ARTICLE

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YouTube™ as a source of information on prostatitis: a quality and reliability analysis

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It was aimed to analyze the YouTube™ videos on prostatitis regarding their source, content, and information included. The term "prostatitis" was searched by relevance and the first 200 video links and features were recorded. Using the 5-point modified DISCERN tool, Global Quality Score (GQS), and Journal of American Medical Association (JAMA) score, the quality and reliability of the information were assessed by two urologists. Inter-rater agreement for DISCERN, JAMA, and GQS had Cohen's kappa coefficients of 0.883, 0.887, and 0.885, respectively. The most common source of upload was doctors/medical institutions (33.0%), and the majority of the content was about general information (27.0%). The mean modified DISCERN, GQS and JAMA scores were 3.24 ± 1.23 (1.00–5.00), 3.25 ± 1.26 (1.00–5.00) and 2.17 ± 1.36 (0.00–4.00), respectively. These scores were correlated with each other ($r = 0.914$, $p < 0.001$ between JAMA and GQS; $r = 0.954$, $p < 0.001$ between JAMA and modified DISCERN; and $r = 0.885$, $p < 0.001$ between GQS and modified DISCERN, Spearman test) and were the highest in the videos uploaded by doctors/medical institutions ($p < 0.001$, Kruskal-Wallis test). Of the videos, 25.5% were poor, 30.5% were moderate and 44.0% were high quality. The high quality videos were significantly shorter than those with poor quality ($p = 0.039$, Kruskal-Wallis test). The poor quality videos had the highest view ratio (50.49 ± 127.74 (0.03–618.91), $p = 0.036$, Kruskal-Wallis test). Most YouTube™ videos on prostatitis are short and high quality videos uploaded by doctors/medical institutions. However, these videos have less view ratios than those with poor quality.

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INTRODUCTION

Video is a commonly preferred content format and an effective way to demonstrate concepts that are not easily explained in text form. YouTube™ is an online video sharing and social media platform launched in 2005 [1]. It provides a communication environment that is free and accessible all the time. Although it was used for music sharing and entertainment purposes in the beginning, it serves as a prominent repository for medical information, today.

In our daily urological practice, we observe that YouTube™ is one of the most popular websites among our patients [1]. It is optimized for mobile devices and many of our patients are already using it to meet their needs for additional information regarding their medical conditions. On the other hand, the quality of the information obtained from YouTube™ is not always sufficient due to the liberated nature of the video platform. This situation may cause the spread of misinformation and even conflicts between healthcare professionals and patients [2].

The term prostatitis comprises a combination of two infectious conditions of the prostate (acute and chronic bacterial prostatitis), its asymptomatic inflammation and a chronic pelvic pain syndrome. This definition and classification proposed by the National Institutes of Health (NIH) has been adopted internationally [3]. Prostatitis causes symptoms including urogenital pain, voiding and sexual dysfunction, which significantly reduces patients' quality of life. Prostatitis symptoms have a high prevalence, comparable to rates of diabetes and ischemic heart disease [4]. Because of this prevalence, prostatitis receives high public attention on social media, however, to our knowledge, no previous study has evaluated prostatitis videos on YouTube™. In the present study, we aimed to analyze the quality and reliability of YouTube™ videos regarding prostatitis.

MATERIALS AND METHODS

Search procedure and selection of videos

On April 4th, 2022, the term "prostatitis" was used to search on YouTube™ in private browser mode (by signing out from any personal account), using Nord virtual private network (VPN) software (a proxy located in the US) and without applying any filter. We sorted the search results by relevance and listed 200 video links on the top. Our inclusion criterion was to include medical information in English. Repeated and off-topic videos were excluded. To minimize the assessment bias, two doctors with diverse levels of expertise in urology (one associate professor [BKA] and one urology specialist [DD]) watched all the videos selected in the following days and scored confidentially.

The following variables were collected for each video: persistence on YouTube™ (days), length (s), likes, comments, number of views and view ratio. View ratio was computed by the division of the number of views

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by days since upload (view per day/100). According to the source of upload, videos were divided into five categories: (1) doctors/medical institutions, (2) health information websites, (3) medical advertisements, (4) patients and (5) TV shows. They were also divided into six categories of content: (1) general information, (2) symptoms and diagnostic methods, (3) treatment, (4) side effects, (5) lifestyle/diet and (6) others.

Local ethics committee approval was obtained (E1-21-2182).

