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RESEARCH ARTICLE

Exploring the Reliability and Accessibility of Youtube for Cerebral Palsy Rehabilitation Information

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ABSTRACT

Objective: Our study aimed to evaluate the characteristics and medical content of YouTube videos pertaining to cerebral palsy (CP) rehabilitation.
Methods: Using the YouTube search engine on August 16, 2021, the term "CP rehabilitation" was searched without any filters. The initial 100 videos were categorized based on their characteristics. The quality, reliability, and accuracy of these videos were evaluated using the Suitability Assessment of Materials (SAM), Global Quality Score (GQS), Journal of American Medical Association (JAMA) benchmark criteria, and modified DISCERN questionnaire.
Results: The average view count of the videos was 38,099 (range: 125–811,777), with an average duration of 444.79 seconds. Most videos were of moderate quality (57%) and contained partially adequate information (86%). In the high-quality category, videos had higher view counts, dislikes, duration, and SAM, JAMA, and modified DISCERN scores compared to low-quality videos ($p < 0.05$). A positive correlation was observed between GQS and the number of views, likes, dislikes, and SAM, JAMA, and modified DISCERN questionnaire scores ($p < 0.05$).
Conclusions: Our findings indicate that the majority of videos were of moderate quality, with some providing adequate information. High-quality videos tended to attract more user engagement, including views, likes, comments, and longer duration, and exhibited better reliability and accuracy scores. YouTube can serve as an alternative resource for patients requiring pediatric rehabilitation, particularly during interruptions in healthcare services such as the COVID-19 pandemic. It is indicated that higher-quality videos produced by healthcare professionals will be more beneficial for patient education in the future.

Keywords: Medical knowledge, e-learning, YouTube, Rehabilitation, Cerebral palsy

INTRODUCTION

With the advancement of the Internet, akin to other domains, the pace of information exchange and the utilization of communication platforms in healthcare have notably accelerated. In the active medical education system, students are encouraged to access visually enhanced educational resources and contemporary online publications. Among social media content, YouTube videos stand out as widely utilized for educational purposes. Park et al. observed that YouTube offers valuable scientific resources for medical and dental students within medical education, highlighting that digital innovations are poised to revolutionize education, rendering it more effective (1).

Not only medical students but also medical educators, physicians, medical support staff, and even patients frequently turn to YouTube to visually comprehend medical issues. Established in 2005 in San Bruno, California, United States, YouTube serves as a platform where approximately 100 videos are uploaded every minute (2). These videos originate from sources whose reliability cannot be ascertained and have not undergone peer review (3). Consequently, some studies evaluating the educational content of YouTube have yielded limited findings. Moreover, these studies often fail to differentiate between educational and non-educational videos or videos from dubious sources. We anticipate that videos produced by credible sources for medical education will exhibit higher quality, exert greater influence on public education, and contribute to scholarly discourse. Reliable YouTube videos addressing various diseases affecting the human body are watched for information regarding treatment adherence, screening, or preventive measures (4). However, the reliability and usefulness of these medical videos on YouTube remain uncertain (5). Fischer et al. reviewed YouTube videos regarding

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knee arthrocentesis and recommended a significant portion of these videos as suitable resources for students, residents, or fellows. However, they noted that certain videos, even those produced by healthcare professionals, lacked adequate and high-quality content (6).

Cerebral palsy (CP) stands as the most prevalent motor disability in childhood. Individuals affected by CP require ongoing physiotherapy and regular check-ups throughout their lives (7). Consequently, patients with CP necessitate rehabilitation, botulinum toxin (Botox) injections, or surgical interventions to mitigate the progression of spasticity. They also need to attend regular hospital appointments.

The emergence of the novel coronavirus (SARS-CoV-2) has significantly disrupted healthcare systems globally, particularly impacting the utilization of healthcare services, especially among children. Although the full extent of the negative consequences of quarantine measures is yet to be fully understood, children have experienced disruptions in the management of their own health conditions. Curfews enforced during quarantine have had notably adverse effects on both elderly individuals and pediatric patients. Furthermore, the reluctance of individuals with disabilities and their families to visit hospitals, coupled with the reassignment of physiotherapists and technicians to pandemic-related duties, has led to the unavailability of physiotherapy and rehabilitation services for a period of time (8). Consequently, some patients have faced the risk of deteriorating physical health, being deprived of Botox treatments, and even experiencing delays in surgical interventions (8).

