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Quality of YouTube videos on focused assessment with sonography in trauma protocol

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Abstract: **Objective:** The Focused assessment with sonography in trauma (FAST) protocol is one of the most critical steps in trauma assessment in current emergency department practices. The contribution of video-based learning to medical education is increasingly recognized. This study aims to evaluate the quality of videos related to e-FAST ultrasonography as well as the factors influencing video quality.

Methods: The study encompassed conducting searches on YouTube using the keywords "FAST," "E-FAST," and "Trauma USG," followed by a comprehensive analysis of the retrieved videos. The quality of these videos was evaluated using JAMA, GQS, and DISCERN scores.

Results: The study included 93 videos. The mean mDISCERN score was 3.1 (0.9), the mean JAMA score was 2.1 (0.7), and the mean GQS score was 3.4 (1.0). Sixty-five (69.9%) of the videos were recorded by individuals, and 60 (64.5%) used only the US image in the video. The median video length was 639 seconds (s) (range: 250–1305 s), median number of comments was 0 (range 0–4), median upload date (days) was 1675 (range: 976-2750), number of views was 2250 (range: 467-14187), and number of likes was 28 (range: 8-162). The mean mDISCERN and JAMA scores of institutional videos were 3.2 (0.9) and 2.2 (0.7), respectively, and the mean mDISCERN and JAMA scores of individual videos were 2.7 (0.8) and 1.9 (0.7) (P values = 0.008 and 0.018, respectively). The mean GQS score of institutional videos was 3.5 (0.1), and the mean GQS score of individual videos was 3.3 (0.8) (P=0.325). The median number of comments in individual videos was 4.0 (range: 0.0–12.5), while the median number of comments in institutional videos was 0.0 (range: 0.0–2.0; P= 0.011). There is a significant difference in the number of likes (P=0.043). No significant difference was found in video length, date, and number of views between individual and institutional videos (P values = 0.236, 0.974, and 0.255, respectively).

Conclusion: Upon reviewing e-FAST/FAST protocol videos on social networks, it becomes apparent that institutional videos exhibit better quality. Institutional videos are not only more target-oriented, but they also provide reliable information and are optimized for timeliness.

Keywords: Emergency Medicine, Internet, Quality Control, Social Media, Training Technics, Ultrasonography

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1. Introduction

Upon arrival at the emergency department, it is crucial for patients with trauma to undergo rapid bedside assessment for hemorrhage in order to minimize the risk of mortality. (1). The focused assessment with sonography in trauma (FAST) protocol is relatively easy, and when performed by experienced operators, may take less than 5 minutes (1). The FAST protocol was developed to assess hemoperitoneum and hemopericardium and has been expanded to extended FAST (e-FAST). This expanded protocol also includes the evaluation of hemothorax and pneumothorax, utilizing bedside ultrasonographic imaging (1,2). While the implementation of the e-FAST protocol has unquestionably become one of the most important steps in trauma assessment in current emergency department practices and may seem relatively straightforward, it requires knowledge and proficiency in ultrasound usage (3).

While the implementation of the e-FAST protocol has become a crucial step in trauma assessment, effective learning methods are essential for developing the required knowledge and proficiency. In recent years, medical education has evolved to embrace various digital learning frameworks, including free open access medical education (FOAM) and reusable learning objects (RLOs). FOAM represents an increasingly important movement in medical education that emphasizes freely accessible, open-source educational resources, while RLOs are self-contained digital learning units that can be reused across different educational contexts. Video-based learning, particularly through platforms like YouTube, represents as a type of reusable learning objects and has become increasingly recognized in medical educa-

tion (4,5). Especially amid the decline in traditional classroom and bedside learning methods, particularly during the COVID-19 pandemic, e-learning and videos have emerged as pivotal components of education (6). Also, it was found that video-based resources were preferred more by students and were more effective than didactic materials in the studies evaluating the teaching of ultrasound-guided procedures (7). YouTube, a widely used social platform, has become an important avenue for accessing information, especially for healthcare professionals (8-10). Studies have examined the accuracy and content of videos available on YouTube regarding information about certain diseases (11,12).

The aim of this study is to evaluate the quality of videos related to e-FAST ultrasonography, which has almost become an integral part of primary assessment in emergency departments, as well as the factors influencing video quality.