Quality and reliability assessment tools

Each video was evaluated by three specific tools: (1) Global quality score (GQS) [5] for the overall quality, flow and usefulness analyses, (2) modified DISCERN tool [6] for the reliability analyses, and (3) Journal of American Medical Association (JAMA) score [7] for information quality analyses.

The 5-point (a range of 1–5, from poor quality 1 and 2 to excellent quality 4 and 5, the score of 3 is moderate) GQS categorized the videos according to their flow, information contained and level of usefulness for patients. The scores were described in detail as follows: score 1 videos have poor quality and flow, most information missing and are not at all useful for patients; score 2 videos have generally poor quality and flow, some information listed but many important topics missing and are of very limited use to patients; score 3 videos have moderate quality, suboptimal flow, some important information is adequately discussed but other poorly discussed, somewhat useful for patients; score 4 videos have good quality and generally good flow, most of the relevant information is listed but some topics are not covered and useful for patients; score 5 videos have excellent quality and flow and are very useful for patients [5].

Another 5-point tool, the modified DISCERN is a practical abbreviated version of its original with 15 questions [6, 8]. The original DISCERN is a tool developed to assess the quality of written consumer health information [8]. The modified version used in the present study included only 5 yes/no questions, where each "yes" and "no" answers have 1 and 0 points, respectively. The questions are as follows: (1) Are the aims of the video clear and achieved? (2) Are sources of information on the video reliable? (3) Is the information balanced and unbiased? (4) Are additional sources of information listed for reference? (5) Does the video address areas of uncertainty? [6, 8]. In the DISCERN scoring, videos scoring below 3 points are considered to have poor quality and should not be used by patients, those scoring 3 are of moderate quality and require additional sources of information, and those scoring above 3 are of high quality and contain useful information for patients.

Currency, attribution, authorship and disclosure criteria of the videos were evaluated with the JAMA scoring system. It was developed for assessment of the information quality of health-related web-sites. Each criterion has 1-point, and the highest possible score is 4. The higher the score, the better the quality of the video [7].

Statistical analyses

The sample size was calculated as 200 using the G*Power software program (latest ver. 3.1.9.7; Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany) [9]. Data analysis was performed using Statistical Package for the Social Sciences (SPSS) software version 22.0 (IBM Corp., Armonk, USA), and a p value less than 0.05 was considered statistically significant. Cohen's kappa was used to assess inter-rater reliability. Descriptive data analysis was performed using mean, standard deviation, median, minimum, maximum, frequency, and percentage values. Shapiro–Wilk test was employed to understand the distribution of the data. For the comparisons of categorical data and means, the chi-square and Kruskal–Wallis tests were applied, respectively. Bonferroni correction was performed for pairwise analysis and a p value of <0.017 (0.05/3) was adjusted as the statistical significance level. Spearman test was used to identify the correlation between the quality scores.

RESULTS

The characteristics of 200 videos are displayed in Table 1. "Doctors/medical institutions" constituted the majority (33.0%) as the source. General information about prostatitis was the most common video content (27.0%). The mean scores for JAMA, GQS and modified DISCERN were 2.17 ± 1.36, 3.25 ± 1.26, and 3.24 ± 1.23, respectively. Of the videos, 25.5% were "poor," 30.5% were "moderate," and 44.0% were "high" quality according to the modified DISCERN classification. The Cohen kappa scores were calculated as 0.883, 0.887, and 0.885 for the modified DISCERN, JAMA and GQS, respectively. These results, which were between 0.81–1, showed almost perfect inter-rater reliability.

Table 1. Source, content, features, and quality score of videos.

Source	***n***	**%**
Doctors/medical institutions	66	33.0
Health information websites	18	9.0
Medical advertisements	24	12.0
Patients	56	28.0
TV shows	36	18.0
Content		
General information	54	27.0
Symptoms and diagnostic methods	28	14.0
Treatment	37	18.5
Side effects	11	5.5
Lifestyle/diet	24	12.0
Others	46	23.0
Features	**Mean ± SD**	**Median (Min–Max)**
Length (s)	476.68 ± 447.30	359 (32-3857)
Persistence on YouTube (days)	1003.14 ± 1082.62	408.50 (2-5003)
Views	16057.98 ± 42630.88	2000 (4-432000)
View ratio	25.53 ± 77.59	3.53 (0.02-618.91)
Comments	56.358 ± 164.62	3 (0-1400)
Likes	224.63 ± 841.72	36 (0-8700)
Quality score	**Mean ± SD**	**Median (Min–Max)**
JAMA	2.17 ± 1.36	2 (0-4)
GQS	3.25 ± 1.26	3 (1-5)
Modified DISCERN	3.24 ± 1.23	3 (1-5)

JAMA Journal of American Medical Association; *GQS* Global quality score.

