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Is the YouTube sharing site a useful source of information about echocardiography?

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Abstract

Purpose/Aim: YouTube, which reaches more and more users every day with auditory and visual interaction, is becoming an easily accessible and increasingly popular source of information on health-related issues. In our study, the scientific content and quality of the Turkish language videos related to echocardiography were evaluated.

Methods: 453 videos obtained as a result of a YouTube search with the keyword 'echocardiography' in July 2020 were evaluated. 54 videos were included in the study after the exclusion criteria. Videos were evaluated with Discern, Content, and Global Quality Scores (GQS).

Results: The median video duration was 190 seconds (95% CI: 122-252). The median number of views was 1312, and the number of likes was 12. The videos had a power index of 165.65 and a Popularity score of 4.2. Discern, GQS, and content scores found that videos scored an average of 3 out of all three scores. Study videos were evaluated in 2 groups, 38 in the 'Useful' Group and 16 videos in the 'Unuseful' group. Video duration and popularity were statistically significantly higher in the 'Useful' Group. No significant difference was found in terms of professional sharing in the' useful 'and' unuseful ' groups. In the correlation analysis, there was a strong positive correlation between the number of views and likes and between likes and popularity. It was found that there was a moderate positive correlation between Video duration and variables of: likes, Discern score and Power Index. It was found that the number of views and likes did not correlate significantly with quality and content scores.

Conclusion: These results show that YouTube has the potential to be an important tool for timely sharing and disseminating health-related information, both as a video repository function and as a social network interface with which users can interact. Although quality posts tend to increase day by day, professional users in the field of health should be encouraged to share videos in medical broadcast quality more frequently.

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Introduction

YouTube is a rapidly developing online video server that reaches a hundred million viewers with nearly two billion views every day, providing easy access to its visitors (1, 2). The Health Information National Trends Survey study reported a significant increase in Internet use to access health-related information. Another study showed that 8 of 10 Internet users use Internet to access health-related information (3, 4). According to the 2018 results of a national health survey, more than one third of the patients visit YouTube to watch health-related videos (5). This information resource, which offers visual and auditory interactions, has become an interesting platform for patients as well as for physicians (6). However, the heterogeneity of the viewers and uploaders and the absence of an approval process for the data on online video platforms in terms of quality and content have led to the spread of false or misleading information on health-related issues (2, 5, 7). Echocardiography is an important noninvasive diagnostic tool used in the diagnosis and follow-up of cardiovascular diseases. Videos on various diagnostic and treatment methods are shared on YouTube by independent users, health institutions, organizations, or medical online publishing institutions to provide information to the society and to train clinicians. In recent years, researchers have evaluated the quality and reliability of YouTube videos, which have become a commonly used source of information for individual and public health. However, there is no study that has evaluated the quality of Turkish YouTube videos on echocardiography. The purpose of our study was to evaluate the scientific content, reliability, and quality of the videos on echocardiography.

Materıal And Method

Based on the application Google Trends (http://www.google.com/trends/) (8), it was determined that the most preferred Turkish keyword on echocardiography on YouTube (http://www.youtube.com) video sharing site was “echocardiography.” This keyword was used on YouTube to access the uniform resource loader and uniform resource finder addresses of the review date of the results for the July 2020 review. To reduce the bias caused by the search engine on the video image due to the location and search history of the study computer, the searches were performed in a single day using the incognito mode of Google Chrome, and the results were recorded for later evaluation (9). Search results were evaluated by two

independent cardiologists (EA and EY). The coefficients of variation for sequential observer assessment and interobserver assessment were calculated by kappa analysis. As a result of the search, 453 videos were accessed; however, non-Turkish videos, repetitive videos, those with low sound quality or silent presentations, those on other subjects, and noneducational informative videos were excluded from the study. In cases where parts of the same video were published by different users, the main video was included in the evaluation, whereas the parts were excluded. Videos with good video and sound qualities clear and fluent language, and clearly visible echocardiography images and imaging techniques were included. Finally, 54 videos were included in the study.

