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ORIGINAL PAPER

Looking for cystoscopy on YouTube: Are videos a reliable information tool for internet users?

Carmine Turco [1], Claudia Collà Ruvolo [1], Simone Cilio [1], Giuseppe Celentano [1], Gianluigi Califano [1], Massimiliano Creta [1], Marco Capece [1], Roberto La Rocca [1], Luigi Napolitano [1], Francesco Mangiapia [1], Lorenzo Spirito [1], Simone Morra [1], Alberto Melchionna [1], Ferdinando Fusco [2], Vincenzo Mirone [1], Nicola Longo [1]

[1] Department of Neurosciences, Reproductive Sciences and Odontostomatology, Urology Unit, University of Naples "Federico II", Italy;
[2] Department of Woman, Child and General and Specialized Surgery, University of Campania "Luigi Vanvitelli", Naples, Italy.

Summary

Objective: The Internet is an important and easily accessible source of information. The aim of the current study was to investigate the quality of YouTube videos on cystoscopy and to establish if they can be used as a reliable information tool for internet users.

Materials and methods: The search term "cystoscopy" was used on YouTube platform and the first 120 YouTube videos were analyzed. To assess the video quality Patient Education Materials Assessment Tool (PEMAT) for Audiovisual (A/V) Materials (Understandability and Actionability sections), Misinformation score and Global Quality Score (GQS) were used.

Results: Of all 120 videos, 72 were included in the analyses. Of all videos, 59.7% (n = 43), and 40.3% (n = 29) were targeted to General Public and Healthcare Workers. Moreover, "technical aspects" was the main topic addressed (n = 29, 40.3%). The median PEMAT A/V Understandability and Actionability scores were 50.0% (IQR: 39.1-70.0) and 66.7% (IQR: 33.3-100.0), respectively. The median Misinformation score ranged from 1.0 to 3.0. According to GQS, 22 (30.6%), 26 (36.1%), 16 (22.2%), 8 (11.1%) videos were poor, generally poor, moderate, and good, respectively. No video was evaluated as excellent.

Conclusions: Today, YouTube videos on cystoscopy are more frequently uploaded by healthcare workers, who share information about specific aspects of this procedure. However, the quality of YouTube contents on cystoscopy is still poor. Therefore, currently users interested in cystoscopy cannot rely on YouTube to get good informative material on this topic. In consequence, future authors should focus on improving the quality of video contents on cystoscopy.

KEY WORDS: *Urethrocystoscopy; Social media; Urology; Internet; PEMAT.*

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INTRODUCTION

Cystoscopy is an endoscopic procedure used to explore the bladder and the urethra in their entirety. It is used with diagnostic, therapeutic and follow-up purposes in oncological, such as bladder cancer or upper tract urothelial carcinoma, and non-oncological conditions, such as lower tract urinary symptoms, urinary incontinence, chronic pelvic pain, recurrent urinary tract infections or urologic trauma (1-9). The Internet is an important and easily accessible source of information. More than 80% of patients look for medical advice or informative contents about their conditions on the web (10). Among all social media, YouTube is a video-sharing platform which allows people to upload or watch videos. It is the second most visited website, with more than 500 hours of content uploaded every minute, from 80 different countries and five billion videos watched every day (11).

In current literature, several previous studies have already examined YouTube video on medical topic (11-14). Internet users may look for information on cystoscopy on YouTube to be aware of what to expect from the procedure to reduce possible distress, pain or anxiety (15).

To the best of our knowledge, we are the first to analyze the quality of YouTube information on cystoscopy. The aim of the current study was to investigate the quality of YouTube videos on cystoscopy and to establish if they can be used as a reliable information tool for internet users.

MATERIALS AND METHODS

Search strategy and video selection criteria

On the 26th of February 2021, a systematic search on YouTube was conducted. The key word used was "*cystoscopy*". Before selecting the videos, to avoid suggestions based on previous research, any personal accounts were logged out and a *Virtual Private Network* (VPN) software was set in the *United States*. No research filter was applied. The first 120 videos (6 pages) were examined (16).

