Letter to Editor

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Examination of Turkish YouTube videos concerning COVID−19 vaccine

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The first COVID-19 vaccine was administered in Turkey on January 13, 2021 after an inactivated COVID-19 vaccine was granted emergency approval[1]. Currently, two types of COVID-19 vaccines, one mRNA and one inactivated, are administered in Turkey[1]. Turkey ranks sixth in the world according to the cumulative total number of COVID-19 cases as of December 18, 2021[2], therefore, protection measures, including vaccination, are of great importance for Turkey.

Information about the COVID-19 vaccine continues to be shared on YouTube videos all over the world, and people use these channels for information[3]. A total of 98% of Internet users in Turkey use YouTube[4], and therefore, it has been considered that YouTube could play an important role in obtaining information about the COVID-19 vaccine.

For this reason, the most-watched Turkish YouTube videos about COVID-19 vaccines were evaluated in terms of source, content, and quality. The top 100 watched videos on YouTube in the last three months as of July 27, 2021 are listed. Turkish "vaccine" and "COVID-19" are used as search terms. Seven videos were excluded from the study selection because one video was deleted after being selected for the study, one video was due to duplication, two videos were not in Turkish, and three videos were longer than 1.5 hours. The analysis continued with a final selection of 93 videos.

The reliability and quality of the videos were evaluated according to the modified DISCERN score (mDISCERN) criteria[5]. The mDISCERN scores, source, content, attitude toward the vaccine, and topics of these videos were evaluated by two independent researchers (physicians). The agreement between the two researchers was evaluated using the kappa coefficient. The kappa coefficient of agreement related to the classification of the YouTube videos was 0.933.

The SPSS program (IBM SPSS Statistics for Windows, version 20.0) was used for statistical evaluation of these videos, the Shapiro-Wilk test was used to evaluate the normality of data. Continuous data in normal distribution were expressed as mean ± SD, and the ANOVA test was used for comparision among different groups; data in abnormal distribution were presented as median (IQR) and the Kruskal Wallis test was used. For categorical data, statistical analysis was performed using the Fisher's exact test, as more than 20% of cells had expected frequencies <5. Statistical significance was considered as $P<0.05$.

The cumulative number of views of these evaluated videos was 9 577 662. Independent users (32.3%), news channels (30.1%), and health professionals (20.4%) were the sources who uploaded the most COVID-19 vaccine videos, in that order of proportion. Among the sources, the longest videos belonged to independent users [10.83 (9.15) min], news channels users [8.72 (9.86) min] and health professionals [7.36 (11.20) min] ($P=0.006$). The highest number of views, likes, dislikes and comments were from show channels videos. The mean mDISCERN score in this study was (2.13±1.46) and the videos with the highest mDISCERN scores were from health professionals (3.47±1.02), followed by medical societies/non-profit organizations (3.25±0.96), and news channels (2.32±1.49) ($P<0.001$).

As for the evaluation of video content, the longest videos were those describing personal experiences [12.09 (6.05) min] ($P<0.001$), and the highest number of views [62 646 (201 628)], likes [657 (3 217)], and comments [297 (1 475)] were found among scientific videos. The mDISCERN score was the highest scientific content videos (3.79±0.89) ($P<0.001$) (Table 1).

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Table 1. Length, views, likes, dislikes, comments, and mDISCERN scores of Turkish YouTube videos concerning COVID-19 vaccine by source, content, attitude towards the vaccine, and subject.

