

Can YouTube Video on Urological Problems Be Used As An Additional Resource in Telemedicine During the COVID-19 Pandemic?

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What's known on the subject? and What does the study add?

Although establishing an international consensus about management of diagnosis and treatment of urological diseases during coronavirus disease-2019 (COVID-19) pandemic among urologists has been attempted, another important step is for patients to be informed about what they should do according to these algorithms-which symptoms are urgent versus cases where there is no need to consult a physician. Telemedicine method is not enough to reach and inform all urology patients. In this study, we aimed to evaluate whether the published YouTube videos are compatible with the current literature and whether they may be considered as a reliable additional information source for urological recommendations during COVID-19 period.

Abstract

Objective: Various recommendations are being offered in order of priority in the diagnosis and treatment of urological diseases during the coronavirus disease 2019 (COVID-19) period. Since it may not be possible to provide information to all patients through telemedicine, additional methods are needed to reach all patients. This study aimed to determine the reliability and quality of YouTube videos that provide information on urological disorders during the COVID-19 period. Another aim was to assess the most shared and most viewed videos on urological disorders on YouTube and their usability as an additional resource in telemedicine during the pandemic.

Materials and Methods: From 17 February 2020, to 31 July 2020, the following keywords were used to search videos on YouTube: "covid urology", "covid andrology", "covid fertility", "covid male infertility", "covid prostate", "covid bladder", "covid kidney", "covid renal", "covid testis", "covid cancer", "covid coitus", "covid sex", "covid sperm" and "covid erectile"; "coronavirus" was also used instead of "covid". In total, 232 videos were evaluated by two urologists according to video characteristics. The number of total views, views per day, likes, dislikes, comments, video length, date of video upload and duration on YouTube was recorded. Finally, a total of 136 relevant English videos were included in the study. A 5-point modified DISCERN tool was used to assess reliability, whereas a 5-point Global Quality score (GQS) was used to evaluate quality. Cohen's kappa score was used to determine inter-rater agreement, while the intraclass correlation coefficient was used to evaluate inter-observer reliability.

Results: All videos had a high DISCERN score [4, interquartile range (IQR) (3-5)] and GQS [5, IQR (4-5)] in general. Moreover, 20 (14.7%) videos containing information about "sexual life" and "effects of COVID-19 on sperm" were described as debated. Videos uploaded by "universities/professional organisations/non-profit physician/physician groups" had higher scores ($p < 0.001$). However, their rates of "number of views per day" ($p = 0.036$) and "likes" ($p < 0.001$) were lower. The majority of videos related to urology (63.9%) included conversations about andrological disorders. The median number of total views and number of views per day were also highest for videos related to andrology.

Conclusion: Although andrological disorders are classified as a non-essential issue and andrological consultations are postponed during the COVID-19 period, the results show that the rate of YouTube videos related to andrology is even higher than uro-oncological diseases during this period. Therefore, it is important to share accurate and reliable information in this field. Our analysis shows that informative, easy-to-understand YouTube videos uploaded by "universities/professional organisations/non-profit physicians/physician groups" can be used as an additional method to telemedicine, especially for andrological disorders that do not require follow-up.

Keywords: COVID-19, SARS-CoV-2, telemedicine, urology, YouTube

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Introduction

Coronavirus disease-2019 (COVID-19), which is caused by severe acute respiratory syndrome-coronavirus-2, became evident following an increase in the number of pneumonia cases in China in December 2019 and later announced as a pandemic by the World Health Organization on 11 March 2020, as a result of its global rapid spread (1). All outpatient activities and surgeries except for emergency and oncological cases have been postponed or cancelled. Even oncological cases have been classified as low and high priority. Since the extent and duration of the pandemic are unpredictable, rescheduling is not possible during this period (2).

Urology, like all other fields, has been affected by this pandemic. Various strategies and recommendations are offered in a stepwise approach in order of priority for the diagnosis and treatment of urological diseases (2). Although establishing an international consensus among urologists has been attempted, another important step is to inform patients on what they should do according to these algorithms: which symptoms are urgent versus which cases do not require consultation to a physician. It is often possible to reach and inform patients with urological problems on follow-up by teleconsultation or video-consultation system (3,4). However, it is also important to inform people who are not on a urological follow-up programme about what they should do during the COVID-19 period when they encounter various urological symptoms.

During quarantine, the easiest and most practical source of information on any topic is the Internet. Since YouTube is an open-access video-sharing website, it can disseminate information better than other social media tools (5). We have come across YouTube videos that highlight tasks that should be done during the COVID-19 period regarding urological diseases. Most of the videos are created by specialists in urology and by other healthcare providers. In this study, we aimed to evaluate which urological diseases people are curious about and want to learn during the COVID-19 period. By making a detailed analysis of YouTube videos related to what is needed for urological diseases during the COVID-19 period, we tried to identify the most shared and most viewed videos about urological pathologies on YouTube during the COVID-19 period. Another aim was to evaluate whether contents of YouTube videos are compatible with the current literature and whether they may be considered a reliable information source of urological recommendations during the COVID-19 period.

Materials and Methods

Data Collection

The following keywords were used to search on YouTube (<http://www.youtube.com>): "covid urology", "covid andrology",

"covid fertility", "covid male infertility", "covid prostate", "covid bladder", "covid kidney", "covid renal", "covid testis", "covid cancer", "covid coitus", "covid sex", "covid sperm" and "covid erectile". The same search was performed using the term "coronavirus" instead of "covid". The videos were sorted according to relevance using a YouTube filtering system. We found 232 videos related to "covid" and "urological conditions" between 17 February 2020 and 31 July 2020, and evaluated them for suitability for our study. All videos were saved in a playlist for review on 31 July 2020, since search results can vary every day on YouTube. Two independent urologists with board certification (Fellow of the European Board of Urology) (I.S. and N.B.) viewed and analysed the videos. Both urologists were blinded to each other's scores on video assessments.

Inclusion Criteria for Videos

The main subjects of our study are lay people who are not familiar with medical concepts and terms. These people need videos that provide simple, basic information in an easily understandable language on what they should do when they experience urological symptoms or disease during the COVID-19 period. For this purpose, English videos having accurate, comprehensive and easily understandable information for lay people rather than containing medical terms and scientific data were included in the study.

Exclusion Criteria for Videos

In total, 61 videos mentioned recommendations of the European Urology Association (EAU) guidelines and American Urological Association (AUA) guidelines for urologists using medical concepts and scientific terms. Since they were not suitable for the study purpose, we described them as "irrelevant", and they were excluded from the study. Non-English videos and videos without audio or visuals were also removed from the study. These data collection criteria are similar to previous studies evaluating YouTube videos on different topics (6,7).

