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Investigation of COVID-19 Vaccine Hesitation In Turkey with Youtube Analysis Method

Türkiye'de COVID-19 Aşı Tereddüdünün Youtube Analiz Yöntemi Ile Araştırılması

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Abstract

Aim Nowadays many people search the internet to gain health information including Coronavirus disease 2019 (COVID-19) vaccines. YouTube™ is one of the most widely used websites. However, the quality and accuracy of health-related YouTube™ videos are still controversial. In this study we aimed to research the COVID-19 vaccine hesitation in Turkey by using YouTube analyses method.

Material and Method In this study, "COVID 19" OR "coronavirus" OR "SARSCOV 2" 'and "vaccine" OR "vaccination" and "vaccine hesitancy" OR "vaccine hesitation" keywords were used to search videos on YouTube™. Firstly, non-Turkish videos and duplicate videos were excluded. Some details about videos such as duration (seconds), view count, number of comments, total likes/ dislikes were recorded. DISCERN (Quality Criteria for Consumer Health Information), JAMA (Journal of the American Medical Association) scores, and Video Power Index (VPI) values of the videos were calculated.

Results Most of the videos were uploaded by news agencies (48%). DISCERN scores of the videos were ranged between very poor and good. The mean JAMA score was found 2.9 that is accepted as a high score. There was a statistically significant difference in the VPI and JAMA scores among videos' sources ($p < 0,05$).

Conclusion Vaccine hesitation can be reduced by increasing the quality of the video content prepared by academic and governmental organizations. The correct use of YouTube videos in community vaccination behaviours can play an important role in the spread of COVID 19 among the community and help control the pandemic.

Keywords YouTube analysis, COVID-19, vaccine, anti-vaccination, community behaviours, Turkey.

Özet

Amaç *Günümüzde pek çok kişi, Coronavirüs hastalığı 2019 (COVID-19) aşıları da dahil olmak üzere sağlık bilgilerine ulaşmak için internette arama yapmaktadır. YouTube en yaygın kullanılan web sitelerinden biridir. Bununla birlikte, sağlıkla ilgili YouTube videolarının kalitesi ve doğruluğu hala tartışmalıdır. Bu çalışmada, YouTube analiz yöntemini kullanarak Türkiye'deki COVID-19 aşı tereddütünü araştırmayı amaçladık.*

Gereç ve Yöntem *Bu çalışmada "COVID 19" VEYA "koronavirüs" VEYA "SARSCOV 2"" ve "aşı" VEYA "aşılama" ve "aşı tereddütü" VEYA "aşı kararsızlığı" anahtar kelimeleri kullanıldı. YouTube'da video aramak için ilk olarak, Türkçe dilinde olmayan videolar ve yinelenen videolar hariç tutuldu. Videolarla ilgili süre (saniye), izlenme sayısı, yorum sayısı, toplam beğeni/beğenmeme gibi bazı detaylar kaydedildi. Videoların DISCERN (Quality Criteria for Consumer Health Information), JAMA (Journal of the American Medical Association) puanları ve Video Güç İndeksi (VPI) değerleri hesaplandı.*

Sonuçlar *Videoların çoğu haber ajansları tarafından yüklendi (%48). Videoların DISCERN puanları çok kötü ile iyi arasında değişiyordu. Ortalama JAMA puanı 2.9 olarak bulundu ve yüksek puan olarak kabul edildi. Videoların kaynakları arasında VPI ve JAMA puanlarında istatistiksel olarak anlamlı bir fark vardı ($p < 0,05$).*

Sonuç *Akademik ve resmi kuruluşlar tarafından hazırlanan video içeriklerinin kalitesi artırılarak aşı tereddütü azaltılabilir. Topluluk aşılama davranışlarında YouTube videolarının doğru kullanımı, COVID 19'un topluluk arasında yayılmasında önemli bir rol oynayabilir ve pandeminin kontrol altına alınmasına yardımcı olabilir.*

Anahtar Kelimeler *YouTube analizi, COVID-19, aşı, aşı karşıtlığı, toplum davranışları, Türkiye.*

INTRODUCTION

Since December 2019, when the first case was detected, coronavirus disease 2019 (COVID-19) has affected 188 countries, causing 111,821,203 confirmed cases and 2,475,140 deaths.[1] The COVID 19 pandemic has caused behavioral changes in individuals in the social field as well as in the health field. As in every period, vaccines are re-inscribed into our social memory that every disease is evaluated with a bias at the beginning. A safe and effective COVID 19 vaccine was needed globally in a short time. For this, many countries worked in cooperation with many organizations.[2-6] Vaccination applications have started around the world. Positive and negative vaccine propaganda has also come to the fore with the vaccine. Hesitations about the vaccine prevent epidemic management like an iceberg. This iceberg includes public concerns about the safety and necessity of vaccines.[7]