The following descriptive data were determined and recorded for each video: video duration (sec), time from the date of sharing to the day when the search for the study was defined upload day (days), number of views, likes, dislikes, comments, and popularity. Video popularity was defined as the ratio of the number of views for the video on the search date to the airtime until that date (2, 10, 11). Video sources were defined as independent user channel (IUC), Hospital-University Channel (HUC), Medical Dot-Com Channel (MDC), and News Agency Channel (NAC). The video power index was calculated with the formula by multiplying the number of views and the number of likes and dividing it by 100 (12). The reliability of the information provided in the videos was rated using a scoring-based scale adapted from the DISCERN tool. This scale comprises five questions that can be answered with Yes or No answers; each Yes answer is given 1 point and indicates good reliability, whereas each No answer is given 0 point and indicates low reliability (**Table 1**) (10, 11, 13, 14).

Table 1: Scoring systems used in video quality and content evaluation in our study.
Discern Score:
1. Are the educational goals clearly stated 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 users to refer to?
5. Are areas of uncertainty, gaps or differences of opinion mentioned?
Content Score:
1. What are the preparations before echocardiography imaging?
2. What are the indications for echocardiography?
3. What is the diagnostic power of echocardiography?

4. What are the imaging details of echocardiography?
Global Quality Score:
1. Not useful at all for viewers.
2.Poor quality in general and poor video streaming; very limited use recommended for viewers.
3. Medium quality and insufficient flow; some important information is provided, but other information is missing. A little useful for the audience.
4. Good quality and generally good flow; most of the relevant information is listed, but some topics have not been covered; useful for viewers.
5. Excellent quality and perfect flow; very useful for viewers.

Content scoring was evaluated using four parameters based on similar examples in the literature. This scale comprises four questions that can be answered with Yes or No answers; each Yes answer is given 1 point and indicates the quality of the video content, whereas each No answer is given 0 point (**Table 1**) (15).

While evaluating the videos, those with a total of 5 points and above in the DISCERN and content scoring systems were considered 'Useful', whereas those with below 5 points were considered 'Unuseful' (15).

In addition, the videos were evaluated in terms of general ease of interpretation and information flow using the global quality score (GQS) (**Table 1**) (16, 17). This scoring system is used to rate the overall quality of each video (graded from 1 to 5 points, 1 indicates low quality, whereas 5 indicates excellent quality).

The study was approved by the local ethics committee (Trabzon Kanuni Training and Research Hospital Non-Invasive Studies Ethics Committee; 17.12.20120/23618724).

Statıstıcs

Descriptive statistics (mean, standard deviation, median, frequency, and percentage) were used to evaluate the study data. Shapiro–Wilk's test was used to estimate the normal distribution of quantitative data. Mann–Whitney's *U* test was used in two-group comparison for continuous variables without normal distribution. A *p*-value of <0.05 was considered significant for all analyses. All statistical analyses were conducted using SPSS 22 (SPSS Inc, Chicago, USA).

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Results

After conducting the search in July 2020, 54 Turkish videos were included in the video analysis. Video resources were as follows: HUC 10 (18.51%), MDC 32 (59.25%), IUC 10 (18.51%), and NAC 2 (3.70%). Median video duration was 190 sec (IQR: 122–252) (minimum 44 sec, maximum 7424 sec). The median number of views of the study videos was 1312 (minimum 10, maximum 266692), and the median number of likes was 12. The power index of the videos was 165.65, and the popularity score was 4.2. As a result of DISCERN, GQS, and content scoring, the videos received an average of 3 points in all three scoring systems (**Table 2**).

Table 2: Demographic data of study videos.