As a YouTube default setting, the videos were sorted by relevance. The exclusion criteria applied were (Figure 1): videos showing different procedures (n = 14), videos without audio (n = 13), videos about topic of other disciplines (n = 7), webinars (n = 7), and videos not in English language (n = 4). For duplicates (n =3), only one was considered. Finally, videos part of a compilation were considered as single.

For each suitable video, the variables collected were length (in seconds), number of thumbs up and thumbs down, number of channel subscribers, number of views, number of comments, number of videos with disabled comments,

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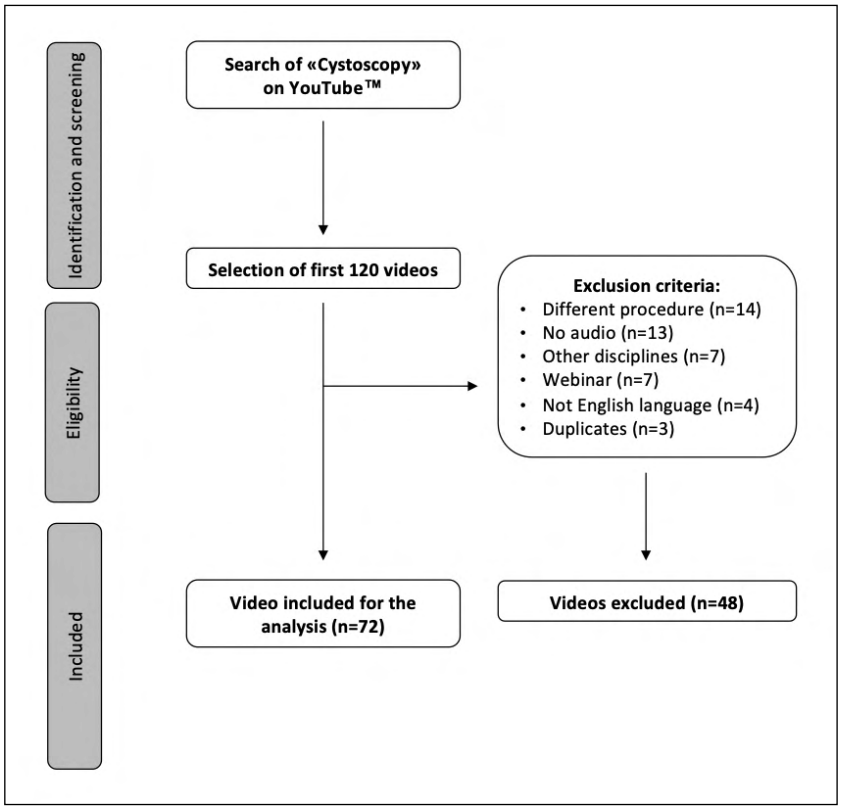
Figure 1.
PRISMA diagram depicting inclusion and exclusion criteria of YouTube video search.



persistence on YouTube (defined as days between the date of upload and the date of analysis), video author (defined as *Associations, Academic Hospitals/University, No Academic Hospitals, Healthcare worker, Patients, Others*), video target (*General public or Healthcare workers*) and video topic (explanation to patient, personal experience, and technical aspects). Finally, *Video Power Index* (VPI), calculated as LIKE ratio (thumbs up x 100/thumbs up + thumbs down) multiplied by VIEW ratio (views/persistence time) divided by 100, was used as an indicator of popularity, as previously done (11).

Quality and misinformation assessment tools

The videos quality was independently assessed by two urology residents [a junior (third year) and a senior (fifth year)]. A third investigator (an Associate Professor) sorted any differences, and consensus was achieved among reviewers. The following video quality assessment tools were used: the *Patient Education Materials Assessment Tool for audio-visual* content (PEMAT A/V), the Misinformation score and the *Global Quality Score* (GQS).

First, the PEMAT A/V is an instrument to establish the Understandability and the Actionability of informative audiovisual contents for patients on different topics. Understandability and Actionability are respectively evaluated by 13 plus 4 questions. Each question can be answered with three options: "*Agree*", "*Not Agree*" and "*Not Applicable*". The final score is a percentage: the higher is the percentage, the more understandable and/or actionable is the material (11).

