



Content Analysis of Exercise Videos Related to Hemiplegia Published on Youtube

Article Info

Article History

Received: 04.01.2026

Accepted: 27.03.2026

Published: 25.04.2026

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Keywords:

JAMA; Quality;
Reliability; Stroke;
Hemiplegia

ABSTRACT

Purpose: The aim of this study is to analyze the content of YouTube hemiplegia exercise videos and determine the quality and reliability of these videos.

Methods: Videos were searched using the search terms "hemiplegia rehabilitation," "hemiplegia exercises," and "hemiplegia physiotherapy" on the YouTube search engine. Video quality and reliability were evaluated using Global Quality Score (GQS) and Journal of American Medical Association (JAMA) Benchmark criteria. Descriptive features of the videos were recorded.

Results: Data from 37 videos were analyzed. The median JAMA score of the videos was 2 and the median GQS was 3. According to GQS, 56.7% of videos were moderate-high quality and 43.2% were low quality. There was no difference between low-quality and moderate-high quality videos in terms of number of views, view rate, number of likes and dislikes, and video power index ($p>0.05$).

Conclusion and Suggestions: The quality of YouTube hemiplegia exercise videos is moderate and the reliability is poor. No differences were found between low-quality and medium-high-quality videos in terms of viewership, viewer engagement, and video popularity. This finding may suggest that users may have difficulty distinguishing high-quality content. This could potentially increase the risk of inappropriate exercise practices.

Youtube'da Yayınlanan Hemipleji ile İlgili Egzersiz Videolarının İçerik Analizi

Makale Bilgileri

Makale Geçmişi

Geliş: 04.01.2026

Kabul: 27.03.2026

Yayınlanma: 25.06.2026

Yazarlar:

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Anahtar Kelimeler:

JAMA; Kalite;
Güvenilirlik; İnme;
Hemipleji

ÖZET

Amaç: Bu çalışmanın amacı YouTube'daki hemipleji egzersiz videolarının içeriğini analiz etmek ve bu videoların kalitesini ve güvenilirliğini belirlemektir.

Yöntem: Videolar, YouTube arama motorunda "hemipleji rehabilitation", "hemipleji exercises" ve "hemipleji physiotherapy" arama terimleri kullanılarak araştırıldı. Video kalitesi ve güvenilirliği, Küresel Kalite Puanı (KKS) ve Amerikan Tabipler Birliği Dergisi (ATBD) ölçüt kriterleri kullanılarak değerlendirildi. Videoların tanımlayıcı özellikleri kaydedildi.

Bulgular: 37 videodan elde edilen veriler analiz edildi. Videoların ortalama ATBD puanı 2 ve ortalama KKS puanı 3 olarak bulundu. KKS'ye göre videoların %56,7'si orta-yüksek kalitede, %43,2'si ise düşük kalitedeydi. Düşük kaliteli ve orta-yüksek kaliteli videolar arasında görüntülenme sayısı, görüntülenme oranı, beğenme- beğenmeme sayısı ve video güç indeksi açısından fark bulunmadı ($p>0,05$).

Sonuç ve Öneriler: YouTube'daki hemipleji egzersiz videolarının kalitesi orta düzeydedir ve güvenilirliği düşüktür. İzlenme oranları, izleyici etkileşimi ve video popülerliği açısından düşük ve orta-yüksek kaliteli videolar arasında fark bulunmamıştır. Bu bulgu, kullanıcıların yüksek kaliteli içeriği ayırt etmekte zorluk çekebileceğini düşündürmektedir. Bu durum, uygunsuz egzersiz uygulamaları riskini potansiyel olarak artırabilir.

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INTRODUCTION

Stroke is a common disease that affects one in four people. Globally, it is the third most common cause of disability, and the second most common cause of death (1). Although stroke is primarily a disease of older people, evidence suggests that the incidence of stroke in individuals under 55 is increasing worldwide (2). An aging, growing population and the increasing number of stroke survivors are increasing the demand for rehabilitation services (3). Weakness (typically hemiplegia), aphasia, cognitive impairment, difficulty speaking or swallowing, visual impairment, and sensory loss are the most common symptoms of stroke. Hemiplegia is partial or complete motor loss in the upper and lower extremities of one half of the body (4). The aim of hemiplegia rehabilitation is to increase the patient's independence in daily living activities and to ensure functional recovery. The rehabilitation program is individualized according to the severity of clinical findings. Individuals with moderate to severe stroke are eligible for an inpatient, comprehensive, multidisciplinary rehabilitation program in a rehabilitation hospital, while individuals with less severe deficits are eligible for an outpatient program (5,6). However, in some low- and middle-income countries, it has been reported that more than 50% of people do not receive the rehabilitation services they need (7). Therefore, rehabilitation programs that can be done at home using digital technologies may provide a more accessible solution for stroke survivors.