2. Methods

2.1. Study design and setting

This bibliometric study was conducted from April 1 to 20, 2024. Humans and animals were not involved in the study, and the research was conducted solely by searching through the link https://www.youtube.com. All videos evaluated in the study are publicly available on YouTube's website.

The search was conducted using the keywords "e-FAST," "Trauma USG," and "FAST USG." The first 100 video links generated by YouTube's search algorithm for each keyword were saved. Subsequently, videos that were unrelated to the keywords, not in English, contained advertisements, product promotions, or course promotions, and duplicates of the same video were excluded. YouTube algorithm takes into account relevance, engagement, and quality factors to provide the best search results, and the systems are designed to identify channels that demonstrate expertise, proficiency, and reliability in a particular subject in line with quality-related objectives (13). Furthermore, YouTube's algorithm takes accounts parameters, such as user age, previously watched videos, view counts, likes, and upload time. The videos to be examined were selected by the same person, using the same Internet protocol address, and on the same day. Then the recorded links were within the designated 20-day period.

2.2. Parameters evaluated and quality analysis

Once the videos to be included in the study were identified, their duration (in seconds), time of upload (year), number of views, number of likes, number of comments, sources (institutional [university, course, academic institutions] or individual), and the technique used in preparing the videos (image only or showing both the narrator and the image together) were noted. Comments that were irrelevant to the subject and appeared under the videos were not included in the study.

Each video was independently watched by two assessors who were unaware of each other's evaluations. To guarantee consistent evaluations and standardization among assessors, we carefully selected individuals who had the same level of ultrasound practice experience and who received e-FAST ultrasound training together from a qualified instructor. Prior to the study, these assessors underwent simultaneous training on the scoring scales and received clear instructions on how to accurately score them, ensuring high-quality results. Each assessor calculated Journal of American Medical Association (JAMA), Global quality score (GQS), and DISCERN scores for each video, and the average scores were recorded for further analysis. The calculation of average scores is shown below.

Mean DISCERN score = (DISCERN score of the first observer + DISCERN score of the second observer)/2

Mean GQS = (GQS of the first observer + GQS of the second observer)/2

Mean JAMA score = (JAMA score of the first observer + JAMA score of the second observer)/2.

The JAMA score, created by Silberg et al., consists of four criteria (authorship, attribution, disclosure, currency), with each question scored as 0 for "no" and 1 for "yes." The JAMA score ranges between 0–4, and high scores are considered as high-quality information (14). The authorship criterion evaluated the identity and credentials of the video owner, the attribution criterion assessed the citation of sources, the disclosure criterion examined conflict of interest declarations and sponsorship status, and the currency criterion evaluated the video upload date. GQS is a scoring system prepared in a 5-point Likert scale, assessing the quality of information, the fluency of the video, and its completeness (15,16).

The Modified DISCERN (mDISCERN) score is a specific scoring system used to determine the reliability, clarity, and appropriateness of references for medical information presented in videos (11,17). It consists of five criteria, with each criteria scored as 0 for "no" and 1 for "yes."

2.3. Statistical analysis

Data analysis was conducted using Jamovi version 2.5 (18). Continuous data were presented as mean (standard deviation) or median, first quartile and third quartile based on the distribution of the variable. Categorical data were presented as number and percentages. Student's t-test was used to compare normally distributed variables between two groups, while the Mann–Whitney U test was used for non-normally distributed variables. Findings were considered significant when $P< 0.05$ unless otherwise specified.

3. Results

YouTube search using the keywords "E-FAST, Trauma USG, and FAST USG" yielded 298 videos. In total 167 videos were excluded; 12 for advertisements, 35 for non-English language, and 120 for discussing topics other than FAST. Of the remaining 131 videos, 38 duplicates were excluded. The study included 93 videos. The exclusion process is summarized in the flow chart (Figure 1).

