

# Quality and reliability of YouTube videos on cardiac rehabilitation exercises

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## Ethics Committee Approval

Ethical approval was not required because this study used only publicly available, anonymous YouTube data and did not involve human participants, patient records, personal identifiers, or any intervention. All procedures complied with user privacy principles and the YouTube Terms of Service.

## Conflict of Interest

No conflict of interest was declared by the authors.

## Financial Disclosure

The authors declared that this study has received no financial support.

## Previous Presentation

The abstract was accepted for presentation at the 8th International Congress of Multidisciplinary Scientific Studies and Global Applications, September 25-20, 2024, Dubai, United Arab Emirates.

## Published

2026 May 7

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## Abstract

**Background/Aim:** YouTube is widely used by patients and caregivers seeking exercise-related health information; however, the scientific accuracy and clinical reliability of this content remain uncertain. This study aimed to evaluate the quality and reliability of YouTube videos on cardiac rehabilitation exercises for individuals with chronic heart disease.

**Methods:** A total of 124 YouTube videos were initially screened, and 67 videos that met the inclusion criteria were analyzed. Video characteristics, including duration, time since upload, views, likes, dislikes, comments, and upload source, were recorded. Each video was assessed using the Journal of the American Medical Association benchmark criteria, the Global Quality Scale, and the DISCERN score.

**Results:** The analyzed videos had a mean (SD) view count of 26,720.92 (68,307.01), comment count of 2.79 (7.68), like count of 149.74 (529.59), and dislike count of 0 (0). The total number of views was significantly correlated with the Global Quality Scale score ( $r = -0.368$ ;  $P = 0.002$ ) and the DISCERN score ( $r = -0.279$ ;  $P = 0.022$ ). Likes, time since upload, video power index, and video duration were not significantly correlated with overall DISCERN, Global Quality Scale, or Journal of the American Medical Association scores ( $P = 0.071-0.921$ ).

**Conclusion:** YouTube videos on cardiac rehabilitation exercises demonstrated generally good quality but only moderate reliability. Nevertheless, these findings do not mean that all videos are clinically appropriate for every patient. Individuals should consult a physician or physiotherapist before performing exercises demonstrated in online videos.

**Keywords:** cardiac rehabilitation, exercise videos, YouTube, digital health, quality and reliability

## Introduction

Cardiac exercise plays a central role in the secondary prevention of cardiovascular events and in the reduction of modifiable risk factors. Cardiac rehabilitation (CR), a multidisciplinary intervention targeting these risks in patients with chronic heart disease, has been shown to reduce mortality and hospitalization rates [1].

Despite its clinical benefits, participation in center-based CR programs remains limited. Common barriers include transportation difficulties, restricted access to facilities, lack of motivation, and inadequate social support. In response to these challenges, recent evidence supports the effectiveness and feasibility of home-based CR as an alternative to traditional center-based programs [2].

In parallel with the widespread use of smartphones, internet-based health information seeking has also increased. Patients frequently consult online resources to learn about their conditions and available treatment options [3]. According to YouTube statistics from 2022, daily views of exercise videos containing terms such as “no-equipment” or “at-home” increased nearly fourfold after the onset of the COVID-19 pandemic [4].

Previous studies have evaluated the quality and reliability of YouTube videos across various health domains, including chronic disease education [5], surgical interventions [6], invasive procedures [7], and musculoskeletal disorders and related therapeutic exercises [8]. Although online platforms are increasingly used for patient education, video content is not subject to peer review or standardized quality control. Consequently, the accuracy, reliability, and scientific validity of health-related videos often remain uncertain [6, 9].

Although YouTube enforces strict copyright policies, it does not apply the same level of scrutiny or quality control to the medical content uploaded to its platform. Given the growing problem of online health misinformation, evaluating the reliability of disease-specific information on widely used platforms is essential [6]. To date, no study has examined the quality and reliability of YouTube exercise videos specifically targeting patients with chronic heart disease. Therefore, the present study aimed to assess the quality and reliability of cardiac rehabilitation exercise videos available on YouTube.