Evaluation of Video Characteristics

For each YouTube video, the number of total views, views per day, likes, dislikes, comments, video length, date of video upload and duration on YouTube were recorded. The accuracy of the information in the videos was evaluated according to the EAU and AUA guidelines (8-10). When evaluating videos on infertility, the American Society for Reproductive Medicine guidelines and the European Society of Human Reproduction and Embryology guidelines were considered, in addition to the two aforementioned guidelines (11,12).

Videos containing scientific, accurate and comprehensive information on the diagnosis and treatment of urological diseases during the COVID-19 period that have been agreed upon according to the aforementioned guidelines were

defined as useful information. Since there are some topics with controversial ideas about diagnosis and treatment that have not been agreed on, videos that did not fully convey controversial or uncertain issues and did not make a balanced and neutral assessment were defined as debated information (e.g. How to lead a reliable sexual life during the COVID-19 period?) Many videos mentioned guidelines of the "Centers for Disease Control and Prevention" to inform about whether COVID-19 causes sexually transmitted disease after intercourse (13), but some videos did not. COVID-19 does not cause sexually transmitted disease, but physical contact during intercourse may cause COVID-19 transmission. Therefore, having sex with your spouse or the same partner who is asymptomatic is safer than having sex with a foreign partner. However, no current evidence-based guidelines are available. The classification made according to the source of the video was as follows: universities/professional organisations/non-profit physicians/physicians (source 1), stand-alone health information websites (source 2), medical advertisements/for-profit organisations (source 3) and individual users (source 4). Other classifications were made according to the target audience (female/male/both genders) and the speaker in the video (physician/non-physician health provider/individual in the video/external voice).

Scoring System for Video Evaluation

The original DISCERN tool is a validated tool comprising 16 questions. It evaluates the quality of written health information regarding treatment options (14). It includes questions evaluating the reliability of written documents, such as information leaflets, discussing treatment options. The main items of this tool are useful to evaluate the aims and clarity of written information sources and whether the written documents are sufficient to access support for shared decision-making (15).

Since the DISCERN tool was created long before online YouTube videos became popular, one of the most recent publications stated that the items of the original DISCERN tool are insufficient to evaluate videos (15). By contrast, many studies on identifying educationally useful YouTube videos have pointed out that the modified DISCERN tool and Global Quality score (GQS) provide a more suitable assessment of visual, vocal and verbal information, scientific accuracy of content and clarity of the given message (6,7,16).

A 5-point modified DISCERN tool was used to evaluate the video reliability and quality of health information available to patients as in previous studies on YouTube videos (Table 1) (6,7). GQS was also used in our study. This 5-point scale is used to evaluate the accessibility, quality and overall flow of information within videos from website resources. A score of "1" indicates "poor quality", and a score of "5" indicates "excellent quality" (Table 1) (6,7). After each urologist evaluated and scored the videos, Cohen's kappa score was used to determine inter-rater

agreement, while the intra-class correlation coefficient was used to evaluate inter-observer reliability.

Statistical Analysis

During the analysis of video characteristics and categorisation of video contents, each data related to videos were assessed as independent variables. The normality of these variables was evaluated using Shapiro-Wilk test, Kolmogorov-Smirnov test, histogram and Q-Q plots. Levene's test was used to assess variance homogeneity. Variables not showing normal distribution are expressed as median (25th-75th percentile). Categorical variables are shown as number and per cent (n, %). The Mann-Whitney U test was used to analyse variables with non-normal distribution between the two groups. All analyses were made using IBM SPSS Statistics 22 (IBM Corp., Armonk, NY, USA) software package; $p < 0.05$ was considered significant.

Results

General Information on Video Characteristics

After evaluating a total of 232 videos related to "COVID" and various "urological diseases" using the search keywords on YouTube, 136 videos were selected according to the inclusion criteria. The flowchart of the study design is shown in Figure 1. The median duration from the date of upload in YouTube, between 17 February 2020 and 31 July 2020, was 47 (min-max, 3-166) days.

Evaluation of Videos According to the Inter-rater Agreement and Intra-class Correlation

The level of inter-rater agreement in terms of the usefulness assessment of videos was positive (kappa coefficient = 0.903). The intra-class correlation coefficient was calculated as 0.941 (95% confidence interval 0.834-0.989) for the DISCERN reliability score and 0.961 (95% confidence interval 0.890-0.991) for GQS. The results show a high inter-rater reliability.

Classification of YouTube Videos According to Their Reliability

Controversial ideas still exist on sexual life during the COVID-19 period. A total of 20 (14.7%) videos that did not talk about contradicting comments on topics described in a balanced and neutral way were evaluated as "debated". Of these videos, four focused on the effects of COVID-19 on sperm and 16 were about sexual intercourse during the COVID-19 period. Content of videos related to all other topics was evaluated as "useful information".

Assessment of Video Characteristics, Sources of Video Upload and Speakers

Table 2 shows the characteristics of the videos evaluated. Although all videos had high DISCERN score and GQS in general,