	n (%)	Length (min)	Views	Likes	Dislikes	Comments	mDISCERN scores
Source							
Health professionals	19 (20.4)	7.36 (11.20)	12715 (153201)	303 (3364)	9 (128)	135 (835)	3.47±1.02
News channels	28 (30.1)	8.72 (9.86)	27255 (60354)	389 (828)	27 (69)	166 (597)	2.32±1.49
Religious channels	4 (4.3)	4.92 (6.31)	10032 (308425)	300 (6266)	11 (366)	59 (1015)	1.75±0.96
Independent users	30 (32.3)	10.83 (9.15)	7185 (85.05)	153 (455)	10 (21)	63 (101)	1.27±1.11
Show channels	2 (2.2)	2.36 (NC[*])	125989 (NC[*])	433 (NC[*])	48 (NC[*])	299 (NC[*])	1.00±0.00
Private hospitals	3 (3.2)	1.46 (NC[*])	15739 (NC[*])	44 (NC[*])	34 (NC[*])	0 (NC[*])	1.33±1.53
Medical societies/non-profit organizations	4 (4.3)	3.80 (3.53)	7826 (11598)	138 (120)	5 (12)	45 (94)	3.25±0.96
Government agencies	3 (3.2)	0.35 (NC[*])	7079 (NC[*])	55 (NC[*])	11 (NC[*])	11 (NC[*])	1.00±0.00
H		19.87	12.06	5.83	8.83	18.15	6.96[&]
P		0.006	0.098	0.560	0.265	0.011	<0.001
Content							
Scientific videos	14 (15.1)	8.20 (8.09)	62646 (201628)	657 (3217)	22 (224)	297 (1475)	3.79±0.89
Information	53 (57.0)	5.31 (10.32)	15739 (43769)	180 (766)	12 (57)	62 (311)	2.21±1.37
Comedy	7 (7.5)	1.10 (2.64)	15319 (149518)	119 (789)	32 (132)	63 (172)	0.57±0.54
Personal experience	19 (20.4)	12.09 (6.05)	6199 (7403)	171 (431)	8 (11)	66 (120)	1.26±0.99
H		18.59	8.43	1.32	5.03	3.40	16.42[&]
P		<0.001	0.038	0.725	0.169	0.377	<0.001
Attitude towards the vaccine							
Positive	58 (62.4)	8.73 (9.27)	15593 (64399)	182 (829)	12 (53)	75 (432)	2.28±1.36
Neutral	31 (33.3)	5.07 (9.88)	7144 (12326)	144 (475)	11 (25)	63 (107)	1.90±1.62
Negative	4 (4.3)	6.81 (13.58)	78602 (96299)	471 (1962)	70 (106)	147 (531)	1.75±1.71
H		0.95	6.98	1.83	3.02	1.01	0.80[&]
P		0.624	0.031	0.401	0.221	0.605	0.394
Subject							
General information	26 (28.0)	4.79 (6.16)	7077 (14640)	107 (258)	9 (27)	28 (68)	2.27±1.46
Side effects	17 (18.2)	10.49 (10.41)	25473 (24489)	418 (3629)	17 (151)	105 (1381)	2.65±1.54
Vaccine efficacy	13 (14.0)	9.04 (6.60)	50966 (260410)	523 (3049)	47 (409)	230 (1441)	2.62±1.45
The vaccination process	26 (28.0)	10.27 (9.97)	8940 (9913)	151 (505)	11 (21)	67 (136)	1.12±0.91
Vaccination during pregnancy	6 (6.4)	3.05 (9.00)	7350 (19253)	30 (433)	4 (12)	28 (145)	3.83±0.98
Vaccine selection	5 (5.4)	11.54 (9.55)	173156 (177087)	897 (1347)	116 (94)	481 (426)	1.60±0.55
H		8.85	26.70	22.45	19.46	16.67	6.54[&]
P		0.115	<0.001	<0.001	0.002	0.005	<0.001
Total		7.36 (9.70)	11580 (67562)	184 (797)	12 (47)	67 (295)	2.13±1.46
Total (cumulative)		732.46	9577662	163860	8244	38406	

[*]NC: IQR not calculated due to the insufficient number of observations. [&]F score. mDISCERN scores were presented as mean±SD, ANOVA test was used; other variables were presented as median (IQR) and Kruskal-Wallis test was used.

Videos with negative attitudes towards the vaccine had the highest number of views, likes, dislikes, and comments. The longest videos and the highest mDISCERN scores belonged to videos with positive attitudes towards the vaccine (Table 1). When the videos were evaluated according to the subject, those concerning vaccine selection had the longest [11.54 (9.55) min], most viewed [173156 (177087)], and the highest number of likes [897 (1347)], dislikes [116 (94)], and comments [481 (4269)]. Videos concerning vaccination during pregnancy had the highest mDISCERN scores (3.83±0.98), followed by vaccine side effects (2.65±1.54) and then vaccine efficacy (2.62±1.45) (P<0.001) (Table 1).