## Materials and methods

This study was designed as an observational, cross-sectional content analysis. During January and February 2024, video content available on YouTube ([www.youtube.com](http://www.youtube.com)) was searched using the keywords “cardiac rehabilitation”, “exercises for cardiac patients”, “exercise for heart disease”, and “cardiac physical therapy”. A total of 124 videos were identified through these searches. Two physiotherapists, one academician (reviewer 1, R1) and one clinician (reviewer 2, R2), each with 10 years of professional experience, independently evaluated the videos. The mean scores of the two independent raters were used in the analysis. Because the aim of the study was not to measure inter-rater agreement, inter-rater reliability statistics, such as the intraclass correlation coefficient or kappa, were not calculated.

The inclusion criteria were as follows: the video had to be posted on YouTube, presented in English, and appear on the

search page using the predefined keywords. Videos were excluded if they were not in English, lasted longer than 60 minutes or shorter than 1 minute, had no sound, contained irrelevant content, consisted solely of music, or included advertising material. After all videos were watched in full, the 67 most-viewed videos that met the inclusion criteria were selected for final analysis.

For each of the 67 videos, the following characteristics were recorded: total number of views, comments, likes, dislikes, days since upload, video power index (VPI), and duration in minutes. This methodological approach has been used in similar studies [10-12]. To assess video popularity, VPI was calculated. First, the like ratio ( $\text{likes} \times 100 / [\text{likes} + \text{dislikes}]$ ) and view ratio ( $\text{number of views} / \text{days}$ ) were determined. The VPI was then calculated using the following formula:  $\text{like ratio} \times \text{view ratio} / 100$  [9, 13]. Videos were further assessed according to the Journal of the American Medical Association (JAMA) benchmark criteria, the Global Quality Scale (GQS), and the DISCERN score.

### Video reliability

Reliability was evaluated using the JAMA benchmark criteria, which assess content across four domains: authorship, attribution, disclosure, and currency. Each criterion present is awarded 1 point, producing a total score from 0 to 4. A score of 1 indicates insufficient information about the video source, scores of 2-3 indicate partially sufficient information, and a score of 4 indicates completely sufficient information [14-16].

### Video quality

Video quality was evaluated using the GQS and DISCERN scales. The GQS assesses online content using five items and produces scores from 1 to 5. Videos scoring 1-2 are classified as low quality, a score of 3 indicates moderate quality, and scores of 4-5 indicate high quality [17, 18]. The DISCERN tool includes three sections and 16 items: eight items assessing information reliability, seven items assessing treatment information, and one item assessing overall information quality. Scores range from a minimum of 16 to a maximum of 80 points [19].

This study was conducted using publicly available and anonymous YouTube data. No personal information was collected, and all procedures adhered to user privacy and the YouTube Terms of Service. Therefore, ethics committee approval was not required [12, 18, 20-23].

### Statistical analysis

All data were analyzed using SPSS software (version 21; IBM Corp., Armonk, NY, USA). Normality was assessed using the Kolmogorov-Smirnov test. Descriptive statistics were presented as mean (SD), median, minimum, maximum, and percentage values. Because the data were not normally distributed, Mann-Whitney U and Kruskal-Wallis tests were used for intergroup comparisons. Spearman correlation analysis was used to evaluate relationships between parameters.  $P < 0.05$  was considered statistically significant.

