ORIGINAL ARTICLE

Evaluating the Quality and Reliability of Cervical Spine Isometric Exercise Videos on YouTube for Neck Pain: A Cross-sectional Study

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ABSTRACT

Background. YouTube contains simple and easily accessible home/health hacks, including self-exercises. However, the quality/reliability of health-related content cannot always be assured, potentially leading to unreliable and harmful information. With rising digital device use, musculoskeletal cervical pain has increased, and neck exercises on YouTube have not been previously evaluated.

Objective. This study aimed to evaluate the quality/reliability of YouTube neck isometric exercise videos.

Methods. A cross-sectional review of YouTube videos on cervical isometric exercises for neck pain was conducted on January 21, 2024. Videos demonstrating cervical isometric exercises, published within the past 10 years, and ≤20 minutes in duration were included. Non-English, duplicate, sponsored, or non-educational videos were excluded. Eligible videos were assessed using the Global Quality Scale and modified DISCERN scale.

Results. 21/197 videos were included. Most videos had moderate quality (52.38%), uploaded by non-physician healthcare professionals (76.19%). Videos with generally poor quality (14.29%) were mostly uploaded by independent users (66.67%). Video quality varied according to the upload source.

Conclusion. Quality and reliability of exercise videos vary based on sources. Videos produced by non-physician healthcare professionals were higher in quality/reliability than those produced by independent users. Medical professionals and institutions can be proactive in providing more quality/reliable public health-related resources.

Keywords: YouTube; neck isometric exercise; neck pain, quality, reliability.

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INTRODUCTION

YouTube videos can be educationally useful, providing a major source of open-access health-related videos worldwide. They can help laypeople understand and perform simple home and health hacks, including self-exercises. However, a number of studies have found a large number of health-related videos containing misleading information that may jeopardize the safety of undiscerning viewers.[1,2] As online resources, such as Google and YouTube, can provide easily accessible answers and quick fixes to various health-related concerns, lay people run the risk of encountering inaccurate and unreliable sources of information. The absence of standardized quality control mechanisms introduces risks: viewers may adopt exercises that are improperly demonstrated, contraindicated for their condition, or based on outdated or misleading

health information. Poor-quality instructional videos may reinforce harmful movement patterns or reduce adherence to evidence-based treatment plans. This is especially relevant in musculoskeletal conditions, where precise technique and safety cues are essential to preventing reinjury. Reliability is equally important because patients perceive video content as authoritative when accompanied by professional visuals or confident narration, even if the information lacks evidence.[3] As more individuals substitute online searching for clinical consultation, ensuring that digital health resources, especially exercise demonstrations, are both reliable and high quality is crucial for promoting safe patient self-management and reducing misinformation-related harm.

Neck pain can be multifactorial, but during the pandemic, it became more commonly affected by lifestyle and psychosocial risk factors, such as long-term stress, lack of social support, and depression.[4] Neck isometric exercises constitute a simple yet effective preventive and therapeutic intervention for neck pain. It activates and strengthen postural neck muscles and can improve the endurance of weak muscles through proprioceptive neuromuscular facilitation.[5] Isometric exercises (i.e., static muscle contractions done for a period of 10 seconds repeated 10 times with 3 seconds interval) can also improve the range of motion of the cervical spine.[6] Previous studies have assessed the quality of YouTube videos as learning tools for different health-related concerns, such as self-administered subcutaneous anti-tumor necrosis factor agent injections for inflammatory conditions, a clinician's guide to prevention and treatment of osteoporosis, and targeted therapies for spondyloarthritis.[2,7,8] The studies have generally found the videos to be inadequate for educational use.

Given the widespread use of mobile devices and increasing incidence of technology-related neck pain, accurate demonstration of cervical isometric exercises is essential. High-quality videos can effectively support adherence, improve health literacy, and enhance rehabilitation outcomes. Currently, no studies have analyzed the quality and reliability of YouTube videos on isometric exercises for neck pain.

OBJECTIVES

This study aims to evaluate the quality and reliability of the most viewed English-language YouTube videos on cervical spine isometric exercises for neck pain. Using the Global Quality Scale (GQS) for video quality assessment and the modified DISCERN scale for video reliability assessment. Additionally, the study aims to compare the quality and reliability of the most viewed videos across the different upload sources (i.e., physicians; nonphysician healthcare professionals; video uploads associated with academic institutions; and independent users).

