ORIGINAL RESEARCH ORİJİNAL ARAŞTIRMA

A Quality Analysis of Cerebral Palsy Videos on YouTube

YouTube'daki Serebral Palsi Videolarının Kalite Analizi

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ABSTRACT Objective: There is a paucity of data pertaining the quality and reliability of information presented on YouTube about childhood disabilities, such as cerebral palsy (CP). The aims were to evaluate both characteristics and quality of CP YouTube video content presented in English, and to identify criteria that can be important for selecting high quality and reliable informational CP videos. **Material and Methods:** YouTube was searched using the keyword "cerebral palsy" in January-2023. 151 videos were included to the study. Video metrics such as number of likes, comments, video duration were analysed and videos were divided into two groups as informational (n=63), and experimental (n=88). The quality, reliability, and popularity of informational videos were evaluated with Global Quality-Score, modified DISCERN score, and Video Power-Index. **Results:** While 41% of informational videos were low quality, 27% were high quality, 32% were moderate quality, considered as acceptable. Only information provider (p<0.001) and DISCERN-scores of videos (low-moderate quality: p=0.001, low-high quality: p<0.001) were different according to quality level. DISCERN scores increased with quality level. 93% of videos which was uploaded by physicians were high-moderate quality. This rate was 88% for official associations, 56% for physical therapists and 66% for patients or families, 16% for non-specified people. **Conclusion:** The quality of more than half of informational YouTube videos (59%) on CP were considered as acceptable. According to our study results, to make appropriate CP videos in YouTube platform, the videos which were uploaded by a physician or an official association should be selected.

Keywords: Cerebral palsy; quality; reliability; YouTube

ÖZET Amaç: YouTube'da serebral palsi gibi çocukluk çağı engellilik durumlarının, bilgilendirici içeriklerinin kalitesi ve güvenilirliği hakkında yeterince veri mevcut değildir. Bu çalışmanın amacı, YouTube'daki İngilizce serebral palsi video içeriklerinin hem karakteristik özelliklerini hem de kalitesini değerlendirmek ve serebral palsinin yüksek kalitede ve güvenilir bilgilendirici videolarını seçebilmek için önemli kriterleri tanımlamaktır. **Gereç ve Yöntemler:** Ocak 2023 yılında "cerebral palsy" anahtar kelimesi ile YouTube taraması yapıldı. Yüz elli bir video çalışmaya dâhil edildi. Beğeni, yorum sayısı, video süresi gibi video metrikleri analiz edildi ve videolar bilgilendirici (n=63) ve deneyimsel (n=88) olarak 2 gruba ayrıldı. Bilgilendirici videoların kalitesi, güvenilirliği ve popülerliği, Global Kalite Skoru, modifiye DISCERN skoru ve Video Power İndeks ile değerlendirildi. **Bulgular:** Bilgilendirici videoların %41'i düşük kalitede iken, %27'si yüksek kalitede, %32'si ise orta kalitede kabul edilebilir idi. Videolar kalite düzeyine göre gruplara ayrıldığında, sadece bilgilendirici videonun kaynağı (p<0,001) ve DISCERN skorları (düşük-orta: p=0,001, düşük-yüksek: p<0,001) gruplar arası farklı bulundu. DISCERN skorları, kalite seviyesine göre artış gösterdi. Hekimler tarafından yüklenen videoların %93'ü orta-yüksek kalitede idi. Bu oran, resmî derneklerde %88, fizyoterapistlerde %56 ve hasta veya ailelerinde %66, kimliği belirsiz kişilerde %16 idi. **Sonuç:** YouTube'daki serebral palsi hakkında bilgilendirici videoların yarısından fazlasının kalitesi (%59) kabul edilebilirdir. Çalışmamızın sonuçlarına göre YouTube platformunda uygun serebral palsi video seçimi için hekimler veya resmî dernekler tarafından yüklenmiş videolar tercih edilmelidir.