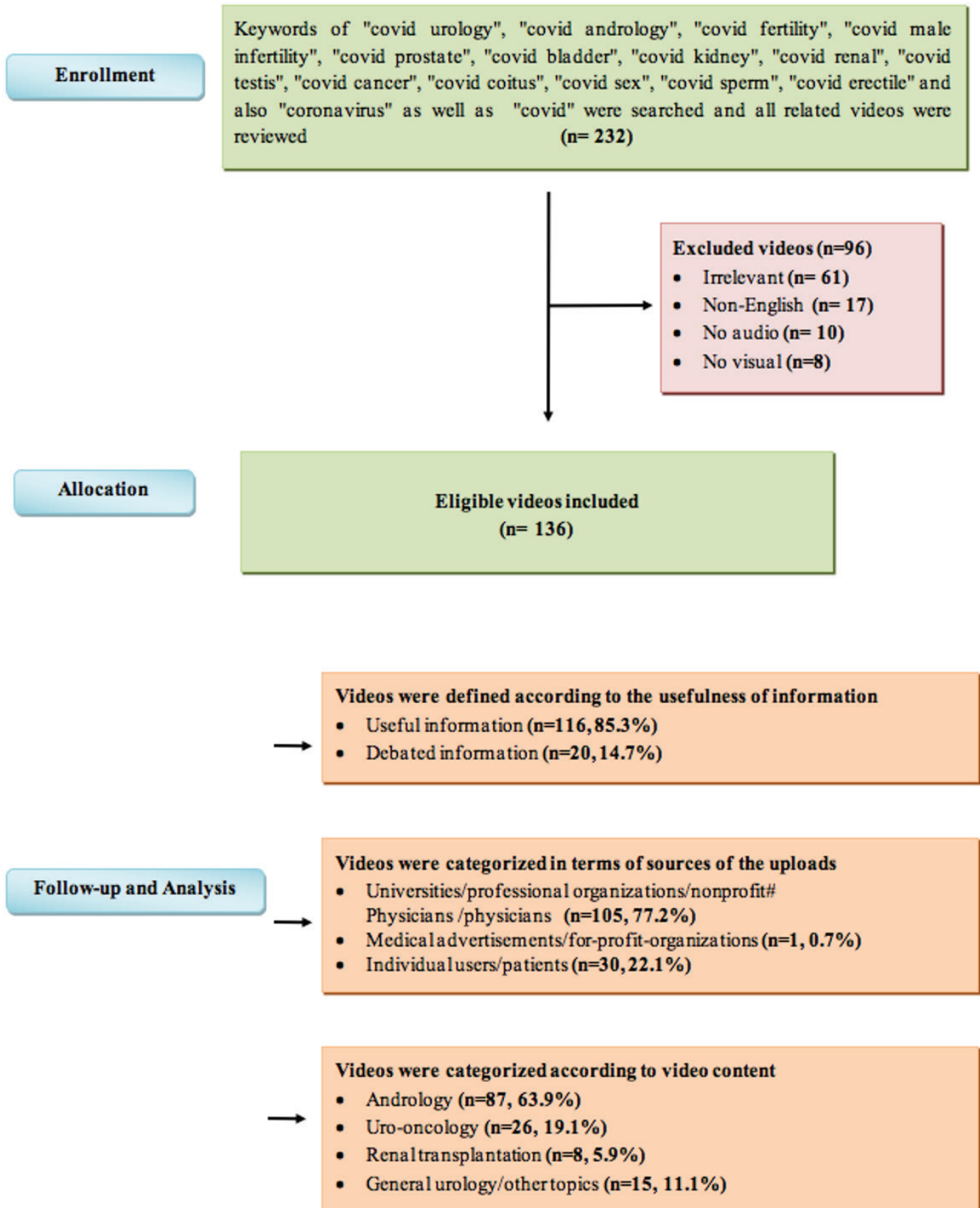


Figure 1. Flowchart of the study design

Table 1. Evaluation tools for reliability and quality of YouTube videos that give information on urological disorders during the COVID-19 period

DISCERN Reliability Tool (1 point per question if answered yes)
1. Are the explanations given in the video clear and understandable?
2. Are useful reference sources given? (publication cited, from valid studies)
3. Is the information in the video balanced and neutral?
4. Are additional sources of information given from which the viewer can benefit?
5. Does the video evaluate areas that are controversial or uncertain?
Global Quality scale
1. Poor quality, poor flow, most information missing and not helpful for patients
2. Generally poor and some information given but of limited use to patients
3. Moderate quality and some important information is adequately discussed
4. Good quality, good flow, most relevant information is covered and useful for patients
5. Excellent quality, excellent flow and very useful for patients
COVID-19: Coronavirus disease-2019

videos uploaded by individual users and medical advertisement/for-profit companies (22.8%) had lower scores. However, the rates of "the number of views per day" and "likes" were higher in the latter group (Table 3). Most of the sources of videos were universities/professional organisations/non-profit physician/physician groups (77.2%), while the physicians and non-physician health providers (83.8%) made up the majority of the speakers (Table 2). Table 4 summarises the characteristics of YouTube videos.

Assessment of Video Contents Related to Different Urological Disorders

When the video content was categorised as andrology, uro-oncology, renal transplantation and general urology/other topics, videos were distributed as 63.9%, 19.1%, 5.9% and 11.1%, respectively. The median number of total views and numbers of views per day were highest for videos related to andrology. The lowest numbers were observed for videos related to uro-oncology (Figure 2).

Discussion

All outpatient activities, except emergency cases, have been suspended and surgical activities, except for emergency and/or oncological interventions, have been limited. How long this unexpected pandemic will continue and its socioeconomic and psychological burden will be alleviated is unknown. In some

Table 2. Analysis of video characteristics according to their usefulness

Parameters	n=136
Number of total views	286.50 (82-1457.50)
Video length (second)	296.50 (141.50-923)
Duration on YouTube (day)	47 (32-57.75)
Number of views per day	8.20 (2.14-31.56)
Likes	5 (1-25)
Dislikes	0 (0-1)
Comments	1 (0-5)
DISCERN score	4 (3-5)
Global Quality Score	5 (4-5)
Video content, n (%)	
-Infertility	57 (41.9)
-Sexual life	26 (19.1)
-Prostate cancer	15 (11.1)
-Telemedicine in urology and general urology	10 (7.4)
-Bladder cancer	8 (5.9)
-Renal transplantation	8 (5.9)
-Effects of COVID-19 on sperm	4 (2.9)
-Renal cancer	3 (2.2)
-Effects of COVID-19 on testis	2 (1.5)
-Neurogenic bladder	1 (0.7)
-Benign renal diseases	1 (0.7)
-Effects of COVID-19 on kidney physiology	1 (0.7)
Sources of uploads, n (%)	
-Universities/professional organisations/non-profit physician/physician groups	105 (77.2)
-Stand-alone health information websites	0 (0.0)
-Medical advertisement/for-profit companies	1 (0.7)
-Individual users	30 (22.1)
Speakers, n (%)	
-Physician	102 (75.0)
-Non-physician healthcare provider	12 (8.8)
-Individual in the video	15 (11.1)
-External voice	7 (5.1)
Target audience, n (%)	
-Male	5 (3.7)
-Both male and female	131 (96.3)
Usefulness of source, n (%)	
- Useful information	116 (85.3)
- Debated information	20 (14.7)
Non-normally distributed data are expressed as "median (25 th -75 th percentile)" Categorical data are expressed as "number (percent)", COVID-19: Coronavirus disease -2019	

countries, teams of national experts discuss and try to reorganise possible strategies for patients with urological disorders (3,17).

This pandemic has made "telemedicine" more prominent as a pragmatic approach to reduce the risk of disease transmission. A virtual clinic is formed between physicians and patients so that

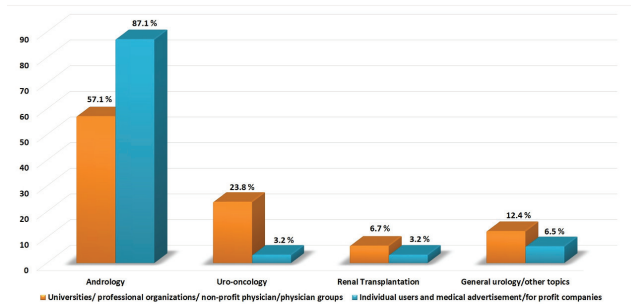


Figure 2. Distribution of video contents according to sources of uploads

problems not needing a traditional face-to-face consultation may be evaluated while avoiding a hospital visit (17,18). Various electronic communication devices such as telephone calls, video conferences and online email consultations can be developed for telemedicine (19-21). In this way, telemedicine, which is a very pragmatic option, especially for infectious diseases and public health emergencies, is also on the agenda for urology practice (19).

During this period, Luciani et al. (19) observed that about half of the patients had to cancel their doctor's appointment. The rate of face-to-face visits dramatically declined from 63% to 9% within the first 4 weeks of the pandemic.