On examining the demographic characteristics of the videos,

Table 1 Demographics of videos included for analysis

Variable	Overall (n=93)
Video length (s), median [Q1-Q3]	639 [250-1305]
Number of comments, median [Q1-Q3]	0 [0-4]
Upload date (days), median [Q1-Q3]	1675 [976-2750]
Number of views, median [Q1-Q3]	2250 [467-14187]
Number of likes, median [Q1-Q3]	28 [8-162]
Mean mDISCERN, mean (SD)	3.1 (0.9)
Mean JAMA, mean (SD)	2.1 (0.7)
Mean GQS, mean (SD)	3.4 (1.0)
Video source, n (%)	
Individual	28 (30.1)
Institutional	65 (69.9)
Video design, n (%)	
Image only	60 (64.5)
The narrator and the image together	33 (35.5)

JAMA: Journal of American Medical Association; GQS: Global quality score; mDICERN: Modified DICERN

Table 2 Relationship between video source, video features, and video scores

Variable	Individual	Institutional	P value
Video length, (s) median [Q1-Q3] ‡	569 [255-863]	767 [230-1507]	0.236
Number of comments, median [Q1-Q3] ‡	4.0 [0.0-12.5]	0.0 [0.0-2.0]	0.011*
Upload date (days), median [Q1-Q3] ‡	1378 [978-2946]	1877 [976-2682]	0.947
Number of views, median [Q1-Q3] ‡	4829 [924-18461]	2158 [335-12484]	0.255
Number of likes, median [Q1-Q3] ‡	102 [14-230]	18 [4-99]	0.043*
Mean mDISCERN, mean (SD)	2.7 (0.8)	3.2 (0.9)	0.008*
Mean JAMA, mean (SD)	1.9 (0.7)	2.2 (0.7)	0.018*
Mean GQS, mean (SD)	3.3 (0.8)	3.5 (0.1)	0.325

‡ Mann-Whitney U test was used P<0.05
Student t test was used P<0.05

Table 3 The relationship between video design, video features, and video scores

Variable	Image only	The narrator and the image together	P value
Video length (s), median [Q1-Q3] ‡	597 [228-1166]	822 [299-1936]	0.118
Number of comments, median [Q1-Q3] ‡	0 [0.00-3.25]	1 [0.00-4.00]	0.569
Upload date, (days) [Q1-Q3] ‡	1750 [976-2750]	1385 [946-3377]	0.876
Number of views [Q1-Q3] ‡	2170 [462-9869]	2807 [589-28225]	0.331
Number of likes [Q1-Q3] ‡	18 [4-103]	48 [11-236]	0.112
Mean mDISCERN, mean (SD)	3.0 (0.9)	3.2 (0.9)	0.171
Mean JAMA, mean (SD)	2.1 (0.7)	2.2 (0.7)	0.306
Mean GQS, mean (SD)	3.3 (1.0)	3.6 (0.8)	0.071

‡ Mann-Whitney U test was used P<0.05
Student t test was used P<0.05

the mean mDISCERN score was 3.1 (0.9), mean JAMA score was 2.1 (0.7), and mean GQS score was 3.4 (1.0). Sixty-five (69.9%) of the videos were recorded by individuals and 60 (64.5%) used only the US image in the video. The median video length was 639 s (range: 250–1305 s), median number of comments was 0 (range 0–4), median upload date (days) was 1675 (range: 976-2750), number of views was 2250 (range: 467-14187), and number of likes was 28 (range: 8-162) (Table 1).

When individual and institutional videos were compared, the mean mDISCERN and JAMA score of institutional videos was 3.2 (0.9) and 2.2 (0.7), respectively, and the mean mDISCERN and JAMA scores of individual videos were 2.7 (0.8) and 1.9 (0.7). The mean mDISCERN and JAMA scores of institutional videos were higher than the scores of individual videos (P values = 0.008 and 0.018, respectively). The mean GQS score of institutional videos was 3.5 (0.1) and the mean GQS score of individual videos was 3.3 (0.8). No significant difference was found in mean GQS scores between individual and institutional videos (P=0.325).