METHODS

Study Design

Similar to other related research work, this study followed a cross-sectional design, as all YouTube videos were obtained and evaluated at a single point in time.[9-11]

Search Strategy

Relevant videos were identified on YouTube (www.youtube.com) using the following search terms: "neck pain exercises," "neck strain exercises," "Calliet's neck exercises" (a popular technique for neck isometrics), and "neck isometric exercises." The terms were selected based on the most searched items on Google Trends (http://www.google.com/trends/). Personal accounts were logged off, and browser cache and search history were cleared to prevent bias in YouTube search results. The search was conducted on January 21, 2024. The video sampling method and evaluation employed were similar to those described in similar studies.[7-10] YouTube users commonly pay attention to the first three pages of the search results (20 videos per page).[12] In this study, the initial screening included the first 60 videos for each search term, aiming for 240 videos. However, only 17 videos were found for "Calliet neck exercises," resulting in a total of 197 videos being evaluated. These were sorted by view count, and each was screened according to specific inclusion and exclusion criteria. This multi-stage screening approach reduces selection bias and ensures that only relevant isometric exercise demonstrations are included. Figure 1 depicts the study flow.

Criteria for video selection

We included YouTube videos that include neck isometric exercises, published within the past 10 years (2014 to 2024), and with a maximum duration of 20 minutes.

Videos with no audio or voice-over to explain the exercise, with audio but not available in English, with no educational value (i.e., does not provide other health-related information, such as relevant anatomy, causes of neck pain, medical and surgical treatment options, rehabilitation), duplicate, or sponsored (i.e., created for the purpose of advertising/selling commercial product/s) were excluded.

Data Gathering

Video parameters

Similar to the study of Koçyigit et al., six specific parameters were obtained and recorded as measurements of audience interaction per video: upload date, video duration, view counts, likes, dislikes, and number of comments.[11] These data are freely available on YouTube. Values per day were calculated by dividing the total number of views and comments by the total number of days elapsed since the video was uploaded on YouTube.