Numerous YouTube content is viewed by people every day. YouTube, which is a website created in the year 2005 to provide free video sharing, is currently the most frequented internet site with 5.03 daily page views per visitor. Most of these views are for entertainment, although some are for educational purposes. This causes an increase in the number of videos added.[8] Today, health researchers and producers search the internet to gain health information about many vaccines, especially, including COVID-19 vaccines. However, with these videos such as the COVID-19 vaccine, panic behaviors may increase in society or misinformation can spread rapidly, as YouTube content is not always created by healthcare professionals, public institutions, or traditional media.[8] YouTube™ is one of the most widely used websites on the internet by Turkish people, too. However, the quality and accuracy of health-related YouTube™ videos are still controversial. Given the potential impact of this media on the transmission of health information, the primary purpose of this research was to identify the expressions of vaccine hesitation content on YouTube and to determine the effects of YouTube videos broadcast from Turkey on viewers, especially by comparing the expression of pro-vaccine and anti-vaccine sentiments. We also aimed to research the quality and accuracy of COVID-19 vaccine-related videos on YouTube™ as a secondary purpose.

MATERIALS and METHODS

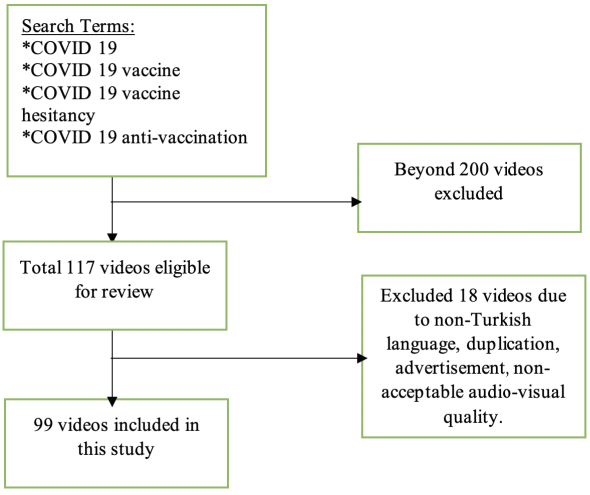
Data collection

In the present study, YouTube (https://www.YouTube.com) was searched using the keywords "COVID 19" OR "coronavirus" OR "SARS COV 2" and "vaccine" OR "vaccination" and "vaccine hesitancy" OR "vaccine hesitation" on March 15, 2021. The keywords of the research submitted to the YouTube™ search bar. The videos were analyzed by three researchers.

Firstly, non-Turkish videos and duplicate videos were excluded. Videos duplicated, shorter than 60 seconds, irrelevance, and nonrelated to research subjects were excluded and eliminated. In this study, the sample size was calculated at a 95% confidence level using the G*Power 3.1.9.2 program.[9] For the analysis, the minimum sample volume was calculated to be 60 seconds using a 0.80 power and 0.50 effect size. To reach the predetermined sample size (168), 200 videos had examined.

The inclusion criteria for the videos were as follows: Turkish language, primary content related to study, and acceptable audio-visual quality.

The following types of videos were excluded from the study: non-Turkish language, duplicate, advertisement, poor audio-visual quality. Search methodology was summarized in the Flow chart.



Flow chart. Search methodology for YouTube videos.

The data consisted of the video's duration, total views, comments, likes and dislikes, source of videos (society/non-profit organization, physician, patient/independent user, and news agency) were noted for each video in Excel form created by researchers.

The reliability, educational features, and quality of video contents were assessed using the modified DISCERN score (mDISCERN) (Quality Criteria for Consumer Health Content) and the modified Journal of the American Medical Association (mJAMA) benchmark criteria as previous similar studies. [8,10-12]

The DISCERN tool was originally developed and validated in 1998 at the University of Oxford, United Kingdom. The aim was to analyze written medical information with 15 questions in terms of reliability and details on treatment (score of 1–5 for each question).[8,10] The DISCERN scoring system is ranged from 15 to 75 points and is classified into five categories as below.[8,10-12]

- Excellent (63–75 points),
- Good (51–62 points),
- Fair (39–50 points),
- Poor (27–38 points),
- Very poor (15–26 points).