YouTube is an important source of information and entertainment, containing content produced by various users and experts. Current data from November 2025 shows that YouTube has over 122 million daily active users and approximately one billion hours of content are watched every day (8). Langford et al. reported that more than a third of patients had watched a health-related video on YouTube (9). Its frequent use, easy access, and extensive video library make YouTube an important source of information for individuals who cannot access healthcare services. On the other hand, the lack of quality assessment of shared videos, the uncertainty of the type of content and reliability of information (10), and the fact that some content is designed to sell products or services may lead to the spread of false information and negatively affect public health. Therefore, the quality and reliability of YouTube videos need to be evaluated. The quality of YouTube videos was investigated in areas such as informing patients and their relatives about stroke (video quality is moderate), thrombectomy in acute stroke (video quality is low), and dysphagia rehabilitation (video quality is high) (11-13). However, the quality and reliability of exercise videos for lower and upper extremity weakness, which is seen in 88% of

stroke survivors, is unknown. Therefore, the purpose of this study was to analyze the content of YouTube hemiplegia exercise videos and determine the quality and reliability of these videos.

MATERIALS AND METHODS

This study is an observational content analysis with a cross-sectional design, evaluating publicly available videos. The study received ethical approval from the XXXX University Ethics Committee (decision number: 2020/110, decision date:16.12.2020) and was carried out in compliance with the Declaration of Helsinki. Videos were searched on May 5, 2021, using the search terms “hemiplegia rehabilitation,” “hemiplegia exercises,” and “hemiplegia physiotherapy” in the YouTube search engine. The search was performed on an inactive personal YouTube account with all cookies and cache cleared to minimize bias. Inclusion criteria were: relevant to hemiplegia rehabilitation; recorded in English; and having adequate image and audio quality. Exclusion criteria were: being recorded in a language other than English, being repetitive videos, and consisting of only audio or video. A total of 180 videos were evaluated for eligibility. 12 videos were identified as duplicates, 83 were presented in languages other than English, 32 featured only background music without verbal narration, 14 lacked any audio component, and 2 were excluded due to thematic unrelatedness. Thirty-seven videos meeting the inclusion criteria were recorded to create an electronic library. The videos were evaluated by three different physiotherapists with 3 years, 5 years, and 12 years of experience, respectively.

Outcome Measures

Video quality and reliability were evaluated using Global Quality Score (GQS) (14) and Journal of American Medical Association (JAMA) Benchmark criteria (15), respectively. When calculating the GQS and JAMA total scores, the score of the most senior evaluator was used as the reference to ensure high clinical accuracy in cases where the evaluators' scores differed. GQS, developed by Bernard et al., is used to assess the quality of medical videos and online health content. It evaluates both the scientific accuracy of the material and the potential benefits to viewers. Scores on the scale range from 1 to 5, with 1–2 indicating low quality, 3 moderate quality and 4–5 high quality (14). The reliability of the hemiplegia exercise videos was assessed using the JAMA Benchmark Criteria. This scale encompasses four domains—Authorship, Attribution, Currency, and Disclosure. Each domain is evaluated as 1 point, resulting in a total score ranging from 0 to 4. Higher scores indicate a more reliable video (15).

Hemiplegia exercise videos were divided into 8 different categories based on the upload source: doctor, physiotherapist, sports scientist, academician, patient, independent user, health and professional organization and advertisement. No videos from doctors, sports scientists, patients or advertising sources were found. For this reason, the source comparison was made by dividing the sources into two categories: physiotherapists and others. The descriptive features of the videos, such as duration, number of views, view rate, number of days since upload, number of likes and dislikes, like rate and number of comments, were recorded. The formula 'number of views / number of days since upload' was used to calculate the view rate; the formula '[(number of likes / number of likes + number of dislikes) x 100]' was used to calculate the like rate; and the formula '[(like rate x view rate)/100]' was used to calculate the video power index (VPI). VPI measures the viewer engagement and popularity of videos (16).

Statistical Analysis

Analysis of research data was done using IBM SPSS 21.0 program. The normal distribution of variables was evaluated with the Kolmogorov-Smirnov test, and categorical variables were given as numbers and percentages, and continuous variables were given as median (min-max). Mann Whitney-U test was used to compare videos according to their quality and source classification. A threshold for statistical significance was determined at $p < 0.05$. Inter-rater reliability was evaluated through intraclass correlation coefficient (ICC) estimates. Based on the 95% confidence interval of the ICC, values exceeding 0.90, ranging from 0.75 to 0.90, from 0.50 to 0.75, and below 0.50 were evaluated as indicating excellent, good, moderate, and poor reliability, respectively (17).