Second, a Misinformation score was appositely created for the study. It consisted of five items: 1) Good explanation of the topic, 2) Indications are clear, 3) Good execution of the procedure, 4) *European Association of Urology* (EAU) guidelines concordance and 5) Pathological cases are showed. Each item was evaluated by five possible different levels of agreement/disagreement (1 = strongly disagree, 2 = disagree, 3 = not agree or disagree, 4 = agree, 5 = strongly agree) (11). The lower was the result, the higher was the misinformation level.

Finally, GQS is a scale evaluating the overall quality and the clinical utility of each video (11). The five permitted options ranged from 1 (Poor quality, poor flow of the site, most information missing, not at all useful for patients) to 5 (Excellent quality and excellent flow, very useful for patients).

The higher was the score, the better was the quality of the video.

Statistical analyses

Descriptive statistics were presented as medians and *Interquartile ranges* (IQR) for continuously coded variables or counts and percentages for categorically coded variables. Chi-square test and Kruskal-Wallis test examined the statistical significance in proportions and medians differences. Cohen kappa statistics was used to measure the reliability of the investigator's evaluations of the videos. Pearson's test was used to assess potential correlations between the variables. In all statistical analyses, R software (*www.rproject.org*) environment for statistical computing and graphics (R version 4.0.0) and Microsoft Excel 2019 were used. All tests were two-sided with a level of significance set at $p < 0.05$.

Results

Videographic characteristics

Of all 120 videos examined, 72 were eligible (Table 1).

The median length was 160.5 seconds (IQR: 109.8-403.5, range: 39-1092), the median number of views was 13787.5 (IQR: 2306.2-52604, range: 94-910019) and the median persistence time on YouTube was 1437.5 days (IQR: 835.8-2029.8, range: 75-4105). Moreover, across the sample, the median number of thumbs up, thumbs down, comments and subscribers were 40.0 (IQR: 7.0-147.0, range: 0-2151), 5.0 (IQR: 1.0-18.5, range: 0-278), 2.0 (IQR: 0-16.8, range: 0-475) and 5930.0 (IQR: 653.8-22025, range: 5-3160000), respectively. Furthermore, 15 videos (20.8%) had disabled comments. Of all videos, 43.1% (n = 31), 1.4% (n = 1), 8.4% (n = 6), 18.0% (n = 13), 19.4% (n = 14) and 9.7% (n = 7) were produced by Associations, Academic Hospitals or Universities, No Academic Hospitals, Healthcare Worker, Patients, Others, respectively. Additionally, 59.7% (n = 43), and 40.3%

Table 1.
Videographic characteristics of 72 YouTube videos on "Cystoscopy" recorded on the 26th of February 2021.

Videographic characteristics		Overall value
Length, sec	Median (IQR)	160.5 (109.8-403.5)
	Range	39-1092
Thumbs up, n	Median (IQR)	40.0 (7.0-147.0)
	Range	0-2151
Thumbs down, n	Median (IQR)	5.0 (1.0-18.5)
	Range	0-278
Subscribers, n	Median (IQR)	5930.0 (653.8-22025)
	Range	5-3160000
Views, n	Median (IQR)	13787.5 (2306.2-52604)
	Range	94-910019
Comments, n	Median (IQR)	2.0 (0-16.8)
	Range	0-475
Disabled comments, n (%)	No	57 (79.2)
	Yes	15 (20.8)
Persistence on YouTube™ (days)	Median (IQR)	1437.5 (835.8-2029.8)
	Range	75-4105
Author, n (%)	Associations	31 (43.1)
	Academic Hospitals - Universities	1 (1.4)
	No Academic Hospitals	6 (8.4)
	Healthcare worker	13 (18.0)
	Patients	14 (19.4)
	Others	7 (9.7)
Target, n (%)	General public	43 (59.7)
	Healthcare workers	29 (40.3)
Video topic, n (%)	Technical aspects	29 (40.3)
	Explaination to patient	27 (37.5)
	Personal experience	16 (22.2)
VPI, n	Median (IQR)	8.8 (2.2-31.1)
	Range	0-4609.88853

IQR: Interquartile range; VPI: Video power index.