## Results

The analyzed videos had a mean (SD) of 26,720.92 (68,307.01) views, 2.79 (7.68) comments, and 149.74 (529.59) likes, with no dislikes. Videos had been uploaded for a mean (SD) of 1,218.26 (431.74) days. The mean (SD) VPI was 11.79 (39.28), and the mean (SD) video duration was 26.84 (14.94) minutes. In

the quality assessments, the mean (SD) DISCERN score was 52.13 (5.48) (R1: 51.28 [6.26]; R2: 52.98 [6.86]), the mean (SD) GQS score was 3.64 (0.68) (R1: 3.73 [1.16]; R2: 3.55 [0.68]), and the mean (SD) JAMA score was 2.21 (0.47) (R1: 2.20 [0.50]; R2: 2.22 [0.57]) (Table 1).

Analysis of content creators showed that most videos were produced by personal trainers (52.2%), followed by exercise physiologists (26.9%), physiotherapists (13.4%), and physicians (7.5%). GQS scores were predominantly high (52.2%) (Table 2).

Table 1. Descriptive characteristics of videos

	Mean	SD	Median	Minimum	Maximum
Total number of views	26,720.92	68,307.01	1,271	110	388,000
Total number of comments	2.79	7.68	0	0	44
Number of likes	149.74	529.59	6	0	3,500
Number of dislikes	0	0	0	0	0
Time since upload (day)	1,218.26	431.74	1,257	240	2,920
VPI	11.79	39.28	0.64	0	278.65
Video duration (minute)	26.84	14.94	22.29	4.48	58
Overall DISCERN score	52.13	5.48	53	32	62
R1 DISCERN score	51.28	6.26	53	27	62
R2 DISCERN score	52.98	6.86	53	35	70
Overall GQS score	3.64	0.68	4	2	5
R1 GQS score	3.73	1.16	4	1	5
R2 GQS score	3.55	0.68	4	2	5
Overall JAMA score	2.21	0.47	2	1	4
R1 JAMA score	2.20	0.50	2	1	4
R2 JAMA score	2.22	0.57	2	2	4

VPI: video power index, R1: reviewer 1, R2: reviewer 2, GQS: Global Quality Scale, JAMA: Journal of the American Medical Association.

Table 2. Evaluation of content creators

Variable	Category	n = 67	%
Content creator	Physician	5	7.5
Content creator	Exercise physiologist	18	26.9
Content creator	Physiotherapist	9	13.4
Content creator	Personal trainer	35	52.2
GQS score	Low	9	13.4
GQS score	Moderate	23	34.3
GQS score	High	35	52.2

GQS: Global Quality Scale, n: number of videos, %: percentage.

Physiotherapists' videos had the highest number of views and likes, with 79,250 (15,991.18) views and 696.66 (1,331.13) likes, followed by exercise physiologists and other creator groups. Physicians' videos had been on the platform the longest, with 1,455 (753.88) days since upload, whereas exercise physiologists were the newest contributors, with 1,025.55 (291.26) days since upload. VPI was highest for physiotherapists (48.12 [96.56]) and lowest for exercise physiologists (3.38 [10.87]). Video duration was longest for personal trainers (32.01 [16.17] minutes) and shortest for physicians (16.95 [18.52] minutes). DISCERN and GQS scores were highest for physiotherapists, whereas JAMA scores were highest for physicians, with minor differences between reviewers (Table 3).

Table 4 shows video characteristics according to GQS-based video quality. Low-quality videos had the highest mean number of views (88,471.11 [65,511.83]), whereas high-quality videos had the highest mean number of likes (198.57 [713.81]). The DISCERN score was also highest among high-quality videos (overall: 54.68 [2.64]; R1: 54.34 [2.48]; R2: 55.02 [4.28]). JAMA scores were higher among moderate-quality videos. The oldest content consisted of high-quality videos (1,336.62 [372.80] days), whereas the newest content belonged to moderate-quality videos. Video duration was longest for low-quality videos and shortest for moderate-quality videos.