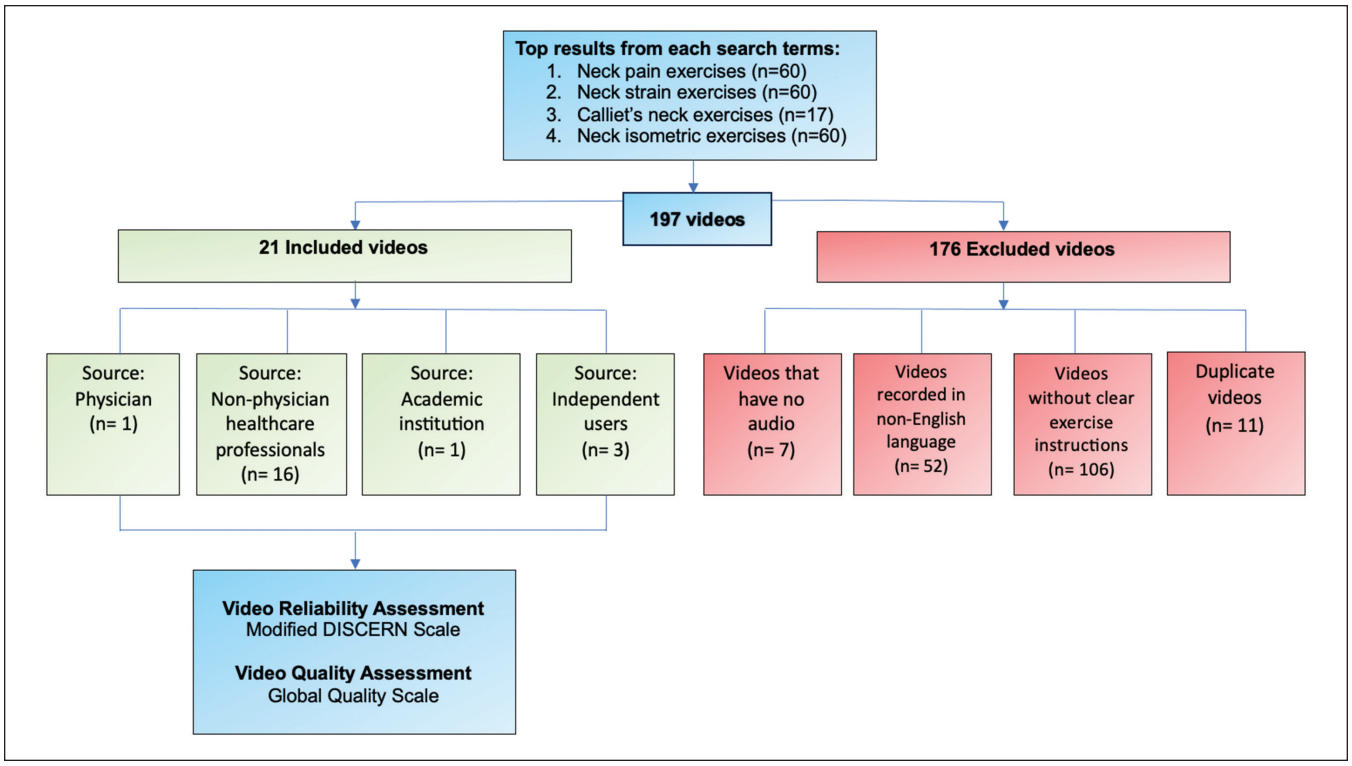

Figure 1. Flowchart for video selection.

Video sources

The YouTube profile or page and relevant external links, where available, providing information on the video source (i.e., owner/ creator/ uploader/ narrator of the video), were explored to conduct background checks on the source's account details and job description. Each video was then categorized according to the following upload source: (1) physicians, (2) nonphysician healthcare professionals (e.g., DPT, physical therapists, chiropractors), (3) video uploads associated with academic institutions, or (4) independent users (e.g., patients, coaches, fitness instructors).[11]

Evaluating video quality and reliability

The video materials were reviewed, including the exercise indications and correct execution. Each included video was subjected to scrutiny by two Physical Medicine and Rehabilitation specialists (V.Y. and E.G.) currently practicing at St. Luke's Medical Center – Quezon City. They have more than ten years of clinical practice and are coauthors of this present study. Both physiatrists were blinded to each other's responses. Following the study by Charnock et al., the five-point Global Quality Scale (GQS) was used to assess the quality of each video, while a modified five-point DISCERN tool was used to assess the video's reliability in providing health-related information.[12]

Because there are no established standards for evaluating video quality, we followed an arbitrary scoring system based on the GQS score ranges used in previous studies: excellent quality (4.21 - 5.00 points), good quality (3.41 - 4.20 points), moderate quality (2.61 - 3.40 points), generally poor quality (1.81 - 2.60 points), and very poor quality (1.00 - 1.80 points).[2,13] This tool (Table 1) was originally developed to evaluate website resources and assess the flow and ease of use of the information available.[13] Both evaluators independently watched all the included videos and rated the quality of each one from a minimum score of 1 (worst quality) to a maximum score of 5 (best quality).

The reliability of the videos was assessed using the modified DISCERN scale (DS), which evaluates the clarity of evidence sources and quality without requiring specialist knowledge or reference to other publications.[12] The modified DS includes five questions (Table 1). One point is given for every "yes" answer, with five points being the highest possible score for each video. Higher scores indicate higher reliability of videos.

Because video quality and reliability inherently involve qualitative interpretation, variability between raters is expected. Therefore, inter-rater agreement was quantified using the intraclass correlation coefficient (ICC) for both GQS and DS scores. The ICC values allowed objective measurement of consistency and provided transparency regarding the strength of agreement. Any differences between rater scores were not forced into consensus because maintaining independent evaluations is consistent with established methodology for the GQS and DISCERN tools. These tools rely on expert judgment, and documenting

Table 1. Assessment Tools for Quality and Reliability Assessment of the YouTube Videos

Quality assessment using the Global Quality Scale (scored based on the following characteristics):
Score of 1: Poor quality, poor flow, most information missing, not helpful for patients.
Score of 2: Generally poor, some information given but of limited use to patients.
Score of 3: Moderate quality, some important information is adequately discussed.
Score of 4: Good quality, good flow, most relevant information is covered, useful for patients.
Score of 5: Excellent quality and excellent flow, very useful for patients.
Reliability assessment using the modified 5-point DISCERN scale (one point is given for every yes; highest possible score is five):
1. Is the video clear, concise, and understandable?
2. Are valid sources cited?
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?

