

# Assessment of the Effectiveness of YouTube in Controlling Myopia Progression

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## ABSTRACT

**Purpose:** Myopia control is important because of the increased risk of complications like retinal detachment, maculopathy, glaucoma and cataract. Nowadays, people can learn about their diseases on the Internet. Due to the fact that online health-related information is not reliable, the evaluation of the reliability of videos is compulsory. We used four scoring systems to evaluate the effectiveness of myopia control videos on You Tube.

**Study Design:** Online survey.

**Methods:** This study included the first 100 YouTube videos that were found after searching for “myopia control” on YouTube. Duration, views, likes, dislikes, and comments were all included in the general video evaluation. Two ophthalmologists independently evaluated the quality of information. The agreement and individual correlations of the data for each video were investigated statistically.

**Results:** Ninety-two videos were included in the study. The mean scores for DISCERN, JAMA, global quality score and usefulness were 34.22, 2.63, 2.02, and 1.35 respectively. Fifteen times increased outdoor activity and decreased near work, 52 times multifocal spectacles, 53 times multifocal contact lens, 58 times orthokeratology, and 40 times pharmacological agents were described as the treatment options. There were 31 videos uploaded by physicians and 24 by universities and private hospitals.

**Conclusion:** YouTube looks like a poor platform according to the scoring system. Especially increased outdoor activity and decreased near work, which are very important in patient’s education, were scarcely described. Healthcare professionals should upload more videos, so that the effectiveness and quality of the videos in this area may improve.

**Key Words:** Myopia, YouTube, DISCERN score, Global Quality Score.

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## INTRODUCTION

Among school age children the incidence of myopia range from 20% – 30%.<sup>1</sup> According to one estimate, half of the world population may be myopic (approximately 10% highly myopic) by 2050.<sup>2</sup> Recently progression of myopia has been accelerated

due to excessive use of digital screen devices for online learning and decreased outdoor activity during the COVID-19 pandemic.<sup>4-6</sup> To prevent global vision impairment caused by uncorrected refractive error, myopia progression control is important.<sup>7</sup> Myopic eyes benefit greatly from optical correction, but increased axial length accompanied by thinning of the retinal pigmentary epithelium, choroid and sclera can increase the risk of retinal detachment, maculopathy, glaucoma and cataracts.<sup>8</sup> Treatment strategies to halt myopia progression include; decreased near work and increased outdoor activity, under corrected spectacles, contact lenses (progressive, bifocal, and multifocal, soft, or rigid contact lenses), orthokeratology and

pharmacological agent (atropine). While some treatment options have side effects, others do not seem to effectively control the progression effectively. Patients and parents feeling undecided on which treatment to opt for, use internet as a valuable source to educate themselves about treatment options.

Today, social media platforms are increasingly used to obtain health information.<sup>9,10</sup> YouTube is the most popular social media platform.<sup>11</sup> YouTube videos are not evaluated before they are posted, so it is impossible to predict the effectiveness and reliability of the information.<sup>12,13</sup> Conducting research is important to evaluate the effectiveness and reliability of the information provided. You Tube videos on myopia progression control have not been evaluated for effectiveness or reliability to our knowledge. The purpose of the study was to report the effectiveness and reliability of You Tube videos regarding information provided to the patients and their parents about myopia progression.

## METHODS

Since this study used only publicly available data, no institutional review board approval was required. On December 20, 2022, YouTube was searched using the keyword ‘myopia progression control’ at <https://www.youtube.com/> for this prospective study. Standard preferences (sorting videos by relevance) were not changed. The first five pages of the search results were viewed (100 videos) because people mostly looked at the first pages.<sup>14</sup>

Videos in English, related content on myopia progression, and videos accessible on December 20<sup>th</sup> 2022 were included in the study. Different languages, shorter than 30 seconds, irrelevant videos, repeat videos, advertisements, videos that were closed to likes, dislikes, and comments were excluded from the study.

All browser search history was cleared without logging in as a user. Views, likes, dislikes, comments, age of video (from upload to December 20, 2022), length (in minutes), upload source (physician, university and private health institution, health channel and patients), country of origin, type (academic or patient information and experience) and treatment options (decreased near work and increased outdoor activity, spectacles, contact lenses, orthokeratology, pharmacological agent) were investigated for each video. Furthermore, rating (daily) and audience

coaction were counted. The audience coaction was recorded as coaction index (number of likes – number of dislikes)/total number of views x 100) and rating by dividing the number of views by the age of video. Finally, scores of the Journal of the American Medical Association (JAMA), DISCERN, global quality and usefulness were assessed.