Table 3. Video characteristics according to content creators

	Physician	Exercise physiologist	Physiotherapist	Personal trainer
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Total number of views	29,089.4 (32,482.81)	1,395.05 (3,188.53)	79,250 (15,991.18)	25,899.83 (48,468.19)
Number of likes	275.8 (273.10)	21.27 (59.67)	696.66 (1,331.13)	57.17 (133.75)
Time since upload (day)	1,455 (753.88)	1,025.55 (291.26)	1,248 (728.08)	1,275.91 (310.29)
VPI	23.28 (25.07)	3.38 (10.87)	48.12 (96.56)	5.14 (14.73)
Video duration (minute)	16.95 (18.52)	22.83 (9.06)	20.26 (11.06)	32.01 (16.17)
Mean DISCERN score	50.4 (6.97)	52.86 (4.77)	55.55 (3.52)	51.12 (5.78)
R1 DISCERN score	42.80 (9.62)	52.66 (3.94)	55 (3.52)	50.6 (6.04)
R2 DISCERN score	58 (10.22)	53.05 (5.96)	55.22 (6.11)	51.65 (6.75)
Overall GQS score	2.90 (0.54)	3.91 (0.46)	4.05 (0.39)	3.5 (0.73)
R1 GQS score	1.80 (0.83)	4.22 (0.54)	4.22 (1.09)	3.62 (1.16)
R2 GQS score	4 (1)	3.61 (0.60)	3.88 (0.60)	3.37 (0.64)
Overall JAMA score	2.50 (1)	2.13 (0.41)	2.27 (0.44)	2.2 (0.40)
R1 JAMA score	2.2 (1.09)	2.11 (0.32)	2.22 (0.44)	2.25 (0.50)
R2 JAMA score	2.80 (1.09)	2.16 (0.51)	2.33 (0.70)	2.14 (0.42)

VPI: video power index, R1: reviewer 1, R2: reviewer 2, GQS: Global Quality Scale, JAMA: Journal of the American Medical Association, SD: standard deviation.

Table 4. Video characteristics according to video quality

	Low quality	Moderate quality	High quality
	Mean (SD)	Mean (SD)	Mean (SD)
Total number of views	88,471.11 (65,511.83)	7,200.82 (11,871.44)	23,669.80 (81,728.33)
Number of likes	89 (221.46)	99.21 (167.76)	198.57 (713.81)
Time since upload (day)	1,231.33 (73.25)	1,033.04 (533.14)	1,336.62 (372.80)
VPI	8.04 (20.02)	10.71 (20.06)	13.47 (51.31)
Video duration (minute)	38.11 (20.55)	19.27 (10.40)	28.92 (13.68)
Overall DISCERN score	42.88 (4.87)	51.86 (5.04)	54.68 (2.64)
R1 DISCERN score	40.33 (6.85)	50.91 (5.18)	54.34 (2.48)
R2 DISCERN score	45.44 (6.54)	52.82 (8.20)	55.02 (4.28)
Overall GQS score	2.38 (0.22)	3.30 (0.24)	4.18 (0.24)
R1 GQS score	1.88 (0.60)	3.21 (0.85)	4.54 (0.56)
R2 GQS score	2.88 (0.33)	3.39 (0.83)	3.82 (0.45)
Overall JAMA score	1.88 (0.22)	2.39 (0.58)	2.18 (0.38)
R1 JAMA score	1.77 (0.44)	2.34 (0.57)	2.22 (0.42)
R2 JAMA score	2 (0)	2.43 (0.78)	2.14 (0.42)

VPI: video power index, R1: reviewer 1, R2: reviewer 2, GQS: Global Quality Scale, JAMA: Journal of the American Medical Association, SD: standard deviation.