Variables	**Median**	**IQR**
Views	1312	(453-7361)
Upload Day (day)	745	(336-1244)
Likes	12	(7-27)
Dislikes	1	(0-2)
Popularity Score	4.2	(2.7-9.2)
Duration (seconds)	190	(122-252)
Power Index	165,65	(44,10-1469)
HUC (%)	10	(18,51%)
MDC (%)	32	(59,25%)
IUC (%)	10	(18,51%)
NAC (%)	2	(3,7 %)
Discern Score (DS)	3	(3-4)
Global Quality Score (GQS)	3	(3-4)
Content Score (CS)	3	(2.03-3.9)

*Popularity Score: View/Upload Day, Power Index: (View * Likes)/100, HUC: Hospital-University Channel, MDC: Medical Dot Com, IUC: Independent User Channel, NAC: News Agency Channel, IQR: Interquartile Range*

The study videos were evaluated in the following two categories: 38 and 16 videos were considered as useful and unuseful, respectively. The number of views for the videos in the useful group was higher; these videos received more likes and had higher power index, although these videos did not show a statistical difference compared to the videos of the

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unuseful group. The video durations were significantly longer in the useful group, and the video popularity score was significantly higher in the useful group. Video resources were evaluated under the following four group titles: HUC and MDC groups were regrouped as professional users in the field of health, and IUC and NAC videos were regrouped as nonprofessional users. There was no significant difference between the useful and unuseful groups in terms of professional sharing. DISCERN, content, and GQS scores, which were used to evaluate video quality, were significantly higher in the useful group than in the unuseful group (**Table 3**).

Table 3: Comparison of video groups data.

Variables	**'Useful' videos (n:38)**		**'Un-useful' videos (n:16)**		***P* value**
	Median	**IQR**	**Median**	**IQR**	
Views	39109	(17286-71120)	26360	(11223-33660)	0.595
Upload Day	522	(306-1344)	748	(376-1564)	0.622
Likes	111	(86-258)	10	(2-42)	0.094
Dislikes	14	(2-28)	1.2	(0-2.7)	0.194
Duration (seconds)	235±29		110±27		**0.043**
Power Index	188642±666120		310±172		0.288
Popularity Score	8 (348)		1.7 (9.2)		**0.038**
Video Sources: Professional (HUC+MDC)	28 (66.7%)		14 (87.5%)		0.633
Discern Score	3.7±0.9		1.6±0.9		**0.000**
Content Score	3.3±0.6		2±0.5		**0.000**
Global Quality Score (GQS)	3.8±0.7		2±0.7		**0.000**

*Popularity Score: View/Upload Day, Power Index: (View * Likes)/100, HUC: Hospital-University Channel, MDC: Medical Dot Com, IQR: Interquartile Range.*

In the correlation analysis, there was a strong positive correlation between the number of views and likes and between likes and popularity score. There was a moderate positive correlation between video duration and likes and between DISCERN score and power index. There was a weak positive correlation between the number of views and the duration of the video. Further, the number of views and likes were not significantly correlated the DISCERN, content, and GQS scores (**Table 4**).

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Table 4: Correlation analysis of study data.

Parameters	**Correlation**	**r**	**p**
View	Likes	0.906	0.000
View	Duration	0.358	0.047
Duration	Likes	0.547	0.003
Duration	Discern Score	0.443	0.021
Duration	Power Index	0.419	0.029
Likes	Popularity	0.657	0.000

*Popularity: View/Upload Day, Power Index: (View * Likes)/100*

Observer sequential assessment and interobserver agreement were statistically significant for each evaluated scoring system, with a kappa coefficient of >0.6. Interobserver agreement was significant and significantly compatible.

Dıscussıon

Overall 11.92% videos obtained as a result of the search for the keyword "echocardiography" on YouTube met the evaluation criteria, and 70.37% videos evaluated were useful in terms of content and video quality. In previous studies on YouTube regarding dialysis, hypertension, and rhinosinusitis, it was shown that only 45%–65% videos provided positive information to the viewers about the disease process, whereas 20%–55% provided misleading information (13, 18, 19). YouTube uses a sophisticated algorithm to rank the video quality based on the watch time of the video. The longer the view time, the more likely the video is suitable for the search terms used, indicating a higher ranking and the likelihood that the video will appear at the top of a search list (20). For this and similar reasons, different methodologies have been used to create the sample. For example, Biggs et al. analyzed the first 100 videos, Kumar et al. analyzed the first 400 videos, and Garg et al. analyzed the first 200 videos (13, 18, 19). In our study, the sample was chosen from the entire video population related to the keyword because we aimed to obtain data that would enable us to access useful information with the search keyword. Although our results indicated that this rate was low when all videos were included in the evaluation, this rate was quite high in the sample obtained with our exclusion criteria. While determining the exclusion criteria, both the literature and the minimum limits regarding how to access a high quality video were used. Therefore, it can be concluded that YouTube is a platform that contains useful information on echocardiography, but this high level of information requires more careful evaluation and selection regarding the obtained data. Acquiring correct information is important; furthermore, it is necessary to categorize and transfer this information in a manner that can be understood by each segment of society; the clinicians have an important task in this.

