborative efforts between healthcare organizations and content creators are essential. Establishing standardized guidelines for medical videos through such partnerships could enhance the educational value of online resources while ensuring adherence to evidence-based practices [8, 20].

Expanding on these findings, future studies could explore the impact of structured video tutorials on actual clinical outcomes, assessing whether enhanced video quality directly translates to improved procedural success rates in practice. For example, Trueger et al. [30] demonstrated the potential of social media in medical education by integrating video-based sessions and academic discussions on spontaneous pneumothorax. However, despite the high quality of this content, a YouTube-based video evaluation session garnered limited engagement, with fewer than 1,000 views and only one like and comment over a decade [31]. This example highlights a key challenge: YouTube's algorithm does not necessarily prioritize high-quality medical content, potentially limiting its visibility and impact.

YouTube's recommendation algorithms play a critical role in determining which videos are presented to users, effectively shaping viewer preferences. As highlighted by Kaval et al. [32], these algorithms act as primary determinants of content selection, often favouring popularity-driven metrics such as views and likes over scientific rigour and educational value [33]. YouTube's recommendation system, which prioritizes engagement over clinical accuracy and adherence to medical guidelines, poses a risk of amplifying misleading or low-quality medical content [32]. Without institutional oversight and content verification, maintaining the integrity of medical education in such an environment becomes increasingly challenging.

Given these concerns, an accreditation system — similar to the "blue checkmark" verification used on platform X — could be introduced for medical content on YouTube. By implementing a certification badge for videos that meet specific educational and quality standards, YouTube could incentivize content creators to prioritize medical accuracy and high-quality production. This approach could also enhance the credibility of medical educators, increasing viewer trust and engagement.

Finally, YouTube's recent initiative to prioritize up to 10 videos from recognized health sources when users search for medical content represents a notable step forward. Although this system does not yet guarantee content accuracy or provide additional high-quality recommendations, it suggests a positive shift toward promoting reliable medical education. Implementing algorithmic refinements that prioritize evidence-based medical content, along with stricter content curation, could further improve the visibility of scientifically validated resources, ultimately benefiting both healthcare professionals and the general public.

Limitations

This study has certain limitations. Although the most commonly searched keyword was used, incorporating additional search terms could have increased video diversity and provided a broader dataset. Additionally, as YouTube is a dynamic platform with constantly evolving content, the number of likes, views, and comments on videos may have changed during the study period. This inherent variability may have introduced limitations in capturing the platform's educational potential comprehensively.

CONCLUSIONS

This study demonstrates that while YouTube offers unique opportunities to expand access to medical education, its unregulated nature poses challenges to ensuring content quality and reliability. In particular, the platform's algorithm-driven video ranking and recommendation system require significant improvements to enhance the visibility

of high-quality educational content. To maximize YouTube's educational potential, collaborative initiatives between content creators and healthcare organizations should focus on developing standardized guidelines for medical videos. Similar to the verified blue checkmark system used on platform X, accreditation mechanisms should be considered to ensure content credibility.

Additionally, integrating media literacy training into medical education programs will empower healthcare professionals to critically evaluate and effectively utilize online resources. Future studies should investigate the impact of video-based education on clinical outcomes and explore expanding analyses to include other languages and platforms.

Article information and declarations

Data availability statement

Data and materials used or analyzed during the present study are available from the corresponding author upon reasonable request.

Ethics statement

This study was designed as a retrospective study, and was approved by the Institutional Review Board of the Polish Society for Disaster Medicine (approval no. 03/06/2024/IRB). This study involved the evaluation of publicly accessible videos, and therefore, ethics committee approval was not deemed necessary. No interventions were performed, and no human participants were included.

Author contributions

All content is the sole responsibility of the author, who is also the uploader and retains full ownership.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Acknowledgments

None.

Conflict of interest

The author declares no conflict of interest.

Supplementary material

None.