Moreover, the majority (94.5%) of patients with urology diseases are at risk for a severe course of COVID-19 because of their advanced age and comorbidities, so social isolation is

Table 3. Analysis of video characteristics according to sources of uploads

Parameter	Universities/professional organisations/non-profit physician/physician groups n=105 (77.2%)	Individual users and medical advertisement/for-profit companies n=31 (22.8%)	p-value
Number of total views	253 (76-1.022)	705 (107-4.701)	+ 0.054
Video length (s)	278 (137-939)	411 (198-731)	+ 0.575
Duration on YouTube (day)	46 (30.5-57)	53 (42-58)	+ 0.286
Number of views per day	7.19 (1.85-28.08)	15.66 (4.60-100.62)	+ 0.036*
Likes	3 (1-15)	20 (5-99)	+ <0.001*
Dislikes	0 (0-1)	1 (0-7)	+ 0.013*
Comments	0 (0-3)	4 (1-20)	+ <0.001*
DISCERN score	4 (3-5)	3 (2-4)	+ <0.001*
Global Quality score	5 (4-5)	4 (3-5)	+ <0.001*
Video content, n (%)			
- Andrology	60 (57.1)	27 (87.1)	‡ 0.019*
- Uro-oncology	25 (23.8)	1 (3.2)	
- Renal transplantation	7 (6.7)	1 (3.2)	
- General urology/other topics	13 (12.4)	2 (6.5)	
Speakers, n (%)			
-Physician	90 (85.7)	12 (38.7)	‡ <0.001*
-Non-physician healthcare provider	8 (7.6)	4 (12.9)	
-Individual in the video	2 (1.9)	13 (41.9)	
-External voice	5 (4.8)	2 (6.5)	
Target audience, n (%)			
-Male	0 (0.0)	5 (16.1)	¶ <0.001*
-Both male and female	105 (100.0)	26 (83.9)	
Usefulness of source, n (%)			
- Useful information	101 (96.2)	15 (48.4)	¶ <0.001*
- Debated information	4 (3.8)	16 (51.6)	

p<0.05; asterisk () indicates significance
 †Mann-Whitney U test data are expressed as "median (25th-75th percentile)"
 ‡Chi-square test Fisher's exact test Data are expressed as 'number (percent)

Table 4. Appendix summarising the characteristics of YouTube videos

Video no	Video title	URL	Video length (s)	Date of upload	Duration on YouTube (day)	Number of total views	Number of views per day	Number of likes	Number of dislikes	Number of comments	The modified DISCERN scores	Global quality Score
1	How to have safe sex during the quarantine	https://youtu.be/sBXZCZy3E-0	320	24.03.2020	55	341809	6214.7	8200	270	656	3	2
2	Love in the time of coronavirus (washing your hands is sexy now!)	https://youtu.be/6_tsEVO7r0	133	12.03.2020	67	262425	3916.79	2800	98	118	1	1
3	Stockpiling semen to fight the coronavirus	https://youtu.be/Q7RQ1ZYvCtg	298	13.03.2020	66	68453	1037.16	273	135	173	1	1
4	Sex during coronavirus? NBCLX	https://youtu.be/cDA9ty2aADQ	244	27.03.2020	52	66222	1273.5	152	21	40	4	4
5	Dr. Oz says regular sex during coronavirus quarantine is good TMZ TV	https://youtu.be/CIEWmyZFtyk	106	18.03.2020	61	59218	970.78	715	48	167	2	3
6	Trying to get pregnant during coronavirus [TTC MUST WATCH]	https://youtu.be/sZvZK3Bn1zA	1380	17.03.2020	62	37054	597.64	533	13	168	5	5
7		This video is no longer available because the YouTube account associated with this video has been terminated	133	17.03.2020	62	31588	509.48	471	22	125	2	3
8	Coronavirus means some couples may never conceive as COVID-19 puts IVF on hold ITV News	https://youtu.be/E7KialUwIbE	195	28.03.2020	51	26071	511.19	126	74	0	3	5
9	Coronavirus outbreak: Dating and sex in the time of a pandemic - Wait there's more podcast	https://youtu.be/3VRV3hqsUCM	1420	24.03.2020	55	19416	353.01	149	58	92	3	4
10	Dr. Oz talks possible treatments and drugs for coronavirus, sex during quarantine and more	https://youtu.be/Bz_QEeAvlw	246	19.03.2020	60	17786	296.43	159	13	26	3	4
11	Couples having sex [DURING THE QUARANTINE SEXY TIMES]!	https://youtu.be/_eA8sr_NdQo	450	26.03.2020	53	13155	248.2	40	7	1	3	4
12		This video is no longer available because the YouTube account associated with this video has been terminated	274	19.03.2020	60	12913	215.21	49	4	8	3	4
13	Your coronavirus questions answered: What about IVF treatments and chemotherapy? TODAY	https://youtu.be/VsTr6zroLsl	295	19.03.2020	60	12790	213.16	78	5	21	5	5
14	Is coronavirus sexually transmitted? Experts respond	https://youtu.be/FzwdU-D5B0w	558	22.03.2020	57	12277	215.38	40	1	7	4	5

15	COVID-19: What transplant patients need to know	https://youtu.be/IXMbKt1ZcT4	272	13.03.2020	66	9950	150.75	92	6	0	4	5
16	COVID-19 and kidney disease	https://youtu.be/ELAPITCMF30	191	12.03.2020	67	7369	109.98	61	10	9	3	4
17	COVID 19, what to ask your fertility doctor	https://youtu.be/RuaSYpUPt-Q	1175	25.03.2020	54	6058	112.18	152	11	20	4	5
18	Dr. Oz suggests couples 'have sex' amidst coronavirus chaos	https://youtu.be/ht9LqsB_Nmc	83	20.03.2020	59	5937	100.62	99	8	20	2	3
19	NY Department of health releases COVID-19 sex guide	https://youtu.be/Y35pukvFNJo	152	26.03.2020	53	5519	104.13	30	3	7	5	5
20	Sex cannot transmit virus, but one can be infected because of proximity – Masika	https://youtu.be/KeS6iMGQFFA	1140	20.03.2020	59	5410	91.69	17	1	3	3	4
21		This video is no longer available because the YouTube account associated with this video has been terminated	475	26.03.2020	53	4701	88.69	382	3	89	1	2
22	Coronavirus and getting pregnant A fertility doctor talks about COVID-19	https://youtu.be/D8jsKnyH000	731	13.03.2020	66	3482	52.75	36	1	13	5	5
23		This video is no longer available because the YouTube account associated with this video has been terminated	123	17.02.2020	90	3375	37.5	39	4	28	3	4
24	Practical advice FOR prostate cancer PATIENTS for weathering changes caused by COVID-19	https://youtu.be/v4JyRwNYVZU	1104	27.03.2020	52	2937	56.48	15	0	1	5	5
25	IVF decisions in the time of COVID-19 (Coronavirus): Advice for fertility patients	https://youtu.be/1nD_SVpHHs8	590	23.03.2020	56	2493	44.51	42	2	3	4	5
26	Tips on how to not destroy your relationship while in quarantine for coronavirus New York Post	https://youtu.be/ysDdWVu6c5A	120	27.03.2020	52	2329	44.78	38	3	10	3	4
27	Male infertility & COVID-19 Infection, what do we know!	https://youtu.be/w9u-N8eGU0k	2545	8.04.2020	44	2185	49.65	110	2	3	5	5
28	Coronavirus: Men infected with COVID-19 may experience testicular damage	https://youtu.be/cun9TJNiOCc	105	14.03.2020	65	2073	31.89	19	5	25	4	4
29	COVID-19: Dr. Michael Braun discusses the virus' impact on patients with renal (kidney) disease	https://youtu.be/j4V95QM87Jw	155	13.03.2020	66	1955	29.62	12	0	3	3	4