natural variability provides a realistic representation of how different clinicians may perceive the same video. A similar methodology was used in prior studies.[2,12,14,15]

Statistical Analysis

All data were recorded and analyzed using SPSS version 25. Continuous variables were presented, where applicable (e.g., GQS and DS scores), and compared across video sources using means (standard deviations, SD), while categorical variables were expressed as counts (frequencies and percentages [%]). Inter-rater agreement was determined using Cohen's kappa score. Inter-rater reliability was evaluated for reliability (DS) and quality (GQS) using the concordance correlation coefficient (CC). CC values ≤ 0 are interpreted as no agreement, 0.01–0.20 as none to slight, 0.21–0.40 as fair, 0.41– 0.60 as moderate, 0.61–0.80 as substantial, and 0.81–1.00 as almost perfect agreement. The ICC provided an objective measure of how similarly the two evaluators rated each continuous outcome, which is essential because both tools (GQS and DISCERN) contain subjective elements and may naturally yield variation between raters. ICC has been widely used to evaluate interrater reliability across medical care and is consistent with established methodology in YouTube quality-assessment research.[16] Data were analyzed at a 95% confidence level, and p-values <0.05 were considered statistically significant.

Statistical comparisons between video-source groups (e.g., ANOVA or nonparametric equivalents) were not performed due to small and uneven sample sizes, particularly in categories with only one or two videos (source: physician and academic institutions). Applying inferential tests under these conditions may yield unstable or misleading results. Therefore, descriptive comparisons were used, consistent with established methodologies in YouTube-quality assessment research.[16]

Ethical Considerations

Our research did not involve participation by non-authors. It did not involve any interaction with the person or group who posted/uploaded any videos or comments online.

RESULTS

YouTube generated a total of 197 videos for the first 20 pages of the search results. Of these, the following were excluded for not meeting the eligibility criteria: 52 were not in English, 7 had no relevant audio, 106 contained real-life cases but without training configuration/ educational value, and 11 were duplicates. There were no sponsored videos. Hence, 21 videos reached analysis. The mean duration of the videos was 5.9 minutes (range: 1.26–11.38). The mean view count and number of comments were 638,707 (range: 71–3,435,651) and 450 (0–1,899), respectively (Table 2).

As shown in Table 3, the majority of the videos were deemed to have moderate quality (n=11/21; 52.38%) based on the GQS. Meanwhile, more than 76% of the videos (n=16/21) were uploaded by non-physician healthcare professionals, and the majority of them had moderate (56.25%) to good (31.25%) quality. On the other hand, 66.67% of the videos (n=2/3) that came from independent users had generally poor quality. In terms of interrater reliability assessment (Table 4), the intraclass correlation coefficient (ICC) value for the GQS was 0.253 (95% CI 0.001–0.522, p=0.051), indicating fair agreement between two raters. On the other hand, the ICC value for the DS was 0.183 (95% CI 0.001–0.379, p=0.022), indicating no to slight agreement between two raters. The evaluation of interrater reliability was not conducted for physician sources and video uploads related to academic institutions, as there was only one video found for each category. Videos produced by non-physician healthcare professionals and independent users attained significantly

Table 2. General Features of Included Videos

Video features	Mean (SD)	Range (min–max)
Total duration (seconds)	358.08 (191.60)	75.6–682.8
Total view counts	638,707 (880,649.87)	71–3,435,651
Total number of comments	450.80 (21,072.24)	0–1,899
Total likes	10,141.14 (12,615.66)	0–42,536
Total dislikes	0	0

SD: Standard deviation

Table 3. Categorization of the Videos according to Sources and Quality Based on the Global Quality Scale, n (%)

Source	Very poor quality	Generally poor quality	Moderate quality	Good quality	Excellent quality	Total (per video source)
Physician	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	1 (4.76)
Non-physician healthcare professionals	0 (0)	1 (6.25)	9 (56.25)	5 (31.25%)	1 (6.25)	16 (76.19)
Video uploads associated with academic institutions	0 (0)	0 (0)	1 (100)	0 (0)	0 (0)	1 (4.76)
Independent users	0 (0)	2 (66.67)	0 (0)	1 (33.33)	0 (0)	3 (14.29)
Total (per level of video quality)	0 (0)	3 (14.29)	11 (52.38)	6 (28.57)	1 (4.76)	21 (100)