JAMA, GQS and modified DISCERN scores were significantly higher in the videos uploaded by "doctors/medical institutions." The modified DISCERN scores were also significantly higher in the videos from "doctors/medical institutions" than in those from other sources after Bonferroni adjustment (Table 2).

Table 3 shows the modified DISCERN classification of the videos according to the source and features. The majority of the videos (80.3%) uploaded by "doctors/medical institutions" were of high quality. The moderate quality videos had lower duration compared to others. The high quality videos were significantly shorter than those with poor quality ($p = 0.039$). The poor quality videos had the highest statistically significant view ratio ($p = 0.036$).

Correlation analyses are presented in Table 4. The modified DISCERN, GQS and JAMA scores were significantly correlated with each other. Looking at the video features; negative correlations were observed between the number of views and the scores of all three scales. However, they were not statistically significant. The same was true for the number of likes.

Table 2. Evaluation of the video quality regarding sources.

Sources	Quality scores of the videos (Mean ± SD)		
	JAMA	**GQS**	**Modified DISCERN**
Doctors/medical institutions	3.20 ± 0.84	4.17 ± 0.80	4.20 ± 0.79
Health information websites	2.67 ± 0.89	3.61 ± 0.99	3.39 ± 0.68
Medical advertisements	1.92 ± 1.31	3.04 ± 1.30	3.06 ± 1.13
Patients	1.44 ± 1.34	2.56 ± 1.12	2.59 ± 1.20
TV shows	1.35 ± 1.10	2.61 ± 1.20	2.57 ± 1.12
*P**	**<0.001**	**<0.001**	**<0.001**

JAMA Journal of American Medical Association, GQS Global quality score.
*Kruskal–Wallis test. Bold *p* values are statistically significant.

Table 3. Comparative analysis of videos according to modified DISCERN score classification.

	Classification by modified DISCERN score			
Source	**Poor *n* = 51 (25.5%)**	**Moderate *n* = 61 (30.5%)**	**High *n* = 88 (44.0%)**	
Doctors/medical institutions	1	12	53	
Health information websites	1	9	8	
Medical advertisements	6	11	7	
Patients	27	16	13	
TV shows	16	13	7	
Video features (mean ± SD)				***P****
Time (s)	619.06 ± 623.47	379.41 ± 302.87	461.59 ± 390.18	**0.039**
Views	29461.84 ± 74957.80	9763.59 ± 16551.63	12652.98 ± 24374.97	0.244
Persistence on YouTube (day)	893.78 ± 995.85	1029.36 ± 1009.68	1048.33 ± 1182.53	0.544
Likes	480.37 ± 1545.03	129.02 ± 370.71	142.68 ± 319.96	0.284
Comments	84.10 ± 242.08	34.77 ± 83.66	55.23 ± 150.68	0.173
View ratio	50.49 ± 127.74	14.98 ± 35.52	18.39 ± 55.04	**0.036**

*Kruskal–Wallis test. Bold *p* values are statistically significant.

Table 4. Correlation of JAMA, GQS and modified DISCERN scores with video features and each other.

	JAMA		**GQS**		**Modified DISCERN**	
	r	***p***	***r***	***p***	***r***	***p***
JAMA	-	-	0.914	**<0.001**	0.954	**<0.001**
GQS	0.914	**<0.001**	-	-	0.885	**<0.001**
Modified DISCERN	0.954	**<0.001**	0.885	**<0.001**	-	-
Time (s)	−0.085	0.230	−0.073	0.303	−0.094	0.185
Views	**−0.029**	0.679	**−0.037**	0.604	**−0.04**	0.574
Persistence on YouTube™ (day)	0.065	0.359	**0.033**	0.639	**0.043**	0.544
Comments	−0.066	0.351	−0.071	0.318	−0.074	0.298
Likes	**−0.021**	0.769	**−0.026**	0.719	**−0.031**	0.658
View ratio	−0.085	0.229	−0.067	0.343	−0.088	0.215

JAMA Journal of American Medical Association, *GQS* Global quality score.
Bold *p* values are statistically significant. Spearman correlation coefficients are indicated as *r*.