Throughout the pandemic, a considerable number of healthcare professionals and members of the public have turned to the Internet, particularly YouTube, to seek information about their medical conditions (9). Studies indicate that 80% of individuals in the United States preferred utilizing online resources for health-related information during this period (9). The interruption of treatment for children with motor disabilities, especially those with CP, has been a significant concern for many families. As a result, tele-rehabilitation has gained prominence, with video-based communication, check-ups, and therapies becoming increasingly utilized (10, 11). Simultaneously, individuals affected by such conditions have continued seeking treatment online due to the necessity of staying home amidst pandemic conditions, coupled with reluctance to visit hospitals (12).

To date, our literature review has not revealed any studies assessing the quality of CP rehabilitation videos on YouTube. Consequently, this study aims to evaluate the quality, source, and content of CP rehabilitation videos available on YouTube.

MATERIALS AND METHODS

In this planned cross-sectional study, we utilized the YouTube search engine (www.youtube.com) to search for the term "cerebral palsy rehabilitation" starting from August 16, 2021. Prior to this search, approval was obtained from the Dokuz Eylül University ethics committee (Ethics Committee Decision No.: 6492- GOA 2021/20-10). We specifically sought videos with medical content. To ensure a broad sample, we employed a neutral term ("cerebral palsy rehabilitation"). From the search results, we selected the top 100 videos with educational content and English-language audio. We then assessed various factors including the number of likes and dislikes, views, video duration, comments, release year, presence of animation, high-definition (HD) quality, and the country of origin. The Suitability Assessment of Materials (SAM) (13) was utilized to evaluate the comprehensibility of medical education videos. The Global Quality Score (GQS) (14), Journal of American Medical Association (JAMA) benchmark criteria) (15), and modified DISCERN (16) questionnaires were employed to assess the educational quality, reliability, and accuracy of the videos. Measurements were recorded for each participant regarding each video. In evaluating video content, the educational material in each video was rated based on the presence or absence of 11 factors, as there was no validated rating system for videos. These factors included (1) etiology of CP, (2) diagnosis of CP, (3) classification criteria of CP, (4) symptoms of CP, (5) classification systems of CP, (6) gait disorder, (7) rehabilitation program, (8) bracing, (9) Botox therapy, (10) medical therapy for spasticity, and (11) surgery. This study employed a quantitative approach for both data collection and analysis. To this end, a survey was developed based on behavioral preferences and perspectives. Additionally, the videos were examined based on upload timeframes (<2015, 2015–2019, ≥2020).

Evaluating Video Suitability

SAM evaluated the videos based on several variables, including (1) the content of the videos, (2) literacy demand, (3) graphics, (4) layout and typography, (5) learning stimulation and motivation, and (6) cultural appropriateness. Subsequently, a distinct SAM score was assigned to each video (9).

Videos achieving a SAM score between 70 and 100 were categorized as "superior," those with a cumulative raw score between 40 and 69 were deemed "sufficient," while videos scoring between 0 and 39 were labeled as "insufficient."

Global Quality Score (GQS)

The GQS, devised by Bernard et al. (14), is a 5-point Likert scale utilized to assess the quality, usability, and coherence of websites. The scale ranges from 1 to 5, with 5 indicating excellent quality and flow, rendering the website highly beneficial for patients. A score of 4 suggests good quality and generally smooth navigation, making the site useful for patients. A score of 3 reflects moderate quality with some flaws in flow, resulting in the site being somewhat useful for patients. A score of 2 indicates generally poor quality and flow, offering limited utility to patients. Finally, a score of 1 signifies poor quality and flow of the site, rendering it not useful for patients at all.

Journal of American Medical Association (JAMA) Benchmark Criteria

The JAMA benchmark criteria assess online videos and resources based on four key criteria: authorship, attribution,

disclosure, and currency. Under these criteria, a JAMA score ranging from 0 to 4 is assigned. Authorship (1 point) evaluates whether authors, contributors, their affiliations, and relevant credentials are provided. Attribution (1 point) assesses whether references and sources for all content are listed. Disclosure (1 point) examines the disclosure of conflicts of interest, funding sources, sponsorship, advertising, support, and video ownership. Currency (1 point) checks for indications of when the content was posted and last updated. JAMA is utilized to gauge the accuracy and reliability of videos. A scorer assigns 1 point for each criterion met in the video, resulting in a final score ranging from 0 to 4, with 4 points indicating the highest quality (15).

Modified DISCERN Questionnaire

The Modified DISCERN Questionnaire serves as an assessment tool comprising five yes/no questions aimed at assessing the quality and reliability of health information publications. The questionnaire's score ranges from 0 to 5 points, with the total score derived from the sum of "yes" points, where each "yes" earns 1 point and each "no" earns 0 points. The questionnaire includes the following questions: "Does the video address areas of controversy/uncertainty?", "Are additional sources of information listed for patient reference?", "Is the provided information balanced and unbiased?", "Are valid sources cited? (from valid studies, physiatrists)," and "Is the video clear, concise, and understandable" (16).