The median number of comments in individual videos was 4.0 (range: 0.0–12.5), while the median number of comments in institutional videos was 0.0 (range: 0.0–2.0; P=0.011). Also, there was a significant difference between the number of likes (P=0.043). No significant difference was found in video length, upload date and number of views between individual

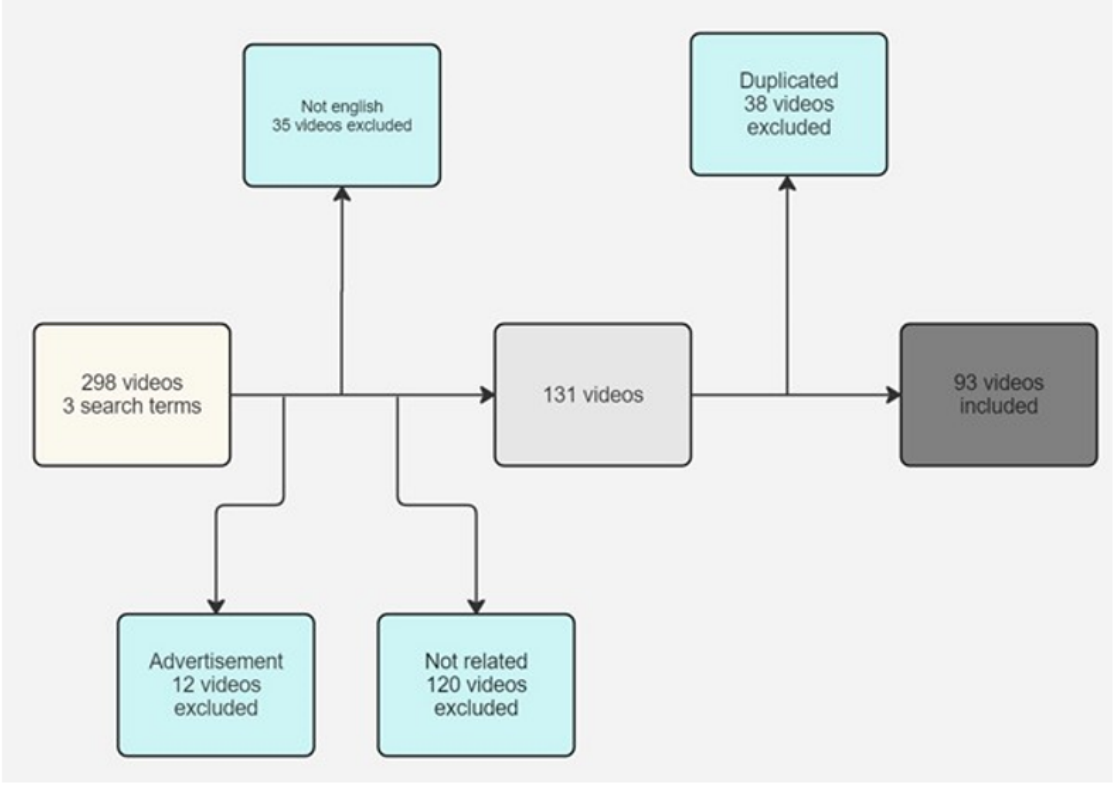

Figure 1 Patient inclusion flowchart

and institutional videos (P values = 0.236, 0.974, and 0.255 respectively) (Figure 2 and Table 2).

On examining the relationship between video design, features, and scores, no significant relationship was found between mean mDISCERN, JAMA, and GQS scores and video design (P=0.171, 0.306, and 0.071, respectively). Similarly, no significant differences were found in terms of video length, number of comments, upload date, view count, and number of likes (P value=0.118, 0.569, 0.876, 0.331, and 0.112, respectively) (Table 3).

4. Discussion

Reusable learning objects (RLO) are instructional components that can be delivered over the internet and can be reused multiple times in different learning contexts (4). Infographics, podcasts, game-based learning, social media, and multimedia-based education are among the RLOs. Although there are different advantages and disadvantages for each, several studies show that multimedia-based education improves interventional and surgical procedure performance (19). To our knowledge, our study is one of the rare studies that examined YouTube videos related to e-FAST and FAST protocol.