Table 4. Interrater Reliability for Video Quality and Reliability Assessments according to Video Sources

Source	Quality (based on the GQS)			Reliability (based on the DS)		
	ICC	95% CI	*p*-value	ICC	95% CI	*p*-value
Physician	N/A	N/A	N/A	N/A	N/A	N/A
Non-physician healthcare professionals	0.200	0.001–0.496	0.208	0.211	0.001–0.474	0.020*
Video uploads associated with academic institutions	N/A	N/A	N/A	N/A	N/A	N/A
Independent users	0.250	0.001–0.550	0.083	0.143	0.001–0.402	0.020*
Overall	0.253	0.001–0.522	0.051	0.183	0.001–0.379	0.022*

GQS: Global Quality Scale; DS: DISCERN Scale; ICC: Intraclass correlation coefficient; N/A: Not applicable.

**significant if p-value <0.05.*

Table 5. Global Quality Scale (GQS) and Modified DISCERN Scale (DS) Scores, and Number of Views and Comments per Day according to Video Sources

Source	GQS, Mean (min-max)	DS, Mean (min-max)	Views per day, Mean (min-max)	Comments per day, Mean (min-max)
Physicians	3 (3–3)	2 (2–2)	63.69	0.01
Non-physician healthcare professionals	3.2 (2–5)	1.8 (1–3)	815.73 (5.30–6,412.46)	0.51 (0.00– 2.70)
Video uploads associated with academic institutions	3 (3–3)	1.5 (1–2)	0.19	0
Independent users	2.9 (2–4)	2.3 (1–4)	51.44 (0.65–109.67)	32,345 (0–97,000)
Total average regardless of source	3.17	1.9	638,707.048	5,065.2381

high overall DS scores (p=0.022). Likewise, videos produced by these sources achieved significant reliability scores (p=0.020 and p=0.020, respectively) (Table 4).

Regardless of upload source, the included videos had a mean GQS score of 3.17, indicating moderate quality, and a mean DS score of 1.9, indicating a low reliability score (Table 5). Considering the upload sources, the highest mean GQS score (mean: 3.2, range: 2–5) came from videos uploaded by non-physician healthcare professionals. Meanwhile, the highest mean DS score (mean: 2.3, range: 1–4) came from videos uploaded by independent users. It seems that the relatively lowest-quality videos (GQS mean: 2.9) came from independent users, while the relatively least-reliable videos (DS mean: 1.5) were uploaded by academic institutions. Videos from non-physician healthcare professionals and independent users seemed to have the greatest interactions in terms of views and comments, respectively (Table 5).

Good quality videos had higher mean DS scores than videos of moderate or poor quality (Table 6). According to uploaders, the videos, which were uploaded by independent users, had the highest video quality compared to videos uploaded by non-physician healthcare professionals. Based on Table 6, it seems that the average daily views, comments, and likes did not necessarily mean the videos had good quality and reliability. There were videos of generally poor quality (e.g., those that came from independent users) that had greater mean views, comments, and likes per day compared to videos with good quality.

Table 6. Modified DISCERN Scale (DS) Mean Scores, Average Daily Views and Comments, and Likes of Videos according to Video Quality

Video quality (based on Global Quality Scale)	DS (Mean)	Views per day (Mean)	Comments per day (Mean)	Number of likes per video source (Mean)
Non-physician healthcare professionals				
Generally poor quality	2.5	5.30	0.00	107
Moderate quality	3.0	1,173.94	0.67	1,4354.33
Good quality	3.6	248.14	0.30	7,155.2
Independent users				
Generally poor quality	2.5	55.16	53.89	1,334.5
Good quality	4.0	44.00	0.02	1,238.0
Overall				
Generally poor quality	2.5	38.54	35.93	925.33
Moderate quality	3.0	966.30	0.60	11,876.18
Good quality	3.67	214.11	0.25	6,169.0

DISCUSSION

Patients increasingly turn to the internet for information on diseases, symptoms, diagnoses, and treatments, with YouTube becoming a leading resource. The quality and reliability of online health information are crucial, as they can significantly impact healthcare outcomes. Isometric exercises, like Calliet's exercise, are effective non-pharmacological interventions for reducing neck pain and improving functional capacity.[4] Research on the usefulness of YouTube videos in medicine shows mixed results; some highlight lower quality or outdated information, while others praise the quality.[2,6,7,9,10] Overall, delivering reliable medical information through videos remains a challenge.