Evaluating User Engagement

Five metrics of user interaction were documented for each video: (1) views, (2) likes, (3) dislikes, (4) video duration, and (5) comments. These data were collected between August 16 and 23, 2021.

Evaluation Team

Data analysis was independently conducted by two researchers (E.Ö. and V.H.). In cases where their assessments differed, each video underwent a re-evaluation based on a combined assessment by both scientists. For analysis purposes, only videos aimed at medical education and healthcare professionals were considered.

Exclusion Criteria

Videos unrelated to CP rehabilitation, not presented in English, repetitive content, and promotional videos were excluded from the study.

Video Sources

The sources of the videos were categorized into the following groups: academic, physician, society/professional organization, health-related website, patient, news, commercial, nonprofit organizations, and government.

Statistical Analysis

The acquired data underwent analysis using SPSS (Statistical Package for Social Sciences, Chicago, IL, USA) version 24.0 software. Continuous data were presented as mean ± standard deviation, while frequency data were expressed as number (n) and percentage (%). The Chi-square test was utilized for the analysis of frequency data, while the Kruskal–Wallis test or Mann–Whitney U-test was employed for data with continuous values, depending on the number of groups. Additionally, the Pearson correlation test was used for correlation analysis between groups. A p-value less than 0.05 was deemed indicative of a significant difference.

RESULTS

Our study focused on the first 100 videos obtained from the YouTube search engine using the keyword "CP rehabilitation" between August 16 and 20, 2021. A total viewing time of 12 hours, 21 minutes, and 19 seconds was dedicate to these videos. The longest video observed was 1 hour, 4 minutes, and 50 seconds, while the shortest lasted only 36 seconds. The video garnering with the highest number of likes received 10,000 likes, whereas the least-liked video received no likes. Regarding viewership, the most-watched video accumulated 811,777 views, whereas the least-viewed one had only 125 views. The video with the highest number of comments obtained 459 comments, whereas the one with the lowest received none. On average, each video garnered approximately 38,099 ± 99,692.52. The average number of likes per video was approximately 351.91, with a standard deviation of 1,218.92. The average number of dislikes was approximately11.47, with a standard deviation of 29.30, and the average number of comments was approximately 26.09, with a standard deviation of 66.44. Additionally, the average duration of the videos was approximately 444.79 seconds, with a standard deviation of 597.20. Among the observed videos, 15% were animated, and 53% were in HD format.

Based on their content, the videos were categorized as follows: 23% provided information on the etiology of CP, 20% covered the diagnosis of CP, 22% addressed classification systems of CP, 73% focused on symptoms of CP, 9% discussed classification systems of CP, 57% tackled gait disorders, 80% outlined rehabilitation programs, 18% detailed bracing, 13% provided information on botulinum toxin therapy, 11% discussed medical therapy for spasticity, and 23% covered surgery.

The videos were assessed based on their SAM scores. The highest SAM score recorded was 36 (94.73%), while the lowest SAM score was 12 (31.57%). Upon evaluation according to SAM scores, 12 videos were classified as inadequate, 72 videos were considered sufficient, and 16 videos were deemed superior.

A weak positive correlation was observed between the total SAM score and the number of views ($r = 0.248$; $p = 0.013$), likes ($r = 0.251$; $p = 0.012$), dislikes ($r = 0.300$; $p = 0.002$), and video duration ($r = 0.425$; $p < 0.001$). Similarly, a strong positive correlation was identified between the number of views and likes ($r = 0.907$; $p < 0.001$), dislikes ($r = 0.881$; $p < 0.001$), and the number of comments ($r = 0.713$; $p < 0.001$). Conversely, a weak negative correlation ($r = -0.224$; $p = 0.025$) was found between the number of views and the video's upload year. A significant discrepancy was observed between the continents where the videos were published and those containing classification criteria ($p < 0.001$), while no significant difference was noted among videos addressing other subject matters ($p > 0.05$) (Table 1).