30	Sex, sexuality and COVID-19. An open conversation	https://youtu.be/ShH7qn3wx8Y	459	19.03.2020	58	1674	28.86	20	0	3	3	3
31	Telehealth during COVID-19	https://youtu.be/Kx09-tuXUuw	3603	30.03.2020	49	1645	33.57	15	1	6	5	5
32	COVID-19 and the kidney, why are we seeing so much kidney involvement?	https://youtu.be/capCRENmDMc	654	26.03.2020	53	1621	30.58	42	1	35	3	4
33	Coronavirus & fertility expert Q&A	https://youtu.be/ilv_mGDo7xo	509	24.03.2020	55	1574	28.61	19	2	6	5	5
34	Coronavirus causes male infertility: What they are not telling you	https://youtu.be/NjcO_pNedXE	171	29.02.2020	78	1477	18.93	25	0	6	4	4
35	What prostate cancer patients need to know about treatment during the COVID-19 pandemic	https://youtu.be/UkCfLF0tpag	779	16.04.2020	32	1399	43.71	3	0	1	5	5
36	IVF treatments put on hold amid coronavirus concerns	https://youtu.be/ujF9EuGWUwo	96	20.03.2020	59	1328	22.5	8	3	4	5	5
37	COVID-19 - Is it safe to conceive during the outbreak?	https://youtu.be/Z3W03HNE-go	268	4.04.2020	44	1318	29.95	18	0	2	4	5
38	What fertility patients should know about COVID-19 (Coronavirus)	https://youtu.be/svpKGG1Mfjk	356	23.03.2020	56	1299	23.19	17	2	6	4	5
39	How to continue your fertility journey during the COVID-19 crisis: 3 pieces of advice	https://youtu.be/raKGuRQ003Y	607	1.04.2020	47	1179	25.08	32	0	5	4	5
40	COVID-19 & your fertility	https://youtu.be/zqdZssWwkMg	1114	26.03.2020	54	865	16.01	0	0	0	5	5
41	How COVID-19 is affecting transplants	https://youtu.be/yQVEC6hVbkl	119	30.03.2020	49	653	13.32	12	0	2	5	5
42	ZERO update: COVID-19 & prostate cancer	https://youtu.be/RHkkNaxj2zY	167	13.03.2020	66	846	12.81	5	1	0	4	4
43	COVID-19: Impact on kidney disease and dialysis	https://youtu.be/ijqd4sol_IU	242	23.03.2020	56	439	7.83	11	0	0	4	5
44	COVID-19, fertility and pregnancy: Coronavirus updates from a fertility doctor	https://youtu.be/Q0E4qScE0Sk	948	1.04.2020	47	795	16.91	17	0	6	5	5
45	COVID-19 A urologist's perspective and plan	https://youtu.be/OfveW-0H7LY	374	19.03.2020	60	764	12.73	25	1	2	4	5
46	The responsibilities of an IVF centre during the COVID-19 pandemic: CHR explains the ASRM statement	https://youtu.be/j5rV8f_aLHg	707	1.04.2020	47	738	15.7	9	1	1	5	5
47	Coronavirus & fertility: fact vs fiction with Dr. Cindy Duke	https://youtu.be/oXoaPA9NmcY	2407	23.04.2020	25	732	29.28	27	0	0	5	5
48	Is having sex during COVID-19 outbreak safe? Know from the experts	https://youtu.be/XRY7-aHWkWc	138	4.04.2020	44	677	15.38	5	0	0	2	3
49	COVID-19 CANCELLED OUR IVF FROZEN TRANSFER // Coping with a cancelled IVF cycle due to Corona Virus	https://youtu.be/LPSmBF02DDg	768	3.04.2020	45	705	15.66	26	3	12	3	4

50	Sex + COVID 19	https://youtu.be/Zka6DCPYm1w	2484	31.03.2020	48	650	13.54	5	0	4	2	3
51	A sexual intimacy guide amid COVID-19 outbreak	https://youtu.be/-TF9lqtEeEU	283	20.03.2020	60	668	11.13	22	0	15	5	5
52	Update: fertility treatment during COVID-19 with Dr. William Schoolcraft	https://youtu.be/6bgmaWoGPqg	290	3.04.2020	46	696	15.13	11	0	0	5	5
53	How to SEX with COVID-19 around Coronavirus can be sexually transmitted	https://youtu.be/CK-6r31XCX8	321	27.03.2020	53	541	10.2	4	0	0	5	5
54	COVID-19 puts fertility treatment, family's dreams on hold	https://youtu.be/LMel0Ock18g	117	11.04.2020	26	699	26.88	3	0	0	3	4
55	Handling infertility treatments during the coronavirus pandemic	https://youtu.be/PSojdfFcEh4	136	24.03.2020	26	685	26.34	5	0	0	4	5
56	Semen retention This is your last chance (COVID-19)	https://youtu.be/ePDUO_tfzjo	411	25.03.2020	55	455	8.27	26	3	11	2	2
57	Greater Boston Urology addresses COVID-19 pandemic	https://youtu.be/YBZDhfY17VU	205	31.03.2020	49	430	8.77	4	0	0	4	4
58	How is COVID-19 affecting people with kidney failure and on the transplant waiting list?	https://youtu.be/_RIUt0hq8pQ	925	28.04.2020	51	417	8.17	5	1	0	4	4
59	Bladder cancer, BCG and COVID-19 Treatment vaccine update for patients and families	https://youtu.be/8R6UQtejVuw?list=PL6k8gHLg nM67FCoxlgRYQsvl E0vmudson	3107	24.04.2020	25	403	7.19	3	0	1	5	5
60	Semen retention COVID-19 Your immune system NEEDS YOU	https://youtu.be/8KzLnH-bmxE	582	19.03.2020	61	386	6.32	44	0	6	2	2
61	Kidney transplants and COVID-19 National Kidney Foundation	https://youtu.be/HFA-BERo0a0	50	21.04.2020	28	416	14.85	5	0	1	4	4
62	Coronavirus (COVID-19) Impact on IVF and egg freezing process RSMC	https://youtu.be/QYmXkXAnOvM	183	17.03.2020	63	361	5.73	4	1	3	4	5
63	Are kidney donors at greater risk for COVID-19? National Kidney Foundation	https://youtu.be/XxADQT7W2yc	63	22.04.2020	27	321	11.88	3	0	1	3	4
64	Infertility & COVID-19 Session 2 /www.gbrclinic.com/+91-9940105555	https://youtu.be/cgJ2Xyo2Eel	2234	23.04.2020	26	293	11.26	3	0	0	3	4
65	Dr. Anindita Singh on fertility treatment plans during COVID-19 pandemic. Teleconsult@1800 313 5677	https://youtu.be/iMW4x8ZKGGQ	172	30.03.2020	50	297	5.94	11	0	0	3	4