Anahtar Kelimeler: Serebral palsi; kalite; güvenilirlik; YouTube

The most common childhood disability is cerebral palsy (CP), an umbrella term that defines a wide variety of symptoms related to non-progressive lesions/anomalies in immature brain.[1,2] CP birth prevalence for high income countries is 1.6 per 1,000 live births and findings of population-based studies showed a higher prevalence in low-middle income countries than high income countries.[3,4] The families

and patients deal not only with physical problems but also with psychological stress and social isolation.[5,6] In recent years, it has become quite common using social media platforms to acquire and share information, also for patients, their families, healthcare professionals, and medical students.[7] Caron and Light reported that social media platforms play an important role in the lives of patients with CP.[8]

Among social media platforms, YouTube (Google, United States of America) is a strong option due to audiovisual components and providing easily accessed, free information. On the other hand, millions of users can upload many videos. Misleading can lead to long-term false consequences. Previous studies which evaluated quality of different health condition videos on YouTube, reported approximately 16-30% of them present misleading or poor quality information.[9-11] It is critically important to analyse the content and quality of videos in YouTube not to lead to inappropriate advising and unethical prescriptions of methods and devices.

In a recent study, CP informational videos were analysed and reported to be moderate quality. However widely used language English videos was not evaluated, only Brazilian-Portuguese videos were evaluated and the features of videos according to their quality level were not reported.

The aims of this study were to evaluate both characteristics and quality of CP YouTube video content presented in English, and to identify criteria that can be important for selecting high quality and reliable CP videos.

▌ MATERIAL AND METHODS

SEARCH STRATEGY AND ELIGIBILITY CRITERIA

A YouTube search for videos was performed on January 10, 2023 using the term "Cerebral Palsy" (using website: https://www.YouTube.com/). This cross-sectional study was based on previous studies which analysed YouTube content of various diseases, exercises, and medical techniques.[9,10,12-20] The first 175 videos which have any content about CP in English were included in the study. Advertising, music, animated videos, videos lasting over 1 hour, non-English videos, videos without sound and videos whose speech content can not be understood clearly were excluded.

This study was conducted according to Helsinki Declaration. This study did not include human or animal subjects. Ethic committee approval was not required. Previous studies on YouTube content followed a similar path.[13,14]

DATA COLLECTION, CATEGORIZATION, AND VIDEO METRICS ANALYSIS

All videos were watched and analysed by 2 independent physical medicine and rehabilitation specialists with a third specialist in case of disagreement. Total days on YouTube, the duration of the videos, number of views, number of views per day, number of likes and dislikes, number of comments were recorded for analyses.

Videos were divided into 2 categories: informational videos and experimental videos. To be classified as informational videos, videos must provide information on at least one of the following areas: diagnosis, symptoms, classification, etiology, prevention, epidemiology, prognosis, functional and clinical aspects, comorbidities, exercises, multidisciplinary treatment, and/or robotic assistive devices-technology, and botulinium toxin injections. These criteria were based on CP guideline.[21]

To be classified as experimental videos, videos must provide patient's biographies, interviews, reports, or daily living. Some videos presented informational content, if the videos main focus was experiment (at least 70% of the video), it was accepted as experimental video. Also these categorization was conducted by 2 independent specialist. In case of disagreement in this process, it was resolved by consensus with a third physical medicine and rehabilitation specialist.[12]

ANALYSIS OF INFORMATIONAL VIDEOS

Content analysis of informational videos were classified as: 1- diagnosis, symptoms, and classification, 2- etiology, prevention, and epidemiology, 3- prognosis, functional and clinical aspects, 4- comorbidities, 5- exercises, 6- multidisciplinary treatment, 7- robotic assistive devices-technology, 8-botulinium toxin injections.

Information providers were defined as: 1-physician, 2-physical therapist, 3-student, 4-patients or families, 5-an official association, 6-videos whose provider was not specified, are defined as "not specified". Presentation of videos were defined as: 1-lecture, 2-interview, 3-report, 4-mixed form.

Popularity of videos was evaluated with "video popularity index" (VPI). The calculation formula of this index is: (likes×100/(likes+dislikes)× (views/day)/100.[13,14] The reliability of videos was evaluated with a 5-point modified "DISCERN score" tool adapted by Singh et al.[15] It has 5 main topics as follows: 1. Are the aims clear and achieved? 2. Are reliable sources of information used? 3. Is the information presented balanced and unbiased? 4. Are additional sources of information listed for patient reference? 5. Are the areas of uncertainty mentioned? The range of final score was 0 to 5. Higher scores denoted better reliability.