Table 1: Comparison of the content of videos over the years

Video content/years		<2015, n (%)	2015-2019, n (%)	≥2020, n (%)	p
High Definition Videos	+	5 (9.4%)	22 (42.6%)	26 (49.1%)	**<0.001**
	-	18 (38.3%)	20 (41.5%)	9 (19.1%)	
Animation	+	2 (13.3%)	11 (73.3%)	2 (13.3%)	**0.027**
	-	21 (24.7%)	31 (36.5%)	33 (38.8%)	
Etiology	+	6 (26.1%)	11 (47.8%)	6 (26.1%)	0.594
	-	17 (22.1%)	31 (40.3%)	29 (37.7%)	
Diagnosis	+	7 (35%)	6 (30%)	7 (35%)	0.298
	-	16 (20%)	36 (45%)	28 (35%)	
Classification Criteria	+	5 (22.7%)	9 (40.9%)	8 (36.4%)	0.988
	-	18 (23.1%)	33 (%42.3)	27 (34.6%)	
Symptoms	+	18 (24.7%)	30 (41.1%)	25 (34.2%)	0.811
	-	5 (18.5%)	12 (44.4%)	10 (37%)	
Classification Systems	+	0 (0%)	3 (33.3%)	6 (66.7%)	0.071
	-	23 (25.3%)	39 (42.9%)	29 (31.9%)	
Gait disorder	+	13 (22.8%)	28 (49.1%)	16 (28.1%)	0.181
	-	10 (23.3%)	14 (32.6%)	19 (44.2%)	
Rehabilitation Program	+	18 (22.5%)	32 (40%)	30 (37.5%)	0.566
	-	5 (25%)	10 (50%)	5 (25%)	
Bracing	+	3 (16.7%)	8 (44.4%)	7 (38.9%)	0.775
	-	20 (24.4%)	34 (41.5%)	28 (34.1%)	
Botulinum Toxin Therapy	+	3 (23.1%)	6 (46.2%)	4 (30.8%)	0.933
	-	20 (23%)	36 (41.4%)	31 (35.6%)	
Medical Therapy for Spasticity	+	2 (18.2%)	5 (45.5%)	4 (36.4%)	0.920
	-	31 (23.6%)	37 (41.6%)	31 (34.8%)	
Surgery	+	4 (18.2%)	12 (54.5%)	6 (27.3%)	0.465
	-	19 (24.7%)	30 (39%)	28 (36.4%)	
SAM	Insufficient	1 (6.3%)	6 (50%)	5 (31.3%)	0.263
	Sufficient	19 (26.4%)	26 (36.1%)	27 (37.5%)	
	Superior	3 (25%)	10 (62.5%)	3 (25%)	
JAMA	Insufficient data (1 Point)	0 (0%)	23 (100%)	0 (0%)	0.280
	Partially sufficient data (2 or 3 points)	2 (4.8%)	34 (81%)	6 (14.3%)	
	Completely sufficient data(4 points)	2 (5.7%)	29 (82.9%)	4 (11.4%)	
GQS	Low quality (1 or 2 points)	1 (4.3%)	18 (78.3%)	4 (17.4%)	0.078
	Intermediate quality (3 points)	10 (23.8%)	18 (42.9%)	14 (33.3%)	
	High quality (4-5 points)	5 (14.3%)	21 (60%)	9 (25.7%)	
Modified DISCERN	1 Points	0 (0%)	3 (75%)	1 (25%)	0.175
	2 Points	10 (24.4%)	22 (53.7%)	9 (22%)	
	3 Points	8 (29.6%)	9 (33.3%)	10 (37%)	
	4 Points	4 (16%)	7 (28%)	14 (56%)	
	5 Points	1 (33.3%)	1 (33.3%)	1 (33.3%)	

SAM: Suitability Assessment of Material, GQS: Global Quality Score, JAMA: Journal of American Medical Association benchmark criteria, p<0.05, Bold font:statistically significance

When considering the upload dates, it was noted that 12 videos were uploaded prior to 2015, 59 videos were uploaded between 2015 and 2019, and 29 videos were uploaded from 2020 onward (Figure 1). A significant correlation was observed between the upload date and the inclusion of animation content as well as the availability of HD videos ($p < 0.001$). Detailed results for SAM, GQS, JAMA, and modified DISCERN based on upload dates and video characteristics can be found in Table 2.

Regarding GQS assessment, 27% of the videos were classified as high quality, while 57% fell into the medium quality category. The outcomes for all evaluation criteria are presented in Table 3. Although statistically significant associations were identified between GQS scores and factors such as the number of views, likes, dislikes, and video duration, no significant correlation was found with the number of comments ($p < 0.05$).

A notable correlation was observed between JAMA scores and modified DISCERN scores, as well as video duration ($p < 0.05$). However, no significant correlation was detected between these evaluation criteria and other video characteristics.

It was determined that SAM, GQS, JAMA, and modified DISCERN scores exhibited weak correlations among each other (Table 4).