66	Fertility treatments halted, delayed during COVID-19	https://youtu.be/OduwM0xttTg	122	15.04.2020	34	280	8.23	0	3	2	3	4
67	CHR's precautions against COVID-19 (coronavirus) infections	https://youtu.be/E4IAvKMAAnUI	917	23.03.2020	57	270	4.73	8	0	5	5	5
68	Mark's April 2020 Update - Now COVID-19, too? - Mark's prostate cancer experience	https://youtu.be/lcj188ja3Ag	391	13.04.2020	36	263	7.3	32	1	4	3	4
69	ICS - COVID 19 and management in neurogenic bladder	https://youtu.be/CbAWK1NRLZY	208	17.04.2020	32	264	8.25	2	0	0	5	5
70	Fertility treatment during COVID-19 with Dr. William Schoolcraft	https://youtu.be/TDX20fTo4 m0	163	27.03.2020	53	253	4.77	0	0	0	4	4
71	Dr Ritu Hinduja - Advise for patients on fertility treatment during COVID-19 pandemic	https://youtu.be/_KcjkVmFMKg	121	28.03.2020	52	250	4.8	5	0	1	4	5
72	Ovarian stimulation during COVID- 19	https://youtu.be/SdDcDDSB0UY	95	6.04.2020	43	246	5.72	7	1	0	4	5
73	Fertility patients face challenges during COVID-19 pandemic	https://youtu.be/jJDqO_Uhhmw	106	10.04.2020	39	231	5.92	3	0	1	3	4
74	COVID-19 North East United States: What you should know about bladder cancer and COVID-19	https://youtu.be/Bk0TMKOkC1g	3385	9.04.2020	40	227	5.67	1	0	0	5	5
75	Telehealth urology visits and COVID-19 updates ACU	https://youtu.be/xWLN98azf2s	407	26.03.2020	54	214	3.96	12	0	4	5	5
76	Infertility treatment during COVID-19 Dr. Akriti Bharati Vatsalya Natural IVF Best IVF Clinic	https://youtu.be/barz3nR2VMg	216	24.04.2020	25	227	9.08	9	0	1	4	4
77	IVF & coronavirus: treatments suspended during pandemic	https://youtu.be/UXkXbl8b4hw	99	7.04.2020	42	201	4.78	3	0	1	4	5
78	COVID 19 and fertility treatment #IVFWEBINARS	https://youtu.be/c1BYFJPparA	3896	7.04.2020	44	222	5.04	1	0	0	5	5
79	How to enjoy sex and to avoid spreading COVID-19?? COVID-19 My Biography	https://youtu.be/uNB2Y4CVwnM	72	24.03.2020	58	196	3.37	1	0	0	3	3
80	Thinking about fertility treatment during COVID-19	https://youtu.be/PUuhfO4f0s4	223	15.04.2020	36	191	5.3	2	0	0	4	5
81	COVID-19 Southeast United States: what you should know about bladder cancer and COVID-19	https://youtu.be/blv7IVqUIVk	3585	10.04.2020	42	173	4.11	4	0	0	5	5
82	Dubai OBGYN explains infertility procedures during COVID-19	https://youtu.be/9NIXgoeQh0o	283	4.05.2020	17	171	10.05	0	0	1	4	5
83	COVID-19 and the West Coast: what you should know about COVID-19 and bladder cancer	https://youtu.be/EqW22OvwRE	3471	14.04.2020	38	159	4.18	3	0	0	5	5

84	Covid19 could damage male fertility? Male Sex Sex Life Sex Education Research Associate	https://youtu.be/INszKlxC3vw	121	13.03.2020	70	154	2.2	8	0	3	3	4
85	Can COVID19 (Coronavirus) cause INFERTILITY? Long lasting impacts of COVID-19 Bite-size Science	https://youtu.be/KzUO6gs37ts	202	24.04.2020	28	146	5.21	17	0	19	5	5
86	Safer sex in the time of COVID 19	https://youtu.be/8off_2wtdAw	198	3.04.2020	49	125	2.55	6	0	1	3	4
87	What COVID-19 precautions mean for patients going through fertility treatment Your Morning	https://youtu.be/_MwPDTUKVI	205	24.03.2020	59	124	2.1	1	0	1	4	5
88	Fertility Clinic in Orange County response to Coronavirus (COVID-19)	https://youtu.be/qQ8ITJ3 mwbl	77	19.03.2020	64	121	1.89	1	0	0	3	3
89	COVID-19 and Infertility: what the coronavirus pandemic means for patients of CARE Fertility	https://youtu.be/IKDHI9ybAUy	228	23.03.2020	60	109	1.81	3	0	0	4	5
90	REPORT: Coronavirus may damage testicles	https://youtu.be/uf2eMseatYg	332	6.04.2020	46	107	2.32	6	0	0	5	5
91	Utah researchers say COVID-19 unlikely to spread through sexual intercourse	https://youtu.be/laEuq-AIOqE	474	29.04.2020	23	106	4.6	12	1	4	4	4
92	Facebook Live - bladder cancer and staying grounded in a time of crisis	https://youtu.be/OP3AnQeVB0Y	3204	20.04.2020	32	98	3.06	1	0	0	5	5
93	Doctor: IVF treatments are getting delayed due to COVID-19	https://youtu.be/8XCidyaGXHQ	1402	9.04.2020	43	92	2.13	0	1	0	4	5
94	Coronavirus and sex: does sex transmit COVID-19? How can you protect yourself while having sex?	https://youtu.be/h05RaLbHYQw	1006	10.04.2020	42	89	2.11	1	0	0	4	4
95	Q&A: Prostate Cancer & COVID-19	https://youtu.be/zJhkdf15Rtc	1088	1.05.2020	20	91	4.55	3	0	0	5	5
96	COVID-19: Kidney Cancer Awareness Month Facebook Live Q&A	https://youtu.be/Gc0AyXl4jWs	798	18.03.2020	65	80	1.23	1	0	0	5	5
97	COVID 19 and the Central US: What you should know about bladder cancer and COVID-19	https://youtu.be/6nF0hcnbKr8	3594	22.04.2020	30	82	2.73	0	0	0	5	5
98	Coronavirus-Part 1- Prostate cancer and COVID-19	https://youtu.be/qtt-AvTtS5s	417	24.03.2020	59	82	1.38	1	0	0	4	5
99	Parents struggling with infertility in limbo due to COVID-19 crisis	https://youtu.be/RGa8AxXTyVY	152	1.04.2020	51	75	1.47	0	1	0	4	5
100	How are urologists handling COVID-19?	https://youtu.be/r11IHtakZBQ	88	6.04.2020	46	82	1.78	1	1	0	4	5