The quality of videos was evaluated with 5-point Global Quality Score (GQS) tool adapted by Bernard et al.[22] It assesses the quality, flow, and usefulness of videos. Scores of 1-2 point indicate low quality, score 3 point indicates moderate quality, and scores of 4-5 point indicate high quality.[13,16,23] This scale presents sufficient concurrent validity and is widely used in cross-sectional studies which evaluate YouTube content.[12,13,19,20]

STATISTICAL ANALYSIS

The distribution of each continuous variable was tested for normality using the Shapiro-Wilk test. Non-normally distributed variables were performed using the Mann-Whitney U test or Kruskal-Wallis test and are expressed as median value (%25-%75). The Pearson's chi-square test was used to compare categorical variables. The categorical variables are expressed in frequencies and percentages. A p-value <0.05 was considered significant. All analyses were performed using the IBM SPSS version 25.0 software (SPSS Inc., Chicago, IL, USA).

RESULTS

Of the 175 English videos screened, 24 videos were excluded, 151 videos were selected for analysis, this process was detailed in flow chart (Figure 1). While 42% of selected videos had informative content, 58% had experimential content.

Most of the video metrics were similar between informational and experimental videos, only "days on YouTube" was higher (p=0.025) and "number of comments" was lower (p=0.026) in informational videos than experimental videos (Table 1).

Content analysis of the informational videos is seen in Table 2. Various topics such as diagnosis, treatment modalities, prognosis, robotic assistive de-
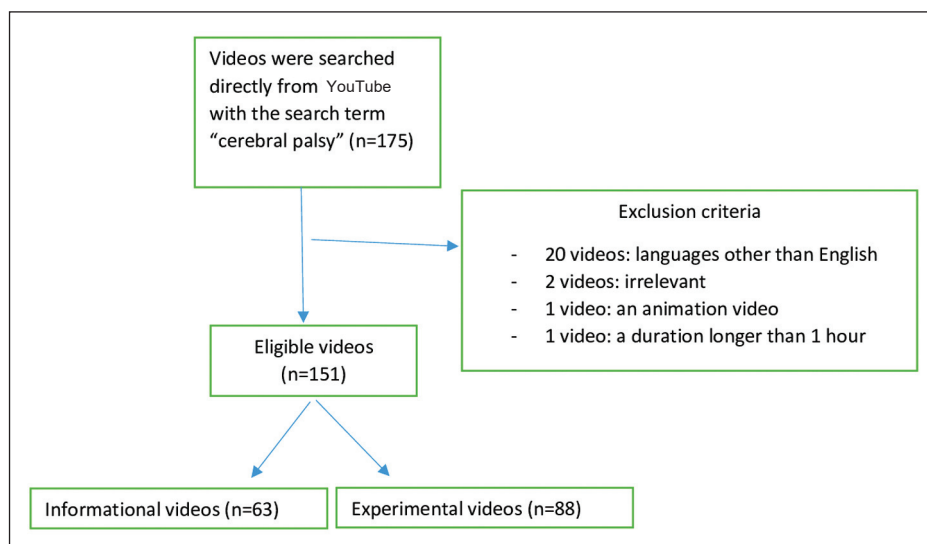

FIGURE 1: Flowchart of selected videos.

TABLE 1: Quantitative characteristics of informational and experimental videos.			
	Informational videos (n=63)	Experimental videos (n=88)	p value
Days on YouTube	2,387 (1233-4082)	1688.50 (678-3301)	0.025
Duration (seconds)	268 (150-440)	313 (181.75-664.75)	0.386
Number of views	27,708 (8763-76595)	20,849 (11904-77863.50)	0.824
Number of views per day	18.11 (5.46-50.96)	17.41 (6.69-60.66)	0.409
Number of likes	195 (65-853)	307 (82-1253.25)	0.147
Number of dislikes	6 (4-23)	5 (2-17)	0.126
Number of comments	12 (3-72)	27.50 (7.50-149.25)	0.026
Video popularity index	96.72 (93.22-97.86)	16.81 (5.94-60.36)	0.286

TABLE 2: Contents of informational videos.	
	n (%)
Diagnosis, symptoms, classification	28 (44.4%)
Etiology, prevention, epidemiology	21 (33.3%)
Prognosis, functional and clinical aspects	20 (31.7%)
Multidisciplinary treatment	20 (31.7%)
Comorbidities	18 (28.5%)
Exercises	15 (23.8%)
Robotic assistive devices and technologies	5 (7.9%)
Assessment tools	3 (4.7%)
Botulinium toxin injection	3 (4.7%)

FIGURE 2: Proportion of low-moderate-high quality videos.

vices etc. were presented in videos. Most of informational videos were about diagnosis, symptoms, and classification of CP (44.4%), followed by etiology, prevention, and epidemiology. 85% of 63 videos had mixed content (two or more) (Table 2).