Table 2: Video characteristics according to years and assessment parameters (mean ± standard deviation)

Years	View Mean ± SD	Like Mean ± SD	Dislike Mean ± SD	Comment Mean ± SD	Time Mean ± SD
<2015 (n=23)	57665.17±78940.35	162.39±163.35	10.26±11.92	14.04**±26.15**	274.35±329.89
2015-2019 (n=42)	50823.85±139470.46	589.40±1837.81	17.90±43.25	28.07±80.33	434.79±645.15
≥2020 (n=35)	997140±13281.41	191.45±339.88	4.54±7.10	31.62±67.04	568.80±656.16
p	**0.001**	0.875	0.065	0.180	0.064
SAM group					
Insufficient (n=15)	6007.43±7157.73	48.18±46.18	1.43±1.78	5.18±7.13	330.88±445.65
Sufficient (n=80)	36387.77±101137.35	325.45±1185.39	10.02±24.44	30.75±71.67	360.28±438.02
Superior (n=5)	91155.08±136994.50	915.58±1952.95	1.43±1.78	5.18±7.13	1103.75±1077.64
p	0.050	**0.025**	**0.023**	**0.018**	**0.001**
GQS (1-5 points)					
Low quality (1 or 2 points)	6007.43±7157.73	48.18±46.18	1.43±1.78	5.18±7.13	330.88±445.65
Intermediate quality (3 points)	24942.33±43230.79	177.52±284.41	7.12±9.18	25.36±55.51	318.70±306.12
High quality (4-5 points)	84891.40±174646.06	900.03±2247.24	26.59±52.39	40±98.34	778.48±939.74
p	**0.036**	**0.006**	**0.008**	0.116	**0.005**
JAMA score (0-4 Points)					
Insufficient data (1 Point)	7488.75±9566.01	76.20±83.34	1.75±2.36	18.50±19.67	630±755.26
Partially sufficient data (2 or 3 points)	36878.23±93538.30	308.09±1114.24	10.77±27.62	24.79±66.24	360.87±443.60
Completely sufficient data (4 points)	60841.70±130076.06	839±2073.57	21.30±45.60	40.30±81.99	1092.40±1151.42
p	0.473	0.573	0.459	0.731	**0.019**
Modified DISCERN score (0-5 points)					
1 Points	7387±10898.64	33.25±31.73	1.50±2.38	6.75±10.43	346.50±453.15
2 Points	37726.43±126535.96	383.82±1569.90	9.87±31.43	23.19±73.73	284.59±327.11
3 Points	35307.14±82238.81	397.07± 1268.74	10.88±27.95	37.40±84.15	366.56±335.16
4 Points	47423.48±81316.07	320.12±499.89	16.08±31.33	22.16±34.54	753.44±953.56
5 Points	31562.66±33770.90	199±166.27	13.33±15.94	22.33±19.75	897.33±841.58
p	0.555	0.059	0.199	0.209	**0.008**

SD: Standart Deviation, SAM:Suitability Assessment of Material, GQS: Global Quality Score, JAMA: Journal of American Medical Association benchmark criteria, Bold font:statistical significance , p<0.05,statistacally significant

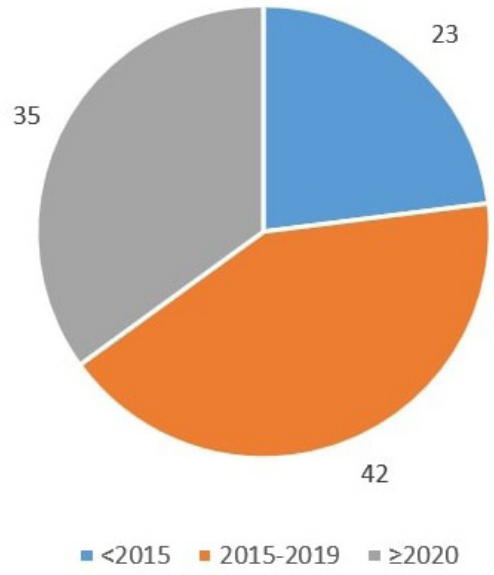

Figure 1: Number of videos by year.

The top two countries contributing video sources on CP rehabilitation are the United States (69%) and India (16%). From a continental perspective, 69% of the videos originate from the Americas, while 31% are sourced from other continents. A significant association was identified between the countries of video origin and the number of comments ($p = 0.028$). This statistical difference is notably attributed to videos from Australia, China, and Switzerland. Additionally, a significant correlation was found between the countries of video origin and video duration ($p < 0.001$). This discrepancy is primarily due to the longer duration of videos from England and India.

No statistically significant difference was observed between the sources from which the videos were uploaded and the results of the reliability and quality surveys (GQS, $p = 0.112$; JAMA, $p = 0.100$; GQS, $p = 0.302$; SAM, $p = 0.169$) (Table 5).