The study videos were evaluated under the following four categories in terms of their sources: MDC and HUC-sourced videos were regrouped as professional video sources in the health field, and IUC and NAC- sourced videos were regrouped as nonprofessional video sources in the health field. Overall 77.76% study videos belonged to the professional users. There was no significant difference between the useful and unuseful groups in terms of being shared by professional users. In the study by Khalil et al., professional posts constituted 74.1% of the entire sample. However, 93.3% videos that the authors grouped as useful belonged to the professional users and 73.6% in our study belonged to the professional users. We think that professional sharing is higher due to research on specific and technical issues such as advanced aortic stenosis and valve replacement therapies (15). Therefore, we believe that users who provide professional services in the field of health should have more widespread and quality publications.

The median value of the duration of the videos analyzed in our study was 190 sec (IQR: 122–252) (minimum 44 seconds, maximum 7424 seconds). The video duration was significantly longer in the useful group than in the unuseful group. There was a moderate positive correlation with video duration and likes, DISCERN score, and popularity score. In a study that evaluated YouTube videos on cardiopulmonary resuscitation, the correlation of the DISCERN score criteria used to evaluate video duration and video quality was similar to that observed in our study (21). However, unlike the authors, in our study, there was a positive correlation between video duration and likes, i.e., user-positive interactions and popularity, which means that it reaches more users in a short time. This was interpreted as the users were close to the fact that a video broadcast, which is satisfactory in terms of educational and informative aspects, needs a certain quality and duration.

The video popularity score was significantly higher in the useful group, indicating that video broadcasts with high scientific content and quality reach more users in a short time. Although there was no significant difference between the groups in terms of number of views and likes, there was a strong positive correlation between popularity score and likes. This result supports the fact that a share that reaches more users in a short time will be subject to more interactions.

DISCERN and content scores were used to determine the useful and unuseful groups. As expected, this caused DISCERN and content scores to be significantly higher in the useful group. However, significantly higher GQS scores in the useful group is a proof of the functionality of the grouping.

The quality and scientific content of the shared videos are as important as how many users the video reaches to and how many likes it gets. Therefore, we made a series of evaluations regarding the number of views and likes between these parameters and the quality scores. The number of views and likes had a very strong positive correlation. This result supports the fact that as viewing increases, videos are evaluated by more users and are subject to interaction.

However, the number of views and likes were not significantly correlated with the DISCERN, content, and GQS scores, indicating that the increase in the number of views and interactions, unfortunately, does not increase the video quality scores based on the evaluated sample.

In conclusion, this study shows that a platform such as YouTube has the potential to be an important tool for sharing and disseminating health-related information in a timely manner, both as a video repository function and as a social network interface with which users can interact. However, the information of such an effective information network should not be ignored. Although quality shares tend to increase day by day, professional users in the field of health should be encouraged to more frequently share videos of medical broadcast quality.

Lımıtatıons

The low number of videos evaluated in our study is the most important limitation. However, we hope that the determination of the study population by evaluating all the results obtained from the relevant keyword will balance this limitation. The higher number of shares with high quality on the subject will enable studies with higher sample numbers in the future. In our opinion, another limitation is that while evaluating video quality and content, we were not able to separately evaluate educational videos for medical students and academics and informative videos for the public. The low sample size is another important aspect. Therefore, general evaluations were preferred in our study rather than more specific scores.

Conflıct Of Interest

We declare that we do not have any actual or potential conflicts of interest, including any financial, personal or other relationships with other people or organizations, within three years from the commencement of the business that could inappropriately affect or be perceived to affect our study.

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