QUALITY OF VIDEOS

The median (25-75%) value of GQS in informational videos was 3.[2-4] The informational videos were divided into 3 categories according to GQS, with the scores of 1-2 were accepted as low quality (n=26), score 3 was accepted as moderate quality (n=20), and the scores of 4-5 were accepted as high quality (n=17). Low quality videos had the highest proportion (41%), while high quality videos had the lowest proportion (27%) (Figure 2).

Comparison of video metrics and video popularity indexes was similar (p>0.05) according to quality in three groups (high-moderate-low quality). However DISCERN scores were found significantly different. It was found higher in high quality group while it was the lowest in low quality group (p val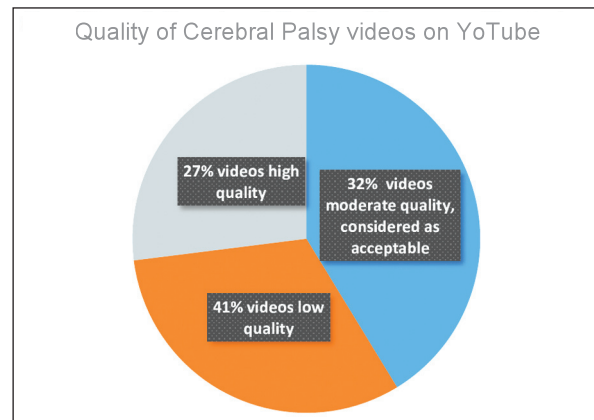ue between low quality-moderate quality: p=0.001, p value between low quality-high quality: p<0.001). In terms of information provider distribution, there was a significant difference between groups (p<0.001): most of the information providers were physician in high quality group (58.8%), most of the information providers were physical therapist in moderate quality group (40%), and most of the information providers were not specified (57.6%) in low quality group (Table 3).

DISCUSSION

This is the first study which systematically assess the reliability and quality of CP information in English on the social media platform, YouTube. 27% of CP videos were found to be useful, 32% were somewhat useful, considered as acceptable, however 41% were not found useful. Additionally, the informational videos were analysed to identify criteria that can be selecting high quality videos. The only identified criteria between high, moderate, and low quality videos was the information provider. Information providers

	Low quality (n=26) Median (25-75%)	Moderate quality (n=20) Median (25-75%)	High quality (n=17) Median (25-75%)	p value
TABLE 3: Comparison of informational videos according to their quality level.				
Video metrics				
Days on YouTube	2,476 (1202-3949)	2,524 (1249-4055)	2,116 (1091-5070)	0.994
Duration (seconds)	281 (149-444)	272 (179-590)	247 (133-444)	0.883
Number of views	12,696 (7922-72126)	28,788 (7706-71133)	44,963 (27269-136975)	0.105
Number of views per day	16.90 (4.36-32.37)	17.47 (4.20-45.57)	37.65 (6.93-159.23)	0.139
Number of likes	156 (63-620)	315 (54-871)	170 (66-1797)	0.663
Number of dislikes	5 (3-19)	6 (4-25)	9 (4-53)	0.325
Number of comments	8 (0-33)	8 (3-126)	16 (5-154)	0.199
Information provider n (%)				
Physician	1 (3.8%)	4 (20%)	10 (58.8%)	p<0.001
Physical therapist	7 (26.9%)	8 (40%)	1 (5.8%)	
Student	1 (3.8%)	0	1 (5.8%)	
Patients or families	1 (3.8%)	2 (10%)	0	
An official association	1 (3.8%)	4 (20%)	4 (23.5%)	
Not specified	15 (57.6%)	2 (10%)	1 (5.8%)	
Presentation of videos n (%)				
Lecture	1 (3.8%)	3 (15%)	7 (41.1%)	0.079
Interview	8 (30.7%)	4 (20%)	4 (23.5%)	
Report	3 (11.5%)	3 (15%)	2 (11.7%)	
Mixed form	14 (53.8%)	10 (50%)	4 (23.5%)	
Popularity				
Video popularity index	16.49 (4.15-32.08)	16.70 (3.81-43.99)	19.97 (5.37-155.94)	0.427
Reliability				
DISCERN score	2 (1-2)	3 (2-3)	3 (3-3.5)	<0.001*

*Low quality-moderate quality: p=0.001, low quality-high quality: p<0.001.

of high and moderate quality videos were mostly physicians and official associations. Furthermore, there was no relationship between quality of video and video metrics such as number of likes, comments, and video duration.