REFERENCES

1. Kalina J. Chater 15 — Pandemic-driven innovations contribute to the develoment of information-based medicine. In: de Pablos PO, Chui KT, Lytras MD. ed. Digital innovation for healthcare in COVID-19 pandemic. Academic Press 2022: 245–262.
2. Wang X, Liu T, Wang J, et al. Understanding learner continuance intention: a comparison of live video learning, pre-recorded video learning and hybrid video learning in COVID-19 pandemic. Int J Hum Comput Interact. 2021; 38(3): 263–281, doi: 10.1080/10447318.2021.1938389.
3. Parkes P, Pillay TD, Bdaiwi Y, et al. Telemedicine interventions in six conflict-affected countries in the WHO Eastern Mediterranean region: a systematic review. Confl Health. 2022; 16(1): 64, doi: 10.1186/s13031-022-00493-7, indexed in Pubmed: 36517869.
4. Alser K, Mallah SI, El-Oun YR, et al. Trauma care supported through a global telemedicine initiative during the 2023-24 military assault on the Gaza Strip, occupied Palestinian territory: a case series. Lancet. 2024; 404(10455): 874–886, doi: 10.1016/S0140-6736(24)01170-X, indexed in Pubmed: 39216977.
5. Mao BP, Teichroeb ML, Lee T, et al. Is online video-based education an effective method to teach basic surgical skills to students and surgical trainees? A systematic review and meta-analysis. J Surg Educ. 2022; 79(6): 1536–1545, doi: 10.1016/j.jsurg.2022.07.016, indexed in Pubmed: 35933308.
6. Rapp AK, Healy MG, Charlton ME, et al. YouTube is the most frequently used educational video source for surgical preparation. J Surg Educ. 2016; 73(6): 1072–1076, doi: 10.1016/j.jsurg.2016.04.024, indexed in Pubmed: 27316383.
7. Katipoğlu B, Akbaş İ, Koçak AO, et al. Assessment of the accuracy of cardiopulmonary resuscitation videos in english on YouTube according to the 2015 AHA resuscitation guidelines. Emerg Med Int. 2019; 2019: 1272897, doi: 10.1155/2019/1272897, indexed in Pubmed: 31186962.
8. Mayer RE. Applying the science of learning: evidence-based principles for the design of multimedia instruction. Am Psychol. 2008; 63(8): 760–769, doi: 10.1037/0003-066X.63.8.760, indexed in Pubmed: 19014238.
9. Glass NE, Kulaylat AN, Zheng F, et al. A national survey of educational resources utilized by the Resident and Associate Society of the American College of surgeons membership. Am J Surg. 2015; 209(1): 59–64, doi: 10.1016/j.amjsurg.2014.09.016, indexed in Pubmed: 25454958.
10. Fehervari M, Das B, Soleimani-Nouri P, et al. Can surgical skills be taught using technological advances online? A comparative study of online and face-to-face surgical skills training. Surg Endosc. 2022; 36(6): 4631–4637, doi: 10.1007/s00464-022-09170-5, indexed in Pubmed: 35254521.
11. Işık NI, Kurtoglu Celık G, Işık B. Evaluating emergency department visits for spontaneous and traumatic pneumomediastinum: a retrospective analysis. Ulus Travma Acil Cerrahi Derg. 2024; 30(2): 107–113, doi: 10.14744/tjtes.2024.66059, indexed in Pubmed: 38305659.