DISCUSSION

YouTube™ is a social media platform that is easily accessible and open 24/7 to everyone. In this platform, billions of users share information about everything and thousands of people all around the world watch those videos every day. Despite its wide usage and rich content, most of the information it contains is commercial, biased or misleading. In addition, only a small number of studies have examined the quality of information shared about urological conditions [10]. To the best of our knowledge, no studies have been conducted on prostatitis. In the present study, we aimed to evaluate the quality and reliability of information on prostatitis provided in YouTube™ videos by using a combination of three validated assessment tools and two different experts' opinion.

With a wide range of clinical presentations, pelvic pain and lower urinary tract symptoms are the two main complaints of

patients with prostatitis [11]. Its serious negative impact on patients' quality of life has been frequently documented [12–14]. Many doctors consider prostatitis problematic to treat effectively, and patients are not always satisfied with the treatments given and turn to other alternative solutions. Due to the difficulty and cost of accessing the health system in many countries, patients may apply to obtain information on the Internet. Sometimes, in cases where the expected benefit from the treatments given cannot be seen, patients may turn to related videos on YouTube™ to find additional solutions. Before applying to the hospital, some patients watch YouTube™ videos in the hope of doing preliminary research about their diseases or to resolve their complaints without going to a doctor. Today, YouTube™ videos form an important part of the health information seeking behavior of our patients with prostatitis.

On YouTube™, viewers can also watch videos to reach the opinion of physicians and to learn about the applications to be made in the presence of certain complaints. In our study, "doctors or medical institutions" ranked first (33.0%) as a source, it constituted nearly one-third of all videos, followed by patients (28.0%), and the rarest source was "health information websites" (9.0%). The fact that prostatitis is a specific subject and is not widely known by other disciplines may explain why "doctors or medical institutions" are the most common video source, they spend more effort to enlighten the audience. Similar to our findings, Melchionna et al. and Toksoz and Duran reported in their studies that medical doctors/clinicians were dominant as video uploaders [15, 16]. The fact that patients are in the second place as video uploaders shows the importance of sharing experiences. Patients who felt distressed or helpless during chronic disease processes feel the need to share their experiences, especially useful treatment options with others who suffer from the same disease. This behavior, which reflects an empathetic point of view, is quite understandable. Chronic diseases can easily push patients to seek different solutions when medical and pharmacological methods are tried and sufficient results cannot be obtained. Considering the chronic and bothersome nature of prostatitis, patients can easily turn to non-medical solutions [17]. We often see this orientation on the intimate anamneses taken from patients in our daily practice. Along this way, we witness that they prefer to watch informative videos rather than read long and boring articles based on guidelines to get medical information. This makes sense from the patient's point of view, especially for those with limited time. However, a group of patients take this information seeking behavior one stage further and try to manipulate the treatment process with what they have learned from YouTube™ videos and may conflict with health professionals [18]. In this case, healthcare professionals have difficulty in explaining costs and risks that may occur to patients. As a solution, we can recommend some videos of our own choice to our patients. Although we cannot restrict patients' access to false information, we can direct them to sources that provide accurate information. Mistreatments, treatment delays and complications can be prevented and also time is saved. At this point, it becomes important to be able to objectively assess the quality of videos. There are various scales and tools that can be used for this purpose. In the current study, three of the most convenient ones, JAMA, GQS and modified DISCERN, were used similar to previous studies [16, 19]. Apart from these, checklist scores [20], and the Patient Educational Materials Assessment Tool have also been used in the literature [15, 18, 21–24]. Evaluating videos using some objective scales instead of subjective evaluation criteria will also provide more satisfactory information in joint evaluations with colleagues and in council-like settings. We would like to emphasize the importance of standardization and the creation of a common language.

Evaluating the video contents, we observed that "general information" about prostatitis is given the most frequently (27.0%) in YouTube™ videos. It may have been aimed to increase the awareness of patients by giving general information and to direct their applications to certain institutions. Fewer videos were uploaded about symptoms, treatments and side effects. Since prostatitis is treated with certain prescription drugs such as antibiotics and analgesics, probably there was little need for speculation about treatment and side effects, or explanation of symptoms with videos. The "other" contents for prostatitis included herbal treatments (phytotherapy), traditional medical recommendations and interventions such as, hot baths, homeopathic and/or alternative medicine, acupuncture, prostatic massage and exercises include the pelvic region.