Similarly, Journal of the American Medical Association (JAMA)[8,10,11,12] and video power index (VPI) ratings are all widely used for evaluating health information on the internet. Therefore, in our study additionally, the video power index (VPI) method was used to analyze the videos' power on YouTube [VPI: (VPI =number of likes / (number of likes + number of dislikes) × 100)].[1]

Authorship (authors, editors, affiliations, and credentials), attribution (references and sources used for the content and copyright material), disclosures (sponsorship, ads, commercial support, and possible conflicts of interests), and currency (dates of posted and amended information) are the four metrics used by JAMA benchmark to assess the accuracy of online information.[14] The scale's ranking ranges from 0 to 4, with 0 being the lowest and 4 being the highest. Higher scores indicate that the information being analyzed is of higher quality.[14]

All these scores were preferred because they were used in a similar study previously conducted. [8,10-14]

YouTube contents, and view numbers, like and dislike numbers, region of uploading, qualification of uploaders, and presence of animation were recorded for YouTube videos.

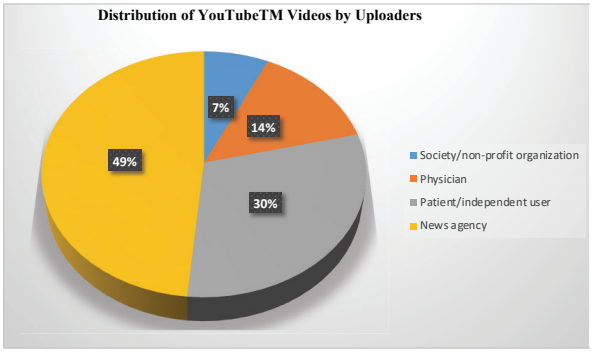
Statistical analyses

Statistical analysis of the data obtained in this study was performed using SPSS Statistics for Windows, Version 26.0 (IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM.). Continuous variables are given with descriptive minimum, maximum, mean, and standard deviation values. Categorical variables are given as frequency (n) and percentage (%). Data normality test was analyzed using the Kolmogorov-Smirnov test. Since the data had normal distribution, evaluation of two independent variables was performed by parametric analysis methods such as Spearman correlation and ANOVA to examine the link between Variables. Interobserver agreement of JAMA and DISCERN scores was evaluated by using the Cronbach alpha

coefficient. $p < 0.05$ values were considered statistically significant. Moreover, in the present study, Cronbach's alpha coefficient value suggests a good internal consistency and exceeded the 0,70 value recommended.[9]

RESULTS

Of the 99 YouTube videos evaluated according to their source, 7,1% was uploaded by society/non-profit organization, 14,1% by physicians, 30,3% by patients, and independent users, and 48% was uploaded by the news agency. In addition, it was determined that the videos produced by the news agency were mostly watched and disliked (Graphic 1).



Graphic 1. Distribution and categorization of the reviewed videos according to uploaders.

Of the 99 YouTube videos, the mean number of views was 22087,141 ± 43,46 and were viewed 2,186,627 times. The maximum number of views was 222,195 and the minimum number of views was 875. Other video characteristics of videos are: The mean of video length is 427,78 (67-1397), the mean number of comments was 134,939 (0-1602), the mean number of likes was 630,263 (0-9332), the mean number of dislikes was 26,707 (0-319). 72 of the videos had positive and 7 negative content. The videos produced by the Society / non-profit organization received the highest rate of likes. Vaccine hesitation was present in 20 of the videos. Some videos had multiple contents (Table 1). The mean of total DISCERN of COVID-19 related YouTube was found 40.5 (min.-max.11-64). Accordingly, there was an agreement between the reviewers who assessed YouTube videos, in terms of total DISCERN score.

The mean JAMA score of the reviewed YouTube videos was found as 2.9 (min-max: 1–4). It showed that there was an agreement between the reviewers in terms of the JAMA scores of YouTube videos. And of the 99 YouTube videos, the mean VPI value was found 90,7(min-max:0-105,3) (Table 2).

From the first 117 videos identified, some were excluded because of duplication or irrelevance (22). The total DISCERN score of the 99 videos included was poor (average score 25.20). According to The DISCERN scoring system ranges and classifications the videos of this research are scored as very poor, poor, fair, or good. Excellent score ranges were not found in the sample (Table 3).[10]

The Journal of the American Medical Association (JAMA) ranking system contains four criteria for one possible point each and a cumulative possible score of four points (authorship, attribution, disclosure, and currency). A four-point score shows the best standard and highest quality.[9] As seen in Table 3 JAMA score is 2.9 that is the highest score (Table 3).