101	COVID-19: What the virus means for infertility patients	https://youtu.be/yXRtP_-QnPw	1103	25.03.2020	58	71	1.22	2	0	0	4	5
102	Calming fears about COVID-19 & Your Fertility With Dr. Serena H. Chen & Medanswers	https://youtu.be/Wk1yAxaaH4I	377	16.03.2020	67	69	1.02	2	0	1	4	5
103	Coping with anxiety during infertility and COVID-19	https://youtu.be/t-AzQnq9lzc	278	16.04.2020	36	77	2.13	1	0	0	4	5
104	PCFNZ Webinar The practicalities of living with prostate cancer during COVID 19	https://youtu.be/exji60p0mxo	3070	23.04.2020	29	69	2.37	1	0	0	5	5
105	Corona and kidney transplant in 2020	https://youtu.be/mtwLs2_4cTU	101	27.03.2020	56	53	0.94	4	0	1	3	5
106	Fertility and the impact of COVID-19	https://youtu.be/ETVbKA5WLQ0	576	30.03.2020	53	49	0.92	1	0	1	4	5
107		This video is no longer available because the YouTube account associated with this video has been terminated	67	17.03.2020	66	48	0.72	0	1	0	3	3
108	What are my prostate cancer treatment options?	https://youtu.be/Ej_mRj226EE	111	10.04.2020	42	48	1.14	0	1	0	3	4
109	What are the benefits of telemedicine?	https://youtu.be/l8Hy48-rnmg	136	7.04.2020	45	49	1.08	1	1	0	3	4
110	STRESS, FERTILITY & COVID-19 WEBINAR #2	https://youtu.be/Ttekwwl7SfE	960	7.04.2020	45	48	1.06	0	0	0	4	5
111	COVID-19 and the South West US: What you should know about bladder cancer and COVID-19	https://youtu.be/R8IRF3csu_8	3872	15.04.2020	37	46	1.24	0	0	0	5	5
112	Managing IVF pregnancy during COVID-19 - Dr. Nidhi Jha - Southend Fertility & IVF	https://youtu.be/rFNKVoD20IU	81	10.04.2020	42	38	0.9	0	0	0	3	4
113	Will COVID 19 affects male infertility?	https://youtu.be/shgNcT95eYM	112	19.04.2020	31	37	1.19	1	0	0	3	4
114	What is telemedicine?	https://youtu.be/clnijuuslNc	55	7.04.2020	45	32	0.71	0	1	0	3	4
115	Does Medicare/insurance cover telemedicine?	https://youtu.be/i68o9V11--c	84	10.04.2020	42	24	0.57	0	1	0	3	4
116	Keeping sex and desire burning during COVID feat Alexa Martinez	https://youtu.be/aLWA-oG4jvl	3407	6.04.2020	46	21	0.45	1	0	2	2	3
117	Do I have to be tech-savvy for a virtual visit?	https://youtu.be/Oj6POx8Qaws	93	10.04.2020	42	12	0.28	0	1	0	3	4
118	Managing urology conditions during COVID-19	https://youtu.be/Uufc16qXuFM	946	29.04.2020	21	14	0.66	0	0	0	4	5
119	COVID-19: infertility consultations during pandemic	https://youtu.be/fs66ySlcoNk	507	22.04.2020	28	15	0.53	0	0	0	4	5

120	Renal medullary carcinoma and COVID-19: Protecting patients with advanced cancers	https://youtu.be/-1GRPtDMDUc	183	19.04.2020	31	6	0.19	0	0	0	4	5
121	COVID-19 and prostate cancer patients	https://youtu.be/YCbOEAulAQM	115	24.04.2020	26	7	0.26	0	0	0	4	5
122	RCC in the COVID era: immunotherapy for metastatic cancer	https://youtu.be/myplExMze7A	664	14.04.2020	36	4	0.11	0	0	0	5	5
123	Explaining adapted IVF protocols during COVID-19 CARE Fertility	https://youtu.be/JaltLP22R4o	172	15.05.2020	7	125	17.85	2	0	0	4	5
124	COVID safety protocol at Nova IVF fertility	https://youtu.be/2IU_do4sbQo	327	21.05.2020	1	68	68	2	0	0	4	5
125	How to keep safe from the coronavirus after your IVF treatment resumes	https://youtu.be/kl3MmMu4Xu0	313	14.05.2020	8	819	102.37	37	0	11	5	5
126	The new normal, adjusting to COVID-19 Webinar	https://youtu.be/ZBhkdonqeig	3690	17.05.2020	5	23	4.6	2	0	0	4	5
127	How has COVID-19 affected ongoing IVF treatment Dr. Shweta Goswami Zeeva Fertility Clinic	https://youtu.be/vcn7Mwt5i_Y	419	16.05.2020	6	15	2.5	0	0	0	4	5
128	Veterans, Prostate Cancer & COVID-19	https://youtu.be/wSRIJ92Chxg	933	6.05.2020	16	27	1.68	1	0	0	4	5
129	Mark Hagenbuch: Battling prostate cancer during COVID-19 crisis	https://youtu.be/5NjRFbQ09-4	708	7.05.2020	15	14	0.93	0	0	0	4	5
130	Yoga for prostate cancer & COVID-19 relaxation	https://youtu.be/4hnUK6PmDg0	1869	6.05.2020	15	7	0.46	0	0	0	3	4
131	Prostate cancer, COVID-19 & stress: Emotional check-in time	https://youtu.be/PVHAMrjX5IO	1901	7.05.2020	15	10	0.66	0	0	0	3	4
132	ZERO's CEO: 'I have COVID-19'	https://youtu.be/LVYpnhqkY8g	1663	24.04.2020	27	166	6.14	0	2	0	3	4
133	Eckert & Ziegler BEBIG: Prostate brachytherapy in times of COVID-19	https://youtu.be/Qb7Lsv77Tp4	134	13.05.2020	9	317	35.22	5	0	0	3	4
134	What patients with bladder cancer can do When COVID-19 impacts their care	https://youtu.be/ixheM0Fur88	159	14.05.2020	8	27	3.37	0	0	0	3	4
135	Sex and dating in the post COVID World Q+A	https://youtu.be/_OCvLC3Vszs	198	19.05.2020	3	761	253.66	6	15	3	2	3
136	Sexual health during the COVID era	https://youtu.be/kQiqR0d_Nls	227	19.05.2020	3	18	6	1	0	0	2	3