RLOs are instructional components that can be delivered over the internet and can be reused multiple times in different learning contexts. While various types of RLOs exist, such as infographics, podcasts, and game-based learning, video-based education has emerged as a particularly valuable tool for medical training. Although YouTube videos represent just one subset of educational RLOs and differ from more structured FOAM resources in terms of peer review and quality control, they can serve as accessible multimedia learning tools. Several studies show that video-based education improves interventional and surgical procedure performance, suggesting the potential value of well-designed video content in medical training (20). However, the varying quality of user-generated content on platforms like YouTube highlights the importance of evaluating these educational resources within the broader context of established educational frameworks like FOAM and RLOs. To our knowledge, our study is one of the rare studies that examined YouTube videos related to e-FAST and FAST protocol, providing insights into the quality and reliability of these freely accessible educational resources.

Zengin et al., evaluated videos related to musculoskeletal ultrasound on YouTube and found that the median mDISCERN score was 3 (range: 2-4) and the median GQS score was 3 (range: 2-4) (21). In another study evaluating videos related to ultrasound-guided dry needling, the mean JAMA score was found to be 2.4 (0.7) (22). In the present study, mean mDISCERN, JAMA, and GQS score was found to be 3.1 (0.9), 2.1 (0.7), and 3.4 (1.0), respectively, consistent with the referred literature.

In the present study, the source of the videos was also evaluated and divided into two categories: individual or institu-