RESULTS

Data from 37 videos were analyzed. The median JAMA score of the hemiplegia exercise videos was 2 and the median GQS was 3. Of the hemiplegia exercise videos, 23 (62.1%) were uploaded by physiotherapists, 8 (21.6%) by health and professional organizations, 4 (10.8%) by independent users, and 2 (5.4%) by academic sources. Descriptive features of the videos are given in Table 1.

Table 1. Descriptive Characteristics of the Videos

Video Features (n=37)	Median (min-max)
Video duration, <i>sec</i>	426 (28.2-2761.2)
Days since upload	786 (450-3889)
Views	19933 (220-1247966)
View ratio	22.8 (0.0-416.6)
VPI, %	126.5 (0-31903.8)
Likes	533 (1-9500)
Dislikes	10 (0-455)
Comments	54 (0-213)
Like ratio, %	98.1 (90-100)
JAMA total score	2 (0-4)
Raters 1	1 (0-2)
Raters 2	3 (0-4)
Raters 3	2 (1-4)
GQS total score	3 (1-4)
Raters 1	2 (1-3)
Raters 2	3 (1-4)
Raters 3	3 (1-4)

JAMA: Journal of American Medical Association; GQS: Global Quality Scale; VPI: Video power index

Due to the low number of high-quality videos, the hemiplegia exercise videos were classified into two groups as low and moderate-high quality according to the GQS score (Table 2). 56.7% of the videos were moderate-high quality and 43.2% were low quality. The number of views, view rate, VPI, likes, and dislikes were similar between low quality and moderate-high quality videos ($p>0.05$). The number of comments was statistically higher in the moderate-high quality group ($p=0.010$).

Table 2. Comparison of Video Features According to Their Quality

	Low Quality n =16 Median (min-max)	Moderate – High n =21 Median (min-max)	z	p
Video duration, sec	364.8 (28.2-2761.2)	450.9 (315.6-1269.6)	-1.300	0.194
Days since upload	786 (450-3889)	766.5 (513-2293)	-0.650	0.516
Views	14338 (220-	33867 (3854-481611)	-1.060	0.289
View ratio	15.3 (0.0-416.6)	38.2 (2.9-241.6)	-1.026	0.305
VPI, %	68 (0-31903.8)	317.9 (1.8-14982.3)	-1.368	0.171
Likes	374 (1-9500)	1030 (64-6200)	-1.607	0.108
Dislikes	8 (0-455)	21 (1-124)	-1.096	0.273
Comments	38 (0-213)	86 (0-176)	-2.278	0.023*
Like ratio, %	97.7 (90-100)	98.2 (94.5-98.9)	-0.445	0.656

JAMA: Journal of American Medical Association; GQS: Global Quality Scale; VPI: Video power index; p: Mann Whitney-U test

A comparison of the features of the hemiplegia exercise videos according to their sources is given in Table 3. Based on the video sources, only the number of days since upload and the number of comments differed between the groups ($p=0.001$; $p=0.010$, respectively). In the physiotherapist group, the number of days since loading was statistically shorter and the number of comments was statistically higher.

Table 3. Comparison of Video Features According to Their Source

	Physiotherapist	Others	z	p
	n =23	n =14		
	Median (min-max)	Median (min-max)		
Video duration, sec	454.2 (28.2-2761.2)	207.6 (64.2-2491.2)	-1.816	0.069
Days since upload	543 (509-3195)	2077 (450-3889)	-3.476	0.001*
Views	19869 (400-481611)	33758.5(220-1247966)	-0.470	0.639
View ratio	27.3 (0.7-241.6)	10.5 (0.0-416.6)	-0.752	0.452
VPI	145.6 (0.1-14982.3)	20.5 (0-31903.8)	-0.971	0.332
Likes	735 (10-6200)	182.5 (1-9500)	-1.159	0.247
Dislikes	10 (0-214)	10.5 (0-455)	-0.188	0.851
Comments	61 (1-213)	4 (0-127)	-2.572	0.010*
Like ratio	98.4 (90.9-100)	96.0 (90-100)	-1.927	0.054
GQS total score	3 (1-4)	2 (1-4)	-0.781	0.435
JAMA total score	2 (1-2)	1.5 (0-4)	-1.202	0.229

JAMA: Journal of American Medical Association; GQS: Global Quality Scale; VPI: Video power index

Inter-rater reliability was found to be moderate for GQS at ICC=0.736 (95% CI: 0.596-0.872) and good for JAMA score at ICC=0.793 (95% CI: 0.642-0.886).