Table 2.
A) Patient Education Materials Assessment Tool for audio-visual content (PEMAT A/V) score, B) Misinformation score and C) Global Quality Score (GQS) of 72 YouTube videos on "Cystoscopy" recorded on the 26th of February 2021.

Variable	Overall value n = 72		General public n = 43 (59.7%)	Healthcare workers n = 29 (40.3%)	p-value
A) PEMAT A/V, (%)					
Understandability	Median (IQR)	50.0 (39.1-70.0)	55.6 (40.8-72.7)	40.0 (30.0-58.3)	0.01
Actionability	Median (IQR)	66.7 (33.3-100.0)	66.7 (33.3-100.0)	66.7 (33.3-100.0)	0.7
B) Misinformation					
1) Good explanation of the topic	Median (IQR)	3.0 (2.0-4.0)	3.0 (2.0-4.0)	3.0 (2.0-4.0)	0.3
2) Indications are clear	Median (IQR)	2.0 (1.0-3.0)	3.0 (1.5-3.0)	2.0 (1.0-3.0)	0.2
3) Good execution of the procedures	Median (IQR)	1.0 (1.0-1.0)	1.0 (1.0-1.0)	1.0 (1.0-2.0)	0.4
4) EAU guidelines concordance	Median (IQR)	3.0 (2.0-3.0)	3.0 (2.0-3.0)	3.0 (2.0-3.0)	0.2
5) Pathological cases are showed	Median (IQR)	1.0 (1.0-2.0)	1.0 (1.0-1.5)	1.0 (1.0-4.0)	0.7
Overall misinformation score	≤ 2.5	49 (68.1)	30 (69.8)	19 (65.5)	0.9
	> 2.5	23 (31.9)	13 (30.2)	10 (34.5)	
C) GQS					
Poor	22 (30.6)		13 (30.2)	9 (31.0)	0.9
Generally poor	26 (36.1)		15 (34.9)	11 (37.9)	
Moderate	16 (22.2)		10 (23.3)	6 (20.7)	
Good	8 (11.1)		5 (11.6)	3 (10.3)	
Excellent	0 (0)		0 (0)	0 (0)	

IQR: Interquartile range; EAU: European Association of Urology.

(n = 29), were targeted to General public and Healthcare workers, respectively. Finally, technical aspects was the main topic addressed (n = 29, 40.3%), followed by explanation to patient (n = 27, 37.5%) and personal experience (n = 16, 22.2%).

Video quality assessment

The median PEMAT A/V Understandability score was 50.0% (IQR: 39.1-70.0), and the median PEMAT A/V Actionability score was 66.7% (IQR: 33.3-100.0). According to video target (General public *vs* Healthcare workers) a statistically significant difference was recorded for Understandability (55.6 *vs* 40.0%, p = 0.01), but not for Actionability (66.7 *vs* 66.7%, p = 0.7) (Table 2A).

The Cohen kappa statistic was used to measure the reliability of the investigator's assessments between the two evaluation times. The Cohen kappa recorded was 0.46 for the Actionability score and 0.17 for the Understandability score. The median Misinformation score ranged from 1.0 (item 3: Good execution of the procedure; item 5: Pathological cases are showed) to 3.0 (item 1: Good explanation of the topic; item 4: EAU guidelines concordance). According to video target (General public *vs* Healthcare workers), no statistically significant difference was recorded. Moreover, a median overall Misinformation score ≤ 2.5 was recorded in 68.1% (n = 49) videos *vs* 31.9% (n = 23) videos with a median overall Misinformation score > 2.5 (Table 2B).

According to GQS, 22 (30.6%), 26 (36.1%), 16 (22.2%), 8 (11.1%) videos were poor, generally poor, moderate, and good, respectively. No video was evaluated as excellent. According to video target (General public *vs* Healthcare workers), no statistically significant differences were recorded (Table 2C).