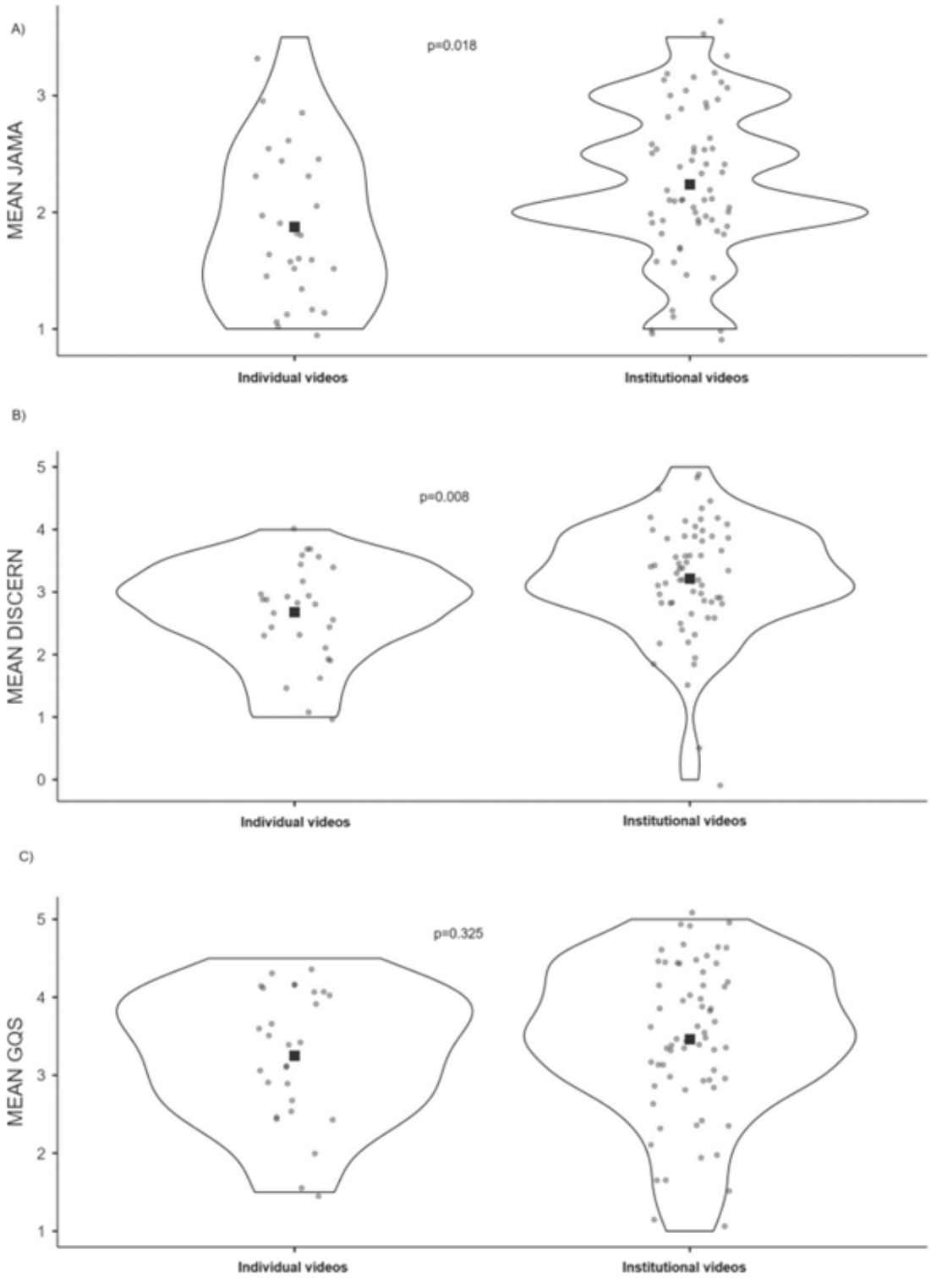

Figure 2 Scatter + violin plox plots and mean values of all three scoring systems

A) JAMA: The scatter + violin plox plots and mean values of the Journal of American Medical Association score

B) GQS: The scatter + violin plox plots and mean values of the global quality score

C) The Scatter + violin plox plots and mean values of the DISCERN score

tional. Although neither individual nor institutional videos achieved scores that could be considered "excellent," it was observed that institutional videos in particular had higher mDISCERN and JAMA scores. However, no significant difference was found in terms of GQS scores. While GQS evaluates videos based on their flow, completeness of information, and utility for patients (15,16), mDISCERN assesses more detailed parameters, such as target orientation, reliability of information sources, and the balance and impartiality of information (11,17).

Conversely, JAMA evaluates videos in terms of advertising or bias, duration, and institutionalization (14). In a study evaluating ultrasound-guided brachial plexus block videos, it was found that institutional videos were more reliable and of higher quality. This can be attributed to the well-organized, high-accuracy content of institutional and educational videos prepared by experts with high level of knowledge on the related procedure, which provide detailed explanations (5). The result obtained in the present study can be explained by the fact that the scoring systems evaluate different sub-parameters of quality (target orientation, clarity, attribution, reliability etc.) and that institutional videos are prepared more professionally.

Although the results showed that institutional videos had higher quality compared to individual videos, it was observed that individual videos received more comments than institutional videos. In a study by Cho et al., educational videos had more comments than individual videos, yet the total number of comments was found to be 1.38 (3.15) (median: 0), suggesting that the videos may not have attracted viewer engagement and may not have played an active role in social media outreach (5). In the present study, the median number of comments for institutional videos was also determined to be 0 (range: 0–4). The higher number of comments on individual videos than institutional ones could be attributed to factors, such as the possibility of responding to comments, comments made for entertainment, and social interaction purposes.

In the study, videos featuring only ultrasound images and those showing the narrator and the ultrasound image together were also compared, but no significant differences were found for all the evaluated parameters. FAST or e-FAST evaluation is a relatively easy and quick imaging modality (1). The fact that this protocol can be performed without careful observation of significant manipulations and probe maneuvers may explain the results obtained in the present study.

5. Limitations

The limitations of our study include the fact that JAMA and GQS scores were not created for medical videos. Although the DISCERN score is specific to medical information, it was not specifically designed to control the interpretation of an imaging protocol. Furthermore, the varying number and duration of the videos, as well as the fact that each video does not contain the entire protocol from beginning to end, are also significant limitations to consider.

6. Conclusion

Upon reviewing e-FAST/FAST protocol videos on Youtube, it becomes apparent that institutional videos exhibit a superior level of quality. Institutional videos are not only more target-oriented, but they also provide reliable information and are optimized for timeliness. While institutional videos had higher quality scores, no video group achieved excellent quality scores. These findings suggest that YouTube videos alone may not be sufficient for e-FAST training and should be supplemented with additional educational resources.

7. Declarations

7.1. Acknowledgement

None.

7.2. Authors' contribution

All authors have made substantial contributions to the conception and design of the study, acquisition of data, analysis and interpretation of data. Also, all authors have contributed to drafting or revising the article and the final version of the article has been approved by all authors.

7.3. Conflict of interest

None.

7.4. Funding

None.

7.5. Declaration of generative AI and AI-assisted technologies in the writing process

While crafting this article, artificial intelligence was exclusively employed for language control and no other purpose.

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