DISCERN includes 3 sections and 16 items; each scored (1-5 points) to assess the accuracy of medical information. The DISCERN score (16–75 points) is assessed into 5 groups; from perfect (63–75) to very poor (16–26).<sup>15</sup> JAMA investigates the trustworthiness of online health information with 4 criteria (authorship, attribution, disclosure, and currency).<sup>16</sup> The global quality score (1 to 5 points) determines the quality of the online video information.<sup>17</sup> Usefulness score (1 to 5 points) determine the relevance of the videos to the subject. It has five parts: definition, indication, applicability, complication and prognosis.<sup>18</sup> Two different ophthalmologists (A.A.E.B. and S.I.K.), who were blinded to description of videos, assessed the videos.

The SPSS program was used to perform statistical analysis. Quantitative data was identified with mean ± standard deviation (SD) values and qualitative data was identified with frequencies and percentages. First, the normality distribution of each continuous variable was assessed. The comparison of variables between groups was assessed with the Mann–Whitney U test and examining the relationships between the variables were assessed with the Spearman correlation test. A  $p < 0.01$  was accepted as statistically significant. The agreement between the two independent ophthalmologists was assessed with the kappa coefficient.

## RESULTS

Ninety-two videos were investigated. Four videos in different languages and four videos that were duplicates were excluded from the study. The mean number of views was 5695 (18 – 160,528). The mean age of the videos was 1,034 (91 – 4,152) days. The mean video length was 15.07 minutes (0.32 – 91.4). Table 1 shows an overview of the videos. Thirty-one (33.7%) videos had been uploaded by physicians, 24 (26.18%) by university and/or private health institutions, 35 (38%) by health channels and 2 (2.2%) by a patient. Forty-nine videos (53.3%) had been uploaded in the USA, 13 (14.1%) in Canada, 9 (9.8%)

in India, 8 (6.6%) in China, and 3 (9.9%) in (each one) Australia-England-Malesia. When examining the type of video, patient education videos were 44 (47.8%) and academic videos 40 (43.5%). Only eight (8.7%) videos were related to the patient's experience. Five different treatment options for myopia progression were described in the videos; 15 times decreased near work and increased outdoor activity, 52 times multifocal spectacles, 53 times multifocal contact lens, 58 times orthokeratology and 40 times pharmacological agent-atropine. Six videos (6.5%) were animated and one video was a myopia song.

**Table 1:** Descriptive analyses of myopia control videos.

	Mean	Range
Views (n)	5695.25	18 – 160,528
Rating (daily)	3.74	0.01 – 44.55
Video age (days)	1034.68	91 – 4152
Likes (n)	84.02	0 – 3800
Dislikes (n)	0	0
Comments (n)	24.77	0 – 1335
Length (minutes)	15.07	0.32 – 91.48
Audience coaction	2.59	0 – 100
DISCERN score	43.96	17 – 72
JAMA score	2.63	0 – 4
Global quality score	2.92	1 – 5
Usefulness score	2.66	0 – 5

The kappa score between ophthalmologists was significant 0.952 (95.2%). The mean scores for DISCERN were 34.22, for JAMA was 2.63, for global quality 2.02, and for usefulness 1.35. The mean viewer interaction score was moderate, 2.59 (range 0 to 100). The mean rating was 3.74 (range 0 to 44). All scores were better in videos uploaded by a physician than those of a non-physician (p <0.001 for each parameter). Table 2 compares video data based on the source of video uploaded.

**Table 3:** Correlation between scores and other variables.

		DISCERN	JAMA	GQS	Usefulness	Likes	Comments
DISCERN	p	< 0.001	< 0.001	< 0.001	< 0.001	= 0.484	= 0.476
	r	= 0.813	= 0.845	= 0.881	= 0.074	= 0.711	= 0.084
JAMA	p	< 0.001	< 0.001	< 0.001	< 0.001	= 0.723	= 0.711
	r	= 0.813	= 0.802	= 0.817	= 0.037	= 0.039	= 0.039
GQS	p	< 0.001	< 0.001	< 0.001	< 0.001	= 0.158	= 0.169
	r	= 0.845	= 0.802	= 0.880	= 0.148	= 0.145	= 0.145
Usefulness	p	< 0.001	< 0.001	< 0.001	= 0.634	= 0.583	= 0.583
	r	= 0.881	= 0.817	= 0.880	= 0.050	= 0.058	= 0.058
Audience coaction	p	= 0.017	= 0.072	= 0.136	= 0.106	< 0.001	< 0.001
	r	= 0.249	= 0.188	= 0.157	= 0.170	= 0.813	= 0.813
Rating (daily)	p	= 0.776	= 0.363	= 0.811	= 0.388	< 0.001	< 0.001
	r	= -0.030	= 0.096	= -0.025	= 0.091	= -0.727	= -0.581
Length	p	< 0.001	< 0.001	< 0.001	< 0.001	= 0.270	= 0.484
	r	= 0.783	= 0.833	= 0.796	= 0.804	= 0.116	= 0.074