Table 3: Scores of assessment parameters

		n
GQS (1-5 points)	Low quality (1 or 2 points)	16
	Intermediate quality (3 points)	57
	High quality (4-5 points)	27
JAMA score (0-4 points)	Insufficient data (1 Point)	4
	Partially sufficient data (2 or 3 points)	86
	Completely sufficient data (4 points)	10
Modified DISCERN score (0-5 points)	1 Points	4
	2 Points	41
	3 Points	27
	4 Points	25
	5 Points	3
SAM	Insufficient	12
	Sufficient	72
	Superior	16

GQS: Global Quality Score, JAMA: Journal of American Medical Association benchmark criteria *SAM:Suitability Assessment of Material*

Table 4: Correlations between quantitative variables and scores

	SAM	GQS	JAMA	Modified DISCERN
Number of views	0.248*	0.277*	0.096	0.048
Number of likes	0.251*	0.251*	0.133	-0.004
Number of dislikes	0.301**	0.249*	0.127	0.098
Number of comments	0.156	0.127	0.071	0.024
Video duration;second	0.425**	0.261**	0.261**	0.314**
SAM	-	0.931**	0.660**	0.650**
GQS	0.931**	-	0.609**	0.632**
JAMA	0.660**	0.609**	-	0.335**
Modified DISCERN	0.650**	0.632**	0.335**	-

GQS: Global Quality Score, JAMA: Journal of American Medical Association benchmark criteria *SAM:Suitability Assessment of Material;* *p<0.05, **p<0.001 Nonparametric Spearmens's rank correlation coefficients

When assessing the numbers of video likes ($p = 0.028$) and dislikes ($p = 0.012$) based on video upload sources, a notable distinction was identified in the Kruskal–Wallis test. Notably, videos uploaded by patients garnered a considerable number of likes. However, no significant disparity was noted between other video parameters and their respective sources ($p > 0.05$).

DISCUSSION

This study examined the content, relevance, and user engagement of YouTube videos pertaining to CP rehabilitation. While a majority of the videos were uploaded between 2015 and 2019, a significant proportion, comprising 30%, were uploaded by 2020. The onset of the COVID-19 pandemic post-2020 significantly impacted the global healthcare system,

Table 5: Video sources by quality, reliability parameters and time periods

		Academic(n)	Physician(n)	Society/Professional Organization(n)	Health-related Website(n)	Patient(n)	News(n)	Commercial(n)	Nonprofit Organization	Government	p
GQS (1-5 points)	Low quality (1 or 2 points) (n=16)	0 (0%)	2 (12.5%)	0 (0%)	8 (50%)	0 (0%)	0 (0%)	6 (37.5%)	0 (0%)	0 (0%)	0.111
	Intermediate quality (3 points) (n=57)	3 (5.3%)	3 (5.3%)	6 (10.5%)	17 (29.8%)	3 (5.3%)	5 (8.8%)	16 (28.1%)	3 (5.3%)	1 (1.8%)	
	High quality (4-5 points) (n=27)	2 (7.4%)	3 (11.1%)	4 (14.8%)	5 (18.5%)	0 (0%)	0 (0%)	6 (22.2%)	6 (22.2%)	1 (3.7%)	
JAMA score (0-4 Points)	Insufficient data (1 Point) (n=4)	0 (0%)	0 (0%)	0 (0%)	2 (50%)	0 (0%)	1 (25%)	0 (0%)	1 (25%)	0 (0%)	0.100
	Partially sufficient data (2 or 3 points) (n=66)	5 (5.8%)	5 (5.8%)	9 (10.5%)	25 (29.1%)	3 (3.5%)	4 (4.7%)	27 (31.4%)	6 (7%)	2 (2.3%)	
	Completely sufficient data (4 points) (n=10)	0 (0%)	3 (30%)	1 (10%)	3 (30%)	0 (0%)	0 (0%)	1 (10%)	2 (20%)	0 (0%)	
Modified DISCERN score (0-5 points)	Very Poor (n=4)	0 (0%)	1 (25%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (75%)	0 (0%)	0 (0%)	0.302
	Poor (n=41)	3 (7.3%)	2 (4.9%)	7 (17.1%)	14 (34.1%)	2 (4.9%)	2 (4.9%)	10 (24.4%)	1 (2.4%)	0 (0%)	
	Fair (n=27)	1 (3.7%)	4 (14.8%)	1 (3.7%)	8 (29.6%)	1 (3.7%)	3 (11.1%)	7 (25.9%)	2 (7.4%)	0 (0%)	
	Good (n=25)	1 (4%)	1 (4%)	2 (8%)	6 (24%)	0 (0%)	0 (0%)	7 (28%)	6 (24%)	2 (8%)	
	Excellent (n=3)	0 (0%)	0 (0%)	0 (0%)	2 (66.7%)	0 (0%)	0 (0%)	1 (33.3%)	0 (0%)	0 (0%)	
SAM	Superior Material (n=12)	0 (0%)	1 (8.3%)	1 (8.3%)	3 (25%)	0 (0%)	0 (0%)	3 (25%)	4 (33.3%)	0 (0%)	0.169
	Adequate Material (n=72)	5 (6.9%)	5 (6.9%)	9 (12.5%)	19 (26.4%)	3 (4.2%)	5 (6.9%)	19 (26.4%)	5 (6.9%)	2 (2.8%)	
	Not Suitable Material (n=16)	0 (0%)	2 (12.5%)	0 (0%)	8 (50%)	0 (0%)	0 (0%)	6 (37.5%)	0 (0%)	0 (0%)	
Timeframes	<2015, (n=23)	1 (4.3%)	2 (8.7%)	1 (4.3%)	6 (26.1%)	0 (0%)	1 (4.3%)	8 (34.8%)	3 (13%)	1 (4.3%)	**0.014**
	2015-2019, (n=42)	3 (7.1%)	4 (9.5%)	9 (21.4%)	5 (11.9%)	1 (2.4%)	4 (9.5%)	13 (31%)	3 (7.1%)	0 (0%)	
	>2020, (n=35)	1 (2.9%)	2 (5.7%)	0 (0%)	19 (54.3%)	2 (5.7%)	0 (0%)	7 (20%)	3 (8.6%)	1 (2.9%)	