DISCUSSION

This study found that YouTube hemiplegia exercise videos were of moderate quality and poor reliability. There was no difference between the number of views, number of likes/dislikes, VPI, like rate, and view rate of low-quality and moderate-high-quality videos. There was no difference in reliability or quality among hemiplegia exercise videos based on video source. Social media platforms are one way to ensure that information reaches a wide audience in a very short time (18). On YouTube, the most popular video-sharing platform, anyone can publish videos. The lack of consideration for the uploader's profession or qualifications, along with the absence of peer review for videos, may lead to poor quality and low reliability of video content, particularly on medical topics. This situation is worrying for both healthcare professionals and patients (19). Because individuals seeking medical information may be exposed to misinformation and their health may be negatively affected. For this reason, the reliability and quality of YouTube videos have been investigated by health professionals in various fields.

Kaymakoğlu et al. reported that the quality of YouTube videos on shoulder dislocation was insufficient (20). Rodriguez et al. reported that YouTube videos about exercise programs recommended after breast cancer were of high quality (21). Similarly, Ng et al. reported that YouTube videos on systemic lupus erythematosus were high quality and reliable (22).

YouTube may be a potential source of information for stroke survivors. Szmuda et al. reported that the average number of views of stroke-related informational videos was 115,875 (107 - 3,249,878), indicating that these videos were of moderate quality (23). Denham et al. investigated the quality and reliability of YouTube videos regarding the concerns and needs of stroke caregivers. The study results showed that the videos provided useful information for caregivers (24). Chang et al. investigated the reliability of YouTube videos on exercises and compensatory maneuvers for dysphagia, one of the complications of stroke. According to the GQS, 54.9% were of high quality, 35.3% were of moderate quality, and 9.8% were of low quality. Of the high-quality videos, 50% were sourced from university/professional organizations; 28.5% from physiotherapists; 10.7% from Health-related websites; and 7.1% from psychiatrists. There was no statistical difference between low, moderate, and high-quality videos in terms of the number of views, likes, comments, and dislikes (13). Assylbek et al. reported that 29.2% of YouTube videos on stroke rehabilitation were of low, 20.8% were of moderate, and 50% were of high quality. The number of daily views and likes was statistically higher for high-quality videos (25). Our findings showed that YouTube hemiplegia exercise videos were of poor reliability and moderate quality. More than half of the videos included in the study were of moderate-high quality. The number of low-quality videos was higher than the numbers reported in the literature (13,25). The low number of high-quality videos and the high number of low-quality videos can be explained by the absence of physicians in video sources and the low number of videos from academic sources. The defining characteristics of the videos, their quality and reliability have not changed according to the video sources. It is necessary for public health that academic, health and professional organizations, physicians and experienced physiotherapists collaborate to prepare reliable and high-quality videos on hemiplegia exercises. Moreover, unlike Assylbek et al.'s study (25) and similar to Chang et al.'s study (13), the descriptive features of the videos, such as the number of dislikes, likes, and views, and VIPs, did not differ between low-quality videos and moderate-high quality videos. This result is a warning for health professionals. The lack of difference between low and moderate-high quality videos in terms of viewing metrics, viewer engagement, and video popularity may lead to incorrect exercise practices and put patients' health at risk. Therefore, when using video sharing

platforms, it is important to obtain information about video quality from healthcare professionals to prevent possible complications.

Our study has some limitations. Considering the cross-sectional nature of the study and the ever-changing nature of YouTube's content quantity and content features, repeating the study at different times may affect the results. Including only English videos in the study may have resulted in the exclusion of high-quality videos made in different languages. Finally, it is also possible that patient relatives will search for “stroke exercises” instead of “hemiplegia exercises”. Therefore, there is a need for studies using the terms that patients' relatives would use.

CONCLUSION and RECOMMENDATIONS

The quality of YouTube hemiplegia exercise videos is moderate and the reliability is poor. There was no significant difference between low-quality and moderate-to-high-quality hemiplegia exercise videos regarding view metrics, video popularity, and viewer engagement. In order for YouTube hemiplegia exercise videos to be used by stroke survivors who have limited access to rehabilitation services, better quality and more reliable videos need to be produced. Encouraging collaboration among academics, health and professional organizations, and physiotherapists for hemiplegia exercise videos can ensure the creation of reliable and high-quality exercise videos.

Acknowledgments: None.

Conflict of Interest: The authors declare that there are no potential conflicts of interest.

Financial Disclosure: The authors have no relevant financial or non-financial interests to disclose.

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