**Table 2:** Comparison of video data based on the source of video uploaded.

	Physicians	Non-Physicians	P value
Views (n)	6195 ± 20138	2907 ± 6416	0.323
Rating (daily)	3.92 ± 8.54	2.73 ± 3.20	0.845
Video age (days)	1027 ± 725	1073 ± 1153	0.514
Likes (n)	96.87 ± 438.6	12.47 ± 17.2	0.237
Dislikes (n)	0	0	1
Comments (n)	28.83 ± 153.3	2.14 ± 4.16	0.112
Length (minutes)	17.47 ± 23.31	1.70 ± 1.48	<0.001
Audience coaction	2.89 ± 11.27	0.96 ± 0.57	0.143
DISCERN score	46.56 ± 13.57	29.5 ± 4.83	<0.001
JAMA score	2.87 ± 0.84	1.28 ± 0.46	<0.001
Global quality score	3.12 ± 0.95	1.78 ± 0.69	<0.001
Usefulness score	2.87 ± 1.09	1.50 ± 0.75	<0.001

Based on the correlations between viewer interaction, rating, length, comments and likes, Table 3 shows the correlations between scores and these variables.

## DISCUSSION

In past, patients used to receive information about diseases from their doctors because there was no online information available. Nowadays, with widespread use of the Internet, people can learn and access easy and free information about their diseases on the Internet, such as You Tube. However, sometimes health-related information is unreliable on You Tube because of videos not uploaded by healthcare professionals or videos just used for advertising and the deficiency of a peer review that controls the effectiveness of the published videos. Assessment of the effectiveness and quality of myopia progression control videos was planned in this study.

Different scoring systems have been used to investigate the effectiveness of online videos.<sup>17,19-23</sup> In this study, DISCERN, JAMA, global quality and usefulness scores were used. The mean scores showed that YouTube videos on myopia progression control provided poor information. Children in particular spent more time on the computer, telephones and tablets during the coronavirus pandemic. The increased outdoor activity and decreased near work, which are so important treatment options for control of myopia progression, were scarcely described. Previous studies similarly showed that YouTube video content was poor and insufficient for an educational resource on ocular diseases.<sup>17,24-25</sup> In order to guide patients to more reliable and useful videos, healthcare professionals should determine the content of a health-related video before uploading.

In this study, a higher score was achieved by videos uploaded by healthcare professionals. These videos can provide more correct information. On the other hand, the ratings and videos uploaded by healthcare professionals and non-healthcare professionals did not show statistically significant differences. Küçük et al, found that refractive surgery videos on YouTube uploaded by healthcare professionals had more viewership than those uploaded by non-healthcare professionals.<sup>17</sup> Similarly, Kalayci et al, found that You Tube videos on keratoplasty uploaded by healthcare professionals were watched more frequently than those uploaded by non-healthcare professionals.<sup>18</sup>

In particular, five treatment options (increased outdoor activity and decreased near work, spectacles, contact lenses, Orthokeratology, pharmacological agent-atropine) were identified in the videos. Increased outdoor activity and decreased near work, which is important in the control of myopia progression, was scarcely described in the videos. Lower dose atropine treatment was most popular in recent videos.

The usefulness score shows the educational effect of a video. Our results showed that videos uploaded by healthcare professionals had higher scores than videos uploaded by non-healthcare professionals. However, none of them met the five criteria and definitions. The myopia progression control videos had moderate information on the indications and procedures of treatment. There was also lesser number of videos about the complications and prognosis of treatments. It is important that the patients should be aware of treatment options, complication and prognosis.

Our study had some limitations. Due to You Tube interactive nature, search results may fluctuate by date (deleted videos or added videos). According to the keyword used, cookies can affect search results, since You Tube is generally accessed through accounts. Although these limitations were noted, two different ophthalmologists blindly assessed the videos with four different scoring systems and found powerful correlation among the scoring systems.

YouTube is a poor social media platform to provide information on the control of myopia progression by patients. Especially, less stress was focused on the increased outdoor activity and decreased near work, which is important for halting myopia progression. Increasing the number of healthcare professionals uploading videos about myopia progression control will lead to higher quality and more reliable content.

**Conflict of interest:** Authors declared no conflict of interest.

**Ethical Approval:** This study was exempted from ethics approval due to using only publicly available data.

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### Authors' Designation and Contribution

Ali Altan Ertan Boz; Designation: *Concepts, Design, Literature Search, Data Acquisition, Data Analysis, Statistical Analysis, Manuscript Preparation, Manuscript Editing, Manuscript Review.*

Sucattin İlker Kocamıs; Associate Professor: *Concepts, Design, Literature Search, Data Acquisition, Data Analysis, Statistical Analysis, Manuscript Preparation, Manuscript Editing, Manuscript Review.*