Significant differences by video quality were observed for total views ( $P = 0.008$ ), time since upload ( $P = 0.030$ ), video duration ( $P = 0.002$ ), overall DISCERN score ( $P < 0.001$ ), R1 DISCERN score ( $P < 0.001$ ), R2 DISCERN score ( $P < 0.001$ ), overall GQS score ( $P < 0.001$ ), R1 GQS score ( $P < 0.001$ ), R2 GQS score ( $P < 0.001$ ), overall JAMA score ( $P = 0.019$ ), and R1 JAMA score ( $P = 0.014$ ). Significant differences by content creator were observed for total views ( $P = 0.046$ ), likes ( $P = 0.005$ ), VPI ( $P = 0.016$ ), video duration ( $P = 0.021$ ), R1 DISCERN score ( $P = 0.001$ ), overall GQS score ( $P = 0.002$ ), and R1 GQS score ( $P < 0.001$ ). Intergroup comparisons of video characteristics by video quality and content creator are presented in Table 5.

The total number of views had a statistically significant negative correlation with the overall DISCERN score ( $r = -0.279$ ;  $P = 0.022$ ) and the overall GQS score ( $r = -0.368$ ;  $P = 0.002$ ). The number of likes, time since upload, VPI, and video duration were

not significantly correlated with overall DISCERN, GQS, or JAMA scores ( $P = 0.071-0.921$ ) (Table 6).

**Table 5. Intergroup comparison of video characteristics by video quality and content creators**

	Video quality (low = 1, moderate = 2, high = 3)			Content creator (physicians = 1, exercise physiologists = 2, physiotherapists = 3, personal trainers = 4)		
	H	P	Group(s) with difference	H	P	Group(s) with difference
Total number of views	5.251	0.008	1, 2; 1, 3	2.818	0.046	2, 3
Number of likes	0.306	0.737	-	4.672	0.005	2, 3; 3, 4
Time since upload	3.719	0.030	2, 3	2.006	0.122	-
VPI	0.079	0.924	-	3.730	0.016	2, 3; 3, 4
Video duration (minute)	6.896	0.002	1, 2; 2, 3	3.491	0.021	2, 3
Overall DISCERN score	32.347	<0.001	1, 2; 1, 3; 2, 3	1.906	0.138	-
R1 DISCERN score	38.309	<0.001	1, 2; 1, 3; 2, 3	6.360	0.001	1, 2; 1, 3; 1, 4
R2 DISCERN score	8.606	<0.001	1, 2; 1, 3	1.699	0.176	-
Overall GQS score	228.146	<0.001	1, 2; 1, 3; 2, 3	5.437	0.002	1, 2; 1, 3
R1 GQS score	64.761	<0.001	1, 2; 1, 3; 2, 3	8.423	<0.001	1, 2; 1, 3; 1, 4
R2 GQS score	9.911	<0.001	1, 2; 1, 3; 2, 3	2.480	0.069	-
Overall JAMA score	4.219	0.019	1, 2; 2, 3	0.827	0.484	-
R1 JAMA score	4.561	0.014	1, 2; 2, 3	0.319	0.812	-
R2 JAMA score	2.735	0.073	-	2.205	0.096	-

VPI: video power index, R1: reviewer 1, R2: reviewer 2, GQS: Global Quality Scale, JAMA: Journal of the American Medical Association.  $P < 0.05$  was considered statistically significant.

**Table 6. Correlations between video characteristics and overall mean quality and reliability scores**

Variable	Coefficient	DISCERN score	GQS score	JAMA score
Total number of views	r	-0.279*	-0.368**	0.222
Total number of views	P	0.022	0.002	0.071
Number of likes	r	0.108	-0.026	0.178
Number of likes	P	0.384	0.834	0.148
Time since upload	r	0.157	0.176	-0.172
Time since upload	P	0.203	0.155	0.163
VPI	r	0.105	-0.012	0.186
VPI	P	0.399	0.921	0.132
Video duration	r	0.077	0.142	-0.123
Video duration	P	0.537	0.253	0.322

VPI: video power index, GQS: Global Quality Scale, JAMA: Journal of the American Medical Association, r: correlation coefficient. \* $P < 0.05$ , \*\* $P < 0.01$ .