12. Anderson D, Chen SA, Godoy LA, et al. Comprehensive review of chest tube management: a review. JAMA Surg. 2022; 157(3): 269–274, doi: 10.1001/jamasurg.2021.7050, indexed in Pubmed: 35080596.
13. Subedi A, Banjade P, Joshi S, et al. Updates on British Thoracic Society statement on pleural disease and procedures 2023. Open Respir Med J. 2023; 17: e18743064286775, doi: 10.2174/0118743064286775231128104253, indexed in Pubmed: 38655073.
14. Pandey A, Patni N, Singh M, et al. YouTube as a source of information on the H1N1 influenza pandemic. Am J Prev Med. 2010; 38(3): e1–e3, doi: 10.1016/j.amepre.2009.11.007, indexed in Pubmed: 20171526.
15. Yıldırım B, Basaran O, Alatas OD, et al. Chest tube insertion techniques on YouTube: is social media a reliable source of learning medical skills? Am J Emerg Med. 2015; 33(11): 1709–1710, doi: 10.1016/j.ajem.2015.08.040, indexed in Pubmed: 26386736.
16. Kıvrak A, Ulusoy İ. How high is the quality of the videos about children's elbow fractures on YouTube? J Orthop Surg Res. 2023; 18(1): 166, doi: 10.1186/s13018-023-03648-1, indexed in Pubmed: 36869361.
17. Göller Bulut D, Paksoy T, Ustaoğlu G. Is online video a suitable source to obtain sufficient and useful information about peri-implantitis? J Oral Maxillofac Surg. 2023; 81(1): 56–64, doi: 10.1016/j.joms.2022.10.001, indexed in Pubmed: 36356635.
18. Ozdemir Kacer E, Kacer I. Evaluating the quality and reliability of YouTube videos on scabies in children: a cross-sectional study. PLoS One. 2024; 19(10): e0310508, doi: 10.1371/journal.pone.0310508, indexed in Pubmed: 39418293.
19. Thoracostomy tubes and catheters: Placement techniques and complications, 2023. https://www.uptodate.com/contents/thoracostomy-tubes-and-catheters-placement-techniques-and-complications?search=chest%20tube&source=search_result&selectedTitle=1%7E150&usage_type=default&display_rank=1. (16.01.2025).
20. Roberts ME, Rahman NM, Maskell NA, et al. BTS Pleural Guideline Development Group. British Thoracic Society Guideline for pleural disease. Thorax. 2023; 78(Suppl 3): s1–s42, doi: 10.1136/thorax-2022-219784, indexed in Pubmed: 37433578.
21. Dev SP, Nascimiento B, Simone C, et al. Videos in clinical medicine. Chest-tube insertion. N Engl J Med. 2007; 357(15): e15, doi: 10.1056/NEJMvcm071974, indexed in Pubmed: 17928590.
22. Kocyigit BF, Akaltun MS, Sahin AR. YouTube as a source of information on COVID-19 and rheumatic disease link. Clin Rheumatol. 2020; 39(7): 2049–2054, doi: 10.1007/s10067-020-05176-3, indexed in Pubmed: 32447603.
23. Szmuda T, Syed MT, Singh A, et al. YouTube as a source of patient information for Coronavirus Disease (COVID-19): a content-quality and audience engagement analysis. Rev Med Virol. 2020; 30(5): e2132, doi: 10.1002/rmv.2132, indexed in Pubmed: 32537771.
24. Ozduran E, Büyükçoban S. A content analysis of the reliability and quality of Youtube videos as a source of information on health-related post-COVID pain. PeerJ. 2022; 10: e14089, doi: 10.7717/peerj.14089, indexed in Pubmed: 36193427.
25. Chang MC, Lee BJ, Park D. The quality, reliability, and accuracy of videos regarding exercises and management for dysphagia in pediatric populations uploaded on youtube. Children (Basel). 2022; 9(10), doi: 10.3390/children9101514, indexed in Pubmed: 36291450.
26. Krakowiak M, Rak M, Krakowiak P, et al. YouTube as a source of information on carbon monoxide poisoning: a content-quality analysis. Int J Occup Med Environ Health. 2022; 35(3): 285–295, doi: 10.13075/ijomeh.1896.01882, indexed in Pubmed: 35119057.
27. Butler DP, Perry F, Shah Z, et al. The quality of video information on burn first aid available on YouTube. Burns. 2013; 39(5): 856–859, doi: 10.1016/j.burns.2012.10.017, indexed in Pubmed: 23273651.
28. Hawryluk NM, Stompór M, Joniec EZ. Concerns of quality and reliability of educational videos focused on frailty syndrome on YouTube platform. Geriatrics (Basel). 2021; 7(1), doi: 10.3390/geriatrics7010003, indexed in Pubmed: 35076501.
29. Cheng A, Nadkarni VM, Mancini MB, et al. American Heart Association Education Science Investigators; and on behalf of the American Heart Association Education Science and Programs Committee, Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation; Council on Cardiovascular and Stroke Nursing; and Council on Quality of Care and Outcomes Research. Resuscitation education science: educational strategies to improve outcomes from cardiac arrest: a scientific statement from the American Heart Association. Circulation. 2018; 138(6): e82–e8e122, doi: 10.1161/CIR.0000000000000583, indexed in Pubmed: 29930020.
30. Trueger NS, Murray H, Kobner S, et al. Global emergency medicine journal club: a social media discussion about the outpatient management of patients with spontaneous pneumothorax by using pigtail catheters. Ann Emerg Med. 2015; 66(4): 409–416, doi: 10.1016/j.annemergmed.2015.05.002, indexed in Pubmed: 26059486.
31. Videos AI. Youtube. 27:07 ed: ALiEM-Annals EM Journal Club with Dr. Jouneau; 2014. https://www.youtube.com/watch?v=AhYZJF4s-JoI&ab_channel=ALiEMInteractiveVideos (19.01.2025).
32. Kaval ME, Sarsar F, Buduneli N, et al. A sustainable, self-sufficient peer review algorithm for health-related YouTube videos: A proposal. Oral Dis. 2024; 30(3): 830–832, doi: 10.1111/odi.14555, indexed in Pubmed: 36840381.
33. Fyfield M, Henderson M, Phillips M. Navigating four billion videos: teacher search strategies and the YouTube algorithm. Learn Media Technol. 2020; 46(1): 47–59, doi: 10.1080/17439884.2020.1781890.