One-way ANOVA tests were used to compare the parameters between the groups according to the source of videos. As seen in Table 4 there was a statistically significant difference in the VPI and JAMA scores among videos' sources ($p < 0,05$). No statistically significant difference was found between YouTube videos in terms of the other DISCERN subscales and JAMA scores (for all videos' sources, $p > 0.05$). DISCERN, VPI and JAMA are analyzed as groups with ANOVA tests (Table 4).

VPI scores were found significant between groups ($p < 0,05$) and JAMA scores were found significant between groups ($p < 0,05$) but DISCERN scores was not found significant between groups($p>0,05$).

We analyzed and correlated DISCERN, VPI, and JAMA scores to examine the relationship between these variables. DISCERN, VPI, and JAMA scores of the videos were examined by the Pearson correlation analysis. Interestingly, a strong correlation was found between DISCERN and JAMA (p< 0,05;). However, the correlation between DISCERN and VPI; the correlation between JAMA and VPI was not found statistically significant (p>0,05) (Table 5). Moreover, Cronbach's alpha coefficient value was 0,84 that exceeding the 0.70 value recommended in the literature.

Table 1. Distribution of the videos' duration, view count, numbers of comments, likes, and dislikes.

Source of Videos	n	Duration (seconds)	Views	Comments	Likes	Dislikes
Society/non-profit organization	7	3443	500608	2922	18513	694
Physician	14	6107	330764	2162	14296	280
Patient/independent user	30	9737	491294	4030	17475	758
News agency	48	23063	863961	4245	12112	912

Table 2. Descriptive Statistics

	n	Minimum	Maximum	Mean	Std. Deviation
VPI score	99	0,00	105,33	90,70	13,37
JAMA Score	99	1	4	2,94	0,753
DISCERN score	99	12	51	25,20	11,61
Views	99	875	222195	22087,14	43464,63
Duration (seconds)	99	67	1397	427,78	291,89
Total likes	99	0	9332	630,26	1678,01
Total dislikes	99	0	319	26,71	56,74
Number of comments	99	0	1602	134,94	278,57
Opinion	99	1	3	1,57	0,812
Valid n (listwise)	99				

Table 3. DISCERN and JAMA scores

Total DISCERN Score (16-80)	
16-26 (very poor)	67
27-38 (poor)	12
39-50 (fair)	17
51-62 (good)	3
63-80 (excellent)	0
Average DISCERN score	25.2
Average number of JAMA benchmarks satisfied (0-4)	2.9

Table 4. VPI score, DISCERN score and JAMA scores according to sources.

		Sum of Squares	df	Mean Square	F	Sig.
VPI	Between Groups	2599,758	3	866,586	5,510	,002
	Within Groups	14940,355	95	157,267		
	Total	17540,113	98			
DISCERN	Between Groups	546,157	3	182,052	1,365	,258
	Within Groups	12673,803	95	133,408		
	Total	13219,960	98			
JAMA	Between Groups	14,314	3	4,771	10,970	,000
	Within Groups	41,322	95	,435		
	Total	55,636	98			
Valid n (listwise)		99				

Table 5. Correlation analysis of DISCERN, VPI and JAMA scores

		DISCERN	VPI	JAMA
DISCERN	Pearson Correlation	1	,178	,211*
	Sig. (2-tailed)		,078	,036
	N	99	99	99
VPI	Pearson Correlation	,178	1	,149
	Sig. (2-tailed)	,078		,142
	N	99	99	99
JAMA	Pearson Correlation	,211*	,149	1
	Sig. (2-tailed)	,036	,142	
	N	99	99	99

* Correlation is significant at the 0.05 level (2-tailed).

DISCUSSION

As a result of the high prevalence of COVID-19, an increasing number of patients/cases are expected to receive information about the vaccine and treatment of this disease. The internet and news agency are some of the most leading sources of information used for this purpose. This was the first study in the literature about evaluation of YouTube videos on Covid-19 vaccine hesitation by independent reviewers. According to the results of our study, approximately 50 % of COVID 19 vaccine related videos were uploaded by News agency, and overall quality of the contents was "very poor". The mean DISCERN score was calculated as>90. These findings were consistent with studies reporting low-quality videos about various COVID-19 vaccine. According to our study, there is a strong correlation was found between DISCERN and JAMA (p <0,05). Similarly in a study by Gokcen & Gumussuyu[13] evaluating YouTube videos pertaining to disc herniation, significant positive correlations have been reported for DISCERN and JAMA scores between the reviewers[9] and Aydin, & Aydin[15] evaluating the quality and reliability of information available on YouTube and Google pertaining to gastroesophageal reflux disease.