## Discussion

The findings of this study indicate that YouTube videos on cardiac rehabilitation exercises show considerable variation in source reliability and content quality. The internet has become a major source of health information, particularly for chronic diseases, underscoring the growing importance of e-health literacy [24]. YouTube, one of the most widely used video-sharing platforms worldwide, hosts many videos addressing the etiopathogenesis, prevention, diagnosis, and treatment of various diseases. Although YouTube provides free access to video content, it lacks a standardized mechanism for monitoring the quality, accuracy, and reliability of the medical information presented.

Keelan et al. [25] published the first study evaluating YouTube videos in 2007, focusing on vaccination-related content.

Since then, numerous studies have examined the quality of YouTube videos on different diseases [26].

The number of views is widely accepted as a key indicator of video popularity. Users can also engage with content by liking or disliking videos and leaving comments. Previous orthopedic studies reported mean view counts of 50,477.9 for posterior cruciate ligament videos, 30,131.6 for kyphosis videos, 71,152 for scoliosis videos, and 150,977.4 for carpal tunnel syndrome videos [27-30]. These findings highlight the broad popularity of YouTube content. In line with this pattern, cardiac rehabilitation exercise videos attracted substantial interest, suggesting wide reach and visibility. However, inflated view counts and likes may sometimes reflect purchased engagement rather than genuine user interaction.

Our analysis showed that high-quality videos were primarily uploaded by health-related professionals, particularly physiotherapists and exercise physiologists. Similarly, other studies have reported that high-quality videos often originate from professional or academic sources, whereas low-quality videos are frequently produced by advertisers, non-profit organizations, or independent users [20, 31, 32]. These findings emphasize the importance of evaluating video sources when using YouTube for health information. Healthcare professionals and institutions should be encouraged to create accurate, unbiased, and educational content. Patients should also be educated about the relevance of upload source when seeking health-related information online.

In a study of YouTube videos related to ankylosing spondylitis exercises, 48.2% of videos were rated as high quality, 17.9% as moderate quality, and 33.9% as low quality, with DISCERN scores showing significant associations with dislike counts. The authors concluded that YouTube is an important platform for accessing high-quality exercise-related videos [23]. In contrast, an analysis of fibromyalgia exercise videos reported that most patient-directed content was low quality (66.7%) or moderate quality (27.0%), whereas videos directed at healthcare professionals were generally of higher quality [33]. This pattern supports the view that reliable health information is more often produced by academic or professional sources. To further improve content quality, video providers should include references and clear source information, allowing patients to access more comprehensive and trustworthy health resources.

In the present study, total view count was negatively correlated with DISCERN and GQS scores. This finding suggests that popularity alone should not be interpreted as a marker of quality or reliability. Therefore, patients and clinicians should approach highly viewed health-related videos cautiously and evaluate whether the content source, references, and clinical messages are appropriate [34].

This study has several limitations. First, video quality was assessed using the GQS and DISCERN tools, which include subjective components. Second, videos were analyzed at a single time point, although YouTube is a dynamic platform where content changes continuously. Third, only English-language videos were included. Fourth, search results may have been influenced by geographic location and previous search history. Fifth, inter-rater agreement was not statistically assessed, which should be considered when interpreting the results. The YouTube

searches were conducted using a standard account without controlling for search personalization factors such as browser history, location settings, or algorithm-based recommendations. As a result, search results may vary across users and time points, which may limit the reproducibility of the study.

In conclusion, YouTube videos on cardiac rehabilitation exercises demonstrated moderate reliability and good overall quality, with substantial user engagement. However, view counts and likes should not be assumed to indicate clinical reliability. To improve e-health literacy, public education initiatives and reliable online resources should be developed by healthcare institutions. Regulatory authorities should also evaluate whether online content, particularly on platforms such as YouTube, is accurate, beneficial, and free from misleading information. Stronger strategies and policies are needed to filter erroneous content and ensure that patients have access to safe and scientifically sound health information.

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