Pearson Chi-square test, p<0.05 statistically significant; GQS: Global Quality Score, JAMA: Journal of American Medical Association benchmark criteria, SAM: Suitability Assessment of Materials

including physiotherapy and rehabilitation practices. Children's access to hospitals became limited to emergency situations, leading to disruptions in their routine treatments and a setback in pre-pandemic progress. Additionally, quarantine measures resulted in reduced activity levels, disrupted sleep and eating patterns, and difficulties in readjusting to normalcy (7). In response to the pandemic, various innovative initiatives in pediatric rehabilitation have become indispensable, including tele-rehabilitation and the use of internet-based patient-oriented videos for treatment continuation (10). This study seeks to analyze the content of YouTube videos addressing CP rehabilitation within these challenging circumstances and evaluate their clarity and reliability.

Originally conceived as a social media platform primarily for entertainment purposes, YouTube is anticipated to evolve into a favored source of information for patients, encompassing health-related content, and serving as a platform for medical professionals to access current academic information. Despite being a compelling source for medical education, concerns have been raised regarding the inadequacy of some videos, even when uploaded by healthcare professionals (6). The presence of unregulated videos with subpar content contributes to information pollution on the Internet, underscoring the need for professionals to upload higher-quality content. For instance, in a study by Yildiz et al. (17) focusing on vestibular rehabilitation videos on YouTube, it was found that while many videos lacked quality, the inclusion of high-quality content by healthcare professionals could potentially alleviate vestibular symptoms in patients. Nevertheless, medical practitioners have been exploring various concepts, such as tele-rehabilitation, to assist patients in improving their clinical conditions from home, leveraging advancements in technology (18). Consequently, social media platforms like YouTube have emerged as crucial mediums for disseminating and exchanging health-related information.

In Askin et al.'s (19) examination of YouTube videos pertaining to transcranial stimulation treatment for stroke, they observed that videos of higher garnered increased views and engagements and had longer durations. Similarly, Tolu et al. (20) highlighted that informative and high-quality videos tend to attract greater popularity and likes. Consistent with existing literature, our study revealed that videos with elevated SAM and GQS scores tended to accumulate more views, likes, and dislikes and featured lengthier durations. Conversely, Koçyiğit et al. (21) found no significant correlation between video quality and metrics such as views, likes, and dislikes.

Notably, videos sourced from health organizations exhibited higher SAM values. Desai et al. (13) reported a median SAM value of 24 in their analysis, noting that videos with superior SAM ratings tended to have longer durations. Similarly, our study indicated a median SAM value of 20.12. Moreover, statistically significant associations were observed between SAM, JAMA, GQS, and modified DISCERN scores and video duration. It was evident that high-quality videos, as indicated by higher rating scores, tended to be longer. This observation aligns with the notion that presenting comprehensive and high-quality content necessitates a longer duration. Özdemir et al (22) also reported similar findings in their examination of cancer rehabilitation videos on YouTube. When crafting video content, it is imperative to strike a balance between providing high-quality information and maintaining audience engagement without sacrificing essential content. Thus, careful consideration should be given to the duration of videos to ensure optimal delivery of information.