Although YouTube™ is an extremely popular video sharing platform, their content can be quite biased and of poor information quality [10, 25]. High number of views of a video does not indicate that it is of high quality. In our study, we found that the videos with a higher view ratio were of lower quality. The reason for this may be that people turn to the most watched videos in the first place, and accordingly, the number of views of such videos may increase. Another reason may be that they sort the videos according to the number of views during the video search and tend to the most watched videos. In the present study, the poor quality videos had the highest view ratio, thus disseminating a lot of misinformation. Similar findings have also been obtained in studies about YouTube™ videos on erectile dysfunction [21, 24], Peyronie's disease [26] and penile prosthesis [22]. Like ratio (like/ [like+ dislike]) and video power index (like ratio × view ratio) are two parameters used to evaluate the video rating and popularity [16, 19]. In November 2021, YouTube™ removed the public dislike count from all its videos [27]. While creators can still see the number of dislikes on YouTube™, viewers can now only see how many likes a video has received. Since we could no longer reach the number of dislikes, we could not use the video power index and the like ratio in our study.

When we examined the quality scores in our study, we found that both the mean and median scores for all three scales were above the average level and correlated with each other. Besides, according to the modified DISCERN scores, the high quality videos ranked first (44.0%). These findings show that English information content about prostatitis on YouTube™ is quite satisfactory in terms of quality and reliability. While the video quality has been found to be low in many urological diseases analyzed in YouTube™ studies [16, 22–24, 28], it is pleasingly high in prostatitis. If viewers do not turn only to popular videos, they will be able to reach the necessary information for themselves by watching videos especially uploaded by doctors/medical institutions.

The modified DISCERN scores of the videos revealed that the high quality videos were significantly shorter than the poor ones. Analyzing YouTube™ videos about male infertility, Ku et al. reached similar findings [20], however, on the contrary, Toprak et al. reported that DISCERN and GQS scores were significantly associated with durations of YouTube™ videos on delayed ejaculation [28]. In our opinion, the quality of the short videos may be attributed to the fact that the information desired to be given to the viewer is conveyed in a clear and striking way as soon as possible. Long videos distract viewers and make it difficult to focus on the messages that need to be delivered. The introduction is the most important part. It should be quick and attractive, otherwise viewers will lose interest in the subject and may not watch the rest of the video.

Ours is the first study evaluating YouTube™ videos on prostatitis. This makes the current study more valuable, but we do have some limitations: (1) In order to reduce the observer bias, the knowledge of two researchers was consulted, but this is still not enough, the observer bias can be reduced by increasing the number of researchers, (2) Only videos in English were selected. The fact that the word "prostatitis" is also used in Spanish brought

Spanish videos in the second place in the search results. However, the authors' lack of knowledge of Spanish resulted in the elimination of many Spanish videos, (3) Only the word "prostatitis" was used as the search term. For example, videos that can be accessed by different search strings such as "prostate infection," "prostate inflammation," etc. have been involuntarily eliminated, (4) YouTube™ settings may vary geographically and periodically. Even we used a VPN engine, we were unable to prevent that bias, (5) Since the YouTube™ algorithm can personalize results based on users' viewing history, an attempt was made to eliminate this bias by searching in "private browser mode". However, the same search was not performed on different web browsers. (6) Even though YouTube™ is one of the most common social platforms on the Internet, it is also the fact that it does not include all videos on the Internet or social media.

CONCLUSIONS

Most YouTube™ videos on prostatitis are short and high quality videos uploaded by doctors/medical institutions. However, these videos have less view ratios than those with poor quality. To reach more audiences, doctors/medical institutions should explore some ways to increase this. We can recommend our patients with prostatitis who want to learn more about their disease on YouTube™, to watch short videos uploaded by doctors/healthcare organizations, regardless of their low view ratios. To objectify our specific video recommendations, we can use GQS, modified DISCERN and JAMA tools.

DATA AVAILABILITY

The data that support the findings of this study are available in the figshare repository at: https://doi.org/10.6084/m9.figshare.20763790.v1.

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AUTHOR CONTRIBUTIONS

BKA: the conception and design of the study, acquisition of data, writing-original draft. DD: acquisition of data, writing-original draft. FC: literature search, drafting the article, review and editing. EGO: statistical analysis and interpretation of data. SB: drafting the article, review and editing. YK: the conception and design of the study, review and editing. CO: critical revision of the manuscript for important intellectual content, supervision. All authors agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors read and approved the version submitted.

COMPETING INTERESTS

The authors declare no competing interests.

ETHICAL APPROVAL

The study was approved by local ethics committee (Number: E1-21-2182).

ADDITIONAL INFORMATION

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