more important for these patients. Boehm et al. (20) reported that 63.2% of patients with urological conditions were eligible for telemedicine. Among eligible patients, 54.1% stated that they would prefer telemedicine instead of face-to-face consultation. This rate was higher for those aged <68 years (20). Technical limitations were the main cause for refusal. Uro-oncological diseases were the most common reason among patients both eligible and willing to use telemedicine (72.2%). Other diseases were incontinence/ bladder dysfunction (6.9%), andrological condition (5.5%), benign prostatic hyperplasia (3.7%), urinary tract infection (3.2%), urolithiasis (2.3%) and other reasons (5.9%) (20). However, interestingly, we observed that uploaded video rates, number of total views and number of views per day were higher for andrology-related YouTube videos. This finding implies that since andrological condition may be the topic that people want to learn most, more andrology-related videos have been uploaded to YouTube. We think that fewer videos on uro-oncology are uploaded since the approach and strategy related to uro-oncology is clearer. By contrast, we think that there are more videos on andrology and sexual life since there are more controversial ideas on this topic. Indeed, among

all urology-related videos during the COVID-19 pandemic, the most viewed videos are related to andrology. We consider that sexual health makes people more curious. For this reason, videos about andrology may be viewed more. We also assume that non-healthcare professionals have uploaded more videos on andrology, considering that they will capture a wider audience.

Sufficient information should be provided to patients under follow-up for urological diseases. However, it appears difficult for patients to determine which of their symptoms can be deferred and for how long. In addition, andrological diseases except for penile fracture, priapism, testicular torsion and scrotal and penile traumas are mostly treated electively and the international guidelines categorise andrological pathologies as a non-essential issue, so consultation with healthcare professionals for this purpose and treatment has to be postponed during the COVID-19 period (8,10). Since patients with andrological pathologies already have a low quality of life, not being able to get treatment during this period may worsen the severity of the disease (17). Because it is not very practical for a urologist to discuss these situations by telemedicine with every patient, we consider that informative, reliable and easy-to-understand YouTube videos may be useful for patients and their relatives.

Despite the ease of access to information, YouTube videos containing medical advertisements and for profit are often listed among the more popular videos (22). For that reason, there is a risk of exposure to misleading and incorrect information (5,23). Although some previous studies have found YouTube to be a source of accurate educational and useful health information (7,16,24,25), there have been opposite views in the literature about the reliability of these videos (16,23,26,27). Studies have recommended using more validated formal assessment tools such as the modified DISCERN tool, GQS or other forms [e.g. instrument that was developed by Azer et al. (24)] (6,7,16). However, it is not possible for lay people to make this evaluation and thereby determine the reliability and quality of the video.

Increasing the awareness of male sexual health and encouraging them to see a physician is important to improve their quality of life. Several studies have stated that the majority of YouTube videos, including videos on andrological topics such as premature ejaculation, are unreliable sources of medical information (7,22,23,28). In the present study, the speaker was a for-profit physician in 7 (35%) of the 20 videos containing debated information, while 65% of the speakers in debated videos were not healthcare providers. We found that 85.3% of all videos contained useful information, and the useful information rate was 96.2% in "universities/professional organisations/non-profit physician/physician groups", which contained 77.2% of all videos. Although most of the YouTube videos contain unreliable information and published by

individual users or medical advertisement/for-profit companies (16,23,26,27,29), our findings show that conversations in the COVID-19 period have been made less by individual users, medical advertisements or for-profit companies, unlike YouTube videos on other topics. However, our findings show that videos uploaded by non-healthcare professionals with lower reliability and quality scores garnered higher views and like. We think that this situation is the result of tricks made by such people to increase the discoverability and viewership of such YouTube videos. An extremely interesting headline, cover photo or custom thumbnail, using descriptive tags and writing a concise synopsis of the video content can often trigger the viewers to click on the video. Adding links to other videos that may be relevant by the video creator may be another common trick. In our opinion, these tricks are used more by non-healthcare professionals to make their videos more popular than videos of healthcare professionals.

Although andrological disorders and infertility have to be considered low priority, the number of patients who want to find solutions for their problems is not small, and they are looking for information on what they can do during this period (30). Although it was recommended to postpone appointments related to infertility in the beginning of the COVID-19 period, in the latest version of the EAU guidelines about COVID-19, male fertility surgery is only considered a high priority when women have limited ovarian reserve or have advanced maternal age, provided that a full discussion is held with the couple (8). In our analysis, 41.9% of all YouTube videos focused on infertility during the COVID-19 period. Current developments related to infertility are one of the most looked for topics and these conversations are very popular.

Study Limitations

To the best of our knowledge, this is the first study to assess the content, view rate, reliability and quality of YouTube videos that give information on urological disorders during the COVID-19 period. However, this study has some limitations. Firstly, the search order and number of video views may change every day because of video popularity and newly added videos. Although we recorded the videos on a playlist by snapshot analysis as in previous similar studies, it is a limitation. Secondly, not analysing non-English-language videos prevents commenting on all YouTube videos. Thirdly, we used a 5-point modified DISCERN tool and GQS to analyse videos with reference to previous studies, but their formal validation has not yet been completed. Finally, we used "covid" and "coronavirus" as search keywords with all the main terms or diseases that we considered for urology. However, there is still a possibility of missing some videos using only these terms.

Conclusion

In this study, 85.3% of all videos contained useful information on what should be done for urological disease during the COVID-19 period. This rate was especially higher in videos uploaded by "universities/professional organisations/non-profit physician/physician groups". The international urology committees classify andrological disorders as a non-essential issue, so they recommended that delaying consultation and treatment during the COVID-19 period. However, our results show that the rate of using YouTube as a source of information on andrology is even higher than that of uro-oncological diseases. We think that informative, easy-to-understand YouTube videos uploaded by "universities/professional organisations/non-profit physician/physician groups" can be used as a useful additional method to improve telemedicine, which is not very practical for reaching every patient with andrological disorders that does not require follow-up.

Ethics

Ethics Committee Approval: This article does not contain any studies with human participants or animals performed by any of the authors. Therefore, there is no need for ethical approval.

Informed Consent: This article does not contain any studies with human participants or animals performed by any of the authors. Therefore, there is no need for informed consent.

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Authorship Contributions

Concept: İ.S., N.B., Design: İ.S., N.B., Data Collection or Processing: İ.S., N.B., Analysis or Interpretation: İ.S., N.B., Literature Search: İ.S., N.B., Writing: İ.S.

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