Chen et al. (23) discovered that YouTube videos serve as an effective educational tool, with HD videos being particularly impactful for this purpose. Conversely, Gençpınar et al. (24) did not identify a significant correlation between liking, disliking, number of comments, impressions, video duration, total SAM score, and whether the videos were in HD format. Our study yielded results consistent with existing literature regarding these video attributes. However, we did find a statistically significant association between the upload date and the prevalence of HD videos. This indicates that while video quality, content, and audience response may not always align, videos with high image quality are uploaded with the intention of attracting more viewership in the current landscape.

In our study, we observed that the content of the videos remained relatively consistent across different time periods. However, when assessing videos based on the continents to which they were uploaded, a statistically significant relationship emerged, indicating that videos addressing CP classification were more prevalent outside the American continent. Additionally, a significant correlation was identified between the duration of the videos and their geographical origin. Specifically, videos originating from non-American continents, particularly those from England and India, exhibited longer durations. This finding suggests that video topics and lengths may have been tailored to meet the expectations of their respective audiences in their respective countries.

Recent research underscores the significant impact of videos featuring patient narratives, experiences, and involvement in therapy sessions on peer-to-peer communication among patients. Our study indicates that interviews with patients participating in CP rehabilitation programs and their families have garnered attention and motivated individuals with similar conditions to engage in such programs. Similar to findings by Chou et al. (25) in the context of cancer rehabilitation, these shared experiences have demonstrated positive effects on patients. Consequently, an increasing availability of such videos holds promise in facilitating broader access to these beneficial programs for other patients. Moreover, Bertamino et al. (26) highlighted the pivotal role played by families of children with pediatric and perinatal strokes during the COVID-19 pandemic in facilitating their treatment. It is imperative for healthcare professionals to enhance communication with children and their families during this challenging period and provide necessary support to ensure uninterrupted care.

Asano et al. (27) highlighted the importance of maintaining CP rehabilitation treatments, even amidst the pandemic, and advocated for the future development of tele-rehabilitation services. Similarly, Cankurtaran et al. (28) proposed that collaborative tele-rehabilitation and telemedicine initiatives involving the families of CP patients could effectively mitigate the adverse effects of potential future pandemics. Various options such as gaming platforms (29), active video games, and virtual reality (30) for in-home tele-rehabilitation during the COVID-19 era present alternative avenues for rehabilitation prior to hospitalization. YouTube serves as a valuable resource not only for cerebral palsy but also for numerous neurological conditions and treatments like selective dorsal rhizotomy (31). Given the findings of our study indicating that higher-quality videos garner more views, it is evident that high-quality content uploaded on YouTube serves as another beneficial resource for patients and their families throughout the treatment journey.

In the current study, no statistically significant difference was observed between the sources of video uploads and the final results of reliability and quality assessments. Similar findings have been reported in prior research (32,33). For instance, Bakulan et al. (34), in their examination of YouTube videos on CP, found that videos uploaded by physicians received higher quality ratings. In our study, videos uploaded by physicians were categorized under both academic and physician titles. Discrepant findings across studies may stem from variations in how authors evaluate the sources of videos.

Furthermore, our study revealed that videos uploaded by patients garnered a significantly higher number of likes. Baker et al. (35) similarly noted a notably greater number of comments in patient-generated videos, with 28% of these comments seeking additional information. This phenomenon can be attributed to the increased attention received by videos featuring patient experiences, thereby leading to noteworthy changes in video interaction metrics.

Our study is subject to certain limitations. These limitations encompass a relatively small sample size and the inclusion of only the initial 100 videos with relevant content. Additionally, our study is restricted to videos with English-language content, thereby excluding non-English videos and the insights they may offer from different nationalities. However, given that English is widely spoken worldwide, the impact of this limitation on our study may be relatively minor.

CONCLUSION

Based on our study findings, the majority of the videos exhibited moderate quality, with some containing adequate information. Videos of high quality tend to attract more user engagement, including views, likes, comments, and longer durations, while also receiving better reliability and accuracy scores. Particularly for individuals requiring pediatric rehabilitation, such as patients with CP who experienced disruptions in healthcare during the COVID-19 pandemic, YouTube videos can serve as an alternative to telecommunication methods. Therefore, future videos produced by healthcare professionals in this domain should prioritize high quality, as they will be more beneficial for patients, aiding in symptom regression and facilitating patient education.

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