Many YouTube videos on neck isometric exercises have inaccurate execution descriptions, often focusing on unrelated neck pain conditions like spondylosis and radiculopathy. Videos presenting instructions or rationales inconsistent with established techniques—such as incorrect hold durations, improper repetitions, or outdated neck pain concepts—were flagged during the GQS and modified DISCERN assessments. These discrepancies contributed to lower scores in quality and reliability. Inaccurate execution of exercises was evaluated through the reviewers' clinical expertise. Both physiatrists independently assessed whether the demonstrated movements matched proper isometric technique (e.g., correct hand placement, appropriate resistance, avoidance of compensatory motions). Videos demonstrating incorrect or unsafe execution were scored lower under the GQS criteria related to quality, clarity, and usefulness for patients, and these issues directly impacted the evaluators' overall scoring. The assessment of isometric neck exercise videos on YouTube found that content quality was generally moderate but varied by source. Videos from non-physician healthcare professionals tended to be of moderate quality, while those from independent users were mostly of poor quality, indicating inadequate reliability and public education overall. Based on the data presented, videos of good quality had higher reliability scores compared to those of moderate or poor quality. Of the 16 videos uploaded by non-healthcare professionals, only 1 was rated poorly, while 2 out of 3 independent user videos were of poor quality. These findings emphasize the need for high-quality, accurate videos for educational purposes. Notably, videos by non-physician healthcare professionals garnered the most views. A study by Kocyigit et al. assessed the quality of YouTube videos on secukinumab treatment, finding no significant differences in views, comments, or likes across different video quality levels.[17] Therefore, these metrics should not be used as indicators of video quality on YouTube.[10,17]

Limitations

This study had a few limitations worth noting. Firstly, there was a relatively small number of videos that met the inclusion criteria. Although the initial search yielded 197 videos, only 21 were eligible for analysis after applying the predefined exclusion criteria (e.g., non-English content, lack of audio explanation, absence of educational value, and duplicate uploads). This limited pool, combined with the uneven distribution across uploader categories (with only one video provided by both physicians and independent users), reduced the statistical power and restricted the use of more robust inferential comparisons between groups. As a result, the video analysis focused on comparing non-physician health care professionals with independent users; hence, the findings should be interpreted with caution. Future studies would benefit from larger and more balanced samples to allow for more comprehensive statistical analyses. Secondly, the assessment was limited to videos from YouTube, which may affect the generalizability of the findings to other platforms. Lastly, the content on YouTube is continuously changing, and audience interaction parameters were analyzed at a single point in time, which may not reflect ongoing trends. Future research should include qualitative feedback on content and further investigate the correlation between video quality and reliability.

CONCLUSION

Isometric neck exercise videos on YouTube generally exhibit moderate quality and low reliability scores, which vary depending on the source. Although the number of included videos decreased substantially from the initially screened 197 to only 21 eligible videos, this reduction itself highlights an important finding with practical implications. The strict inclusion and exclusion criteria were necessary to ensure that only videos demonstrating true cervical isometric exercises with clear instructional value were evaluated. The fact that the majority of videos were excluded primarily due to lack of educational content, absence of proper exercise demonstration, non-English audio, or irrelevant content reveals a significant shortage of accurate, evidence-based neck exercise materials available to the public on YouTube. Rather than diminishing the study's impact, the limited number of eligible videos underscores the need for greater clinician involvement in producing accessible, high-quality instructional content. The scarcity of appropriate videos suggests that many users searching for guidance may rely on suboptimal or misleading resources, which can have implications for patient safety and adherence to proper rehabilitation techniques. Therefore, the study provides meaningful insight into an under-recognized gap in online patient education and reinforces the necessity of developing reliable digital rehabilitation tools that can meet the needs of a rapidly growing audience seeking medical information online. Videos made by non-healthcare professionals often rank higher in quality than those from independent users, with better quality correlating to higher reliability. However, YouTube content is constantly being updated, which means that popular videos may not always provide accurate information. To improve the quality and reliability of these resources, medical professionals and institutions should produce videos with precise information and high-quality visuals, allowing for better evaluation of the content.

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Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Declaration

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