We analyzed and correlated DISCERN, VPI, and JAMA scores in order to examine the relationship between these variables by the Pearson correlation analysis. There was only was found a strong correlation between DISCERN and JAMA (p <0,05).

Moreover, Cronbach's alpha coefficient value was found 0,84 in our study. This value reflects high consistency

between the two raters/reviewers.

Due to the increasing number of people using YouTube to search for health-related information, public health policymakers should consider this method by which the public impact of these uses can be assessed. Therefore, analysis of social network data via web search can be effective in evaluating health concerns such as vaccines. Social platforms such as YouTube are known to be had the potential to influence people's health behaviors.[16,17]

YouTube analysis is one of the best methods to determine the attitude of society on a subject, and this analysis has been used for various medical and non-medical topics in previous years.[16,18] However, few studies have been done to understand how people use this social network for health purposes.[16,17] Limited similar studies on vaccine anti-vaccination, knowledge attitude about vaccination is encountered in the literature.[19,20] A YouTube analysis study was conducted on the vaccines made by Aquino et al.[21] from Italy. This study is one of the studies showing how web search trends and analysis of social network data represent vaccine hesitancy at the population level.[21] But no similar studies have been found on the topic of the COVID-19 vaccine, which has been applied globally due to the pandemic, although it is in the Phase 3 study. In addition, there is no similar YouTube analysis study conducted in our country about any vaccine. Our study is valuable in this area, especially because it reflects the data of our country, Turkey.

A study by Hernández-Garcia et al.[20] from Spain on the knowledge of influenza vaccination has been published very recently. A total of 100 videos were evaluated in this study, and it was determined that 74.0% were produced by mass media or health professionals. Of these videos containing 65.0% positive messages; the main issues were the benefits (59.0%) and side effects (39.0%) of the vaccine.[19] videos detected fraud. It has been determined that videos with user-generated content show a higher probability of fraud than healthcare professionals (Odds ratio (OR) = 15.56). This study included influenza videos between 2015-2020.[20] Our study included videos from the last months of 2020 and the first 2 months of 2021. The reason for this was that the effect of the pandemic was seen in our country on March 11, 2020, and the vaccine was just started to be applied. In our study, most of the videos were produced by news agencies (48%).
In a similar study conducted in Canada on vaccines, 56% of the video content was published by independent individuals.[22] In our study, when the uploaders of the videos are viewed, it was determined that 7,1% were uploaded by Society/non-profit organization, 14,1% by physicians, 30,3% by patients, and independent users, and 48% was uploaded by the news agency. It was found that the number of videos produced by experts on vaccines was very low.

In a study conducted in Vietnam, media data about vaccine side effects were evaluated. In this study, it was reported that there was a high rate of vaccine hesitation and rejection among subjects living in an urban environment.[23] It was found that; the most emphasized topics were autism causation (47,1%), undisclosed or poorly understood risks (42,5%), adverse reactions (40,2%), and thimerosal or mercury content in vaccines (36,8%) were detected as frequently mentioned side effects. In this study, it was stated that most of the videos (65,5%) deter the use of vaccines.[23] No data were found in our study about all of these effects, which were reported as standard vaccine side effects. The most frequently expressed reason for hesitation in our study was the uncertainty about vaccination. The rapid approval of vaccines by the World Health Organization (WHO) due to the pandemic was thought to be related to this situation.

Overall, anti-vaccination videos were reported to be three times more numerous than pro-vaccination videos.[24] In our study, the number of videos containing positive content about vaccination was higher. Since the beginning of our research, we've observed a growing number of positive

and hesitant videos about vaccines. Negative content was present in only 7 videos. The VPI and DISCERN scores of the videos with negative content were also below the average. This may be due to the public's urgent need for COVID 19 vaccine due to the pandemic. In terms of vaccine side effects, although the hesitation was in 72 of the contents, the videos had positive content in general.

Finally, it was observed that videos on COVID-19 vaccine side effects reached millions of viewers. Anti-vaccination behaviors and vaccine hesitation can be reduced by increasing the quality of the video content prepared by academic and governmental organizations. The correct use of YouTube videos in community vaccination behaviors can play an important role in the spread of COVID-19 among the community and help control the pandemic.

Ethics approval

This study did not require approval from the local research ethics committee as it contained only public data.

Conflict of interest

The authors declare no personal or financial conflict of interest

Disclosure

No financial support was received.

Author Contributions

Main idea/Planning: SA,BA,HOA
Analysis/Comment: BA
Data provision: All authors
Spelling: BA, HOA
Review and Correction: SA,BA
Confirmation: All authors

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