In today's digital world, social media platforms such as YouTube have become an indispensable part of daily living. The correct use of this resources may provide online information for patients and their caregivers as well health professionals and medical students. Nonetheless, in these platforms, quality and reliability of videos are uncertain since anyone can upload videos, so there is a risk of spreading misinformation about health conditions and treatment modalities. In the literature, there are many studies analysing quality of YouTube videos about different health topics.[9,10,12-20] Garg et al. reported misleading ratio as 16.5% in YouTube videos about dialysis and Kumar et al. reported this ratio as 33% in hypertan-

sion.[10,11] Ertem et al. analysed YouTube videos about piriformis exercises and 31% videos found to be of low quality.[23] Also in another study, quality of musculoskeletal ultrasound videos were analysed and 40% of videos were reported to be of low quality.[13] In our study, 41% of videos were low quality. This ratio is persistent with above studies, most of them reported approximately 1/3 of the YouTube videos as misleading or low quality.[11,13,23] On the other hand, more than 50% of videos are reported as acceptable quality in some studies, including ours. So, YouTube can be used for medical information by appropriate video selection.

More than half of YouTube English CP videos were categorized as experimental (58%), this ratio was the same also in Brazilian-Portuguese CP videos.[12] YouTube is a platform where people share not only information, but also personal experiences, feelings, thoughts. The information videos about CP

mostly presented multi topic mixed content (85%). The most presented topics were diagnosis, symptoms and classification in English videos. Video metrics of experimental and informational videos were almost similar except number of days on YouTube and number of comments. Although number of days on YouTube were higher in informational videos, number of comments were lower than experimental videos. This result may be due to the fact that people react to emotional videos and comment, because the experimental videos contain intense emotional content.

Brazilian-Portuguese informational CP videos were reported to be moderate quality, also in our study quality of general informational videos were moderate and suboptimal flow.[12] Both English and Brazilian-Portuguese informational CP videos can be considered as somewhat useful, acceptable for patients, families, healthcare professionals and medical students. Appropriate video selection is the most important thing. In order to determine how appropriate video selection can be made, informational CP YouTube videos were divided into 3 groups according to quality level (high-moderate-low quality). And characteristics were compared between 3 groups. Video metrics such as number of likes, comments were similar, also VPI was similar in 3 groups. This result showed that there was no relation between video popularity and quality. Similar to our result, Moon and Lee reported that high quality coronavirus disease-2019 videos were not popular.[17] Comparison of three groups showed that only DISCERN scores and information provider were different. As expected, DISCERN score which indicates high reliability, was found higher in high quality group, lower in low quality group like other studies.[10,18] Information providers of CP videos were physicians, physical therapist, official associations, patients or families and people who were not specified. 93% of videos which were uploaded by physicians were high-moderate quality and also 88% of videos which were uploaded by official associations were high-moderate quality. This rate was 56% for physical therapists and 66% for patients or families. Furthermore, the quality of videos which were uploaded by non-specified people, was very low (84% of them were low quality). Accord-ing to our study results, to make appropriate CP videos in YouTube platform, patients, families, healthcare professionals and medical students must select the videos which were uploaded by a physician or an official association.

We recommend health professionals and professional associations to increase uploading high quality videos, so that patients, families, and clinicians can access more accurate information about CP. Besides, YouTube should consider collaborating professional organizations like "Cerebral Palsy Foundation" to scan and remove low quality videos.

LIMITATIONS

One of the limitations of this study is that only YouTube was evaluated from social media platforms, findings of this study should not be generalized to all social media platforms. Secondly, despite using validated tools to analyse reliability and quality, these tools are subjective tools which represents the researchers' perspectives. In future, there is a need for large studies which analyse CP videos in all social media platforms.

CONCLUSION

There is a large number of experimental and informational videos in English about CP in YouTube platform. In the light of this study, more than half of the videos (59%) were acceptable as informational videos. It has been found that the most determinant of video quality is the information provider, not number of likes and comments. Those who want to learn about CP on YouTube platform are recommended to watch the videos uploaded by physicians and official associations.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

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