When the relationship between the source of the COVID-19 vaccine videos and the content was evaluated, health professionals had the highest number of broadcasts with scientific content (57.9%), news channels had the most information content (75.0%), and independent users had the most descriptions of personal experience (60.0%). All videos from sources such as private hospitals, religious channels, government agencies, and medical societies/non-profit organizations contained informational content (P<0.001) (Table 2).

In our study, 62.4% of the videos demonstrated a positive attitude toward the COVID-19 vaccine. Of the videos broadcast by news channels, 10.7% were negative in attitude, while only 3.3% from independent user's channels were negative. No videos regarding the vaccine negatively appeared in other sources (P=0.088) (Table 2).

In evaluating the relationship between the sources and the subjects of videos, the subject of side effects was most common among health professional sources (31.6%), general information was most common on news channels (35.7%), and explanation of the vaccination process was most common among independent user sources (70.0%). The distribution of the subjects according to source is provided in detail in Table 2.

In conclusion, in which Turkish YouTube videos concerning the COVID-19 vaccine were examined, although the most frequently uploaded videos were from independent users, the highest quality

Table 2. Relationship of the source of Turkish YouTube videos concerning COVID-19 vaccine to content, attitude towards vaccine and subject [*n* (%)].

	Health professionals	News channels	Religious channels	Independent users	Show channels	Private hospitals	Medical societies/ non-profit organizations	Government agencies	Total	*p*
Content										
Scientific videos	11 (57.9)	3 (10.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	14 (15.1)	
Information	8 (42.1)	21 (75.0)	4 (100.0)	8 (26.7)	2 (100.0)	3 (100.0)	4 (100.0)	3 (100.0)	53 (57.0)	<0.001[a]
Comedy	0 (0.0)	3 (10.7)	0 (0.0)	4 (13.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	7 (7.5)	
Personal experience	0 (0.0)	1 (3.6)	0 (0.0)	18 (60.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	19 (20.4)	
Attitude towards the vaccine										
Positive	17 (89.5)	15 (53.6)	1 (25.0)	14 (46.7)	2 (100.0)	2 (66.7)	4 (100.0)	3 (100.0)	58 (62.4)	
Neutral	2 (10.5)	10 (35.7)	3 (75.0)	15 (50.0)	0 (0.0)	1 (33.3)	0 (0.0)	0 (0.0)	31 (33.3)	0.088[b]
Negative	0 (0.0)	3 (10.7)	0 (0.0)	1 (3.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (4.3)	
Subject										
General information	4 (21.1)	10 (35.7)	3 (75.0)	3 (10.0)	0 (0.0)	2 (66.7)	2 (50.0)	2 (66.7)	26 (28.0)	
Side effects	6 (31.6)	4 (14.3)	0 (0.0)	4 (13.3)	1 (50.0)	0 (0.0)	2 (50.0)	0 (0.0)	17 (18.2)	
Vaccine efficacy	3 (15.8)	7 (25.0)	1 (25.0)	2 (6.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	13 (4.0)	
The vaccination process	0 (0.0)	4 (14.3)	0 (0.0)	21 (70.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (33.3)	26 (28.0)	<0.001[c]
Vaccination during pregnancy	5 (26.3)	1 (3.6)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	8 (6.5)	
Vaccine selection	1 (5.3)	2 (7.1)	0 (0.0)	0 (0.0)	1 (50.0)	1 (33.3)	0 (0.0)	0 (0.0)	5 (5.3)	
Total	19 (100.0)	28 (100.0)	4 (100.0)	30 (100.0)	2 (100.0)	3 (100.0)	4 (100.0)	3 (100.0)	93 (100.0)	

[a]Fisher's exact test was used because 27 cells (84.4%) have an expected count of less than 5. [b]Fisher's exact test was used because 18 cells (75.0%) have an expected count of less than 5. [c]Fisher exact test was used because 40 cells (83.3%) have an expected count of less than 5.

videos were from healthcare professionals. The most discussed topic was vaccine selection. Videos from independent users were most often featured personal experiences. The number of videos uploaded by government agencies and universities was insufficient. For improved quality content, these sectors should try new ways to utilize an ever-growing platform for public health information purposes. In addition, since personal experience is of interest to viewers, reputable institutions can employ this approach to overcome vaccine hesitancy.

Conflicts of interest statement

The author declares there is no conflict of interest.

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Author's contributions

K.A. designed the research, conducted data collection, performed the analytic calculations, and wrote the manuscript.

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