Variable correlations

We tested for possible correlations. First, we examined possible correlations between videographic characteristics (length in seconds, thumbs up, thumbs down, number of views, persistence on YouTube, channel subscribers and VPI) and quality assessment tools (PEMAT Understandability and Actionability scores, Misinformation score and GQS). Second, possible correlations within quality assessment tools were performed.

We recorded a statistically significant positive correlation between PEMAT A/V Understandability and Misinformation score (r = 0.50, p ≤ 0.001) and between PEMAT A/V Actionability scores and Misinformation score (r = 0.42 p ≤ 0.001). Conversely, no statistically significant result was recorded between the other correlations (r coefficients ranged from -0.14 to 0.21, all p ≥ 0.1).

Discussion

YouTube is the second most visited platform and allows people to upload video

regarding health topics. However, currently, no filter or revision progress of video contents exists. In consequence, YouTube can represent a risk for misinformation. Since cystoscopy is recommended both for diagnosis and follow up of oncological and non-oncological conditions, we took into consideration the importance of this procedure and the impact of a correct information on YouTube. Therefore, the aim of the current study was to evaluate the quality of YouTube videos on cystoscopy and to establish if they can be used as a reliable information tool for internet users. To the best of our knowledge, no previous investigators examined the quality of YouTube contents on cystoscopy procedure. We addressed this void and identified several noteworthy observations.

First, we recorded that approximately 80% of videos were uploaded by hospitals and/or healthcare workers and approximately 60% of videos were targeted to General public. Moreover, the main topic addressed concerned technical aspects (40%), such as the assembly of a cystoscope or the preparation of a sterile draping. In consequence, according to our results, today YouTube is more frequently managed by people with a medical background, rather than no-medical educated individuals, in terms of uploading contents regarding cystoscopy. Therefore, it would be expected that videos uploaded by healthcare workers should be characterized by good quality contents. Thus, it is important to evaluate video contents to confirm or not this expectation.

Second, considering the PEMAT A/V tool, we recorded an overall Understandability score of 50.0% and, specifically, a higher Understandability score was recorded in video targeted to General public (55.6%), relative to Healthcare workers (40.0%). Conversely, we recorded a higher overall Actionability score (66.7%), relative to Understandability, and no differences were recorded between video targets. According to *Shoemaker at al.*, a PEMAT A/V score < 70% is considered poorly understandable and poorly actionable (17). In consequence, nowadays YouTube videos regarding cystoscopy are more actionable than understandable but are still considered as not sufficient quality videos. Similarly, to our results, previous studies regarding other medical topics recorded low Understandability and Actionability scores. For example, *Salama et al.* (18) evaluated 53 videos on hypospadias recording an Understandability and an Actionability score of 54.5 and 21.8%, respectively. Moreover, *Rubel et al.* (19) analyzed the quality of 40 YouTube videos on sinusitis and obtained an Understandability and an Actionability score of 46.3 and 57.7%, respectively. In conclusion, future authors should focus on uploading better quality videos to achieve higher PEMAT A/V scores, regardless of the topic.

Third, considering the Misinformation score, the lowest median score was recorded for item 3 ("*Good execution of the procedure*") and item 5 ("*Pathological cases are showed*)". Consequently, viewers interested in cystoscopy may not be sufficiently informed on how the procedure is executed or how their conditions appear. Moreover, none of the questions proposed reached the maximum score. Consequently, according to the Misinformation score appositely created for this study, none of the video analyzed could grant a complete information to viewers.

Fourth, similarly to the results recorded from the other quality assessment tools applied, GQS also indicated a low video quality. Indeed, almost 70% of videos were considered as poor or generally poor and none was evaluated as excellent. These observations were confirmed even when the videos were analyzed according to video target: both General public and Healthcare workers targeted videos were mostly evaluated as low quality.

Fifth, we recorded a positive correlation between PEMAT A/V Understandability score and Misinformation score ($r = 0.50$) and between PEMAT A/V Actionability score and the Misinformation score ($r = 0.42$). In consequence, the more the video was understandable and/or actionable, the higher was the quality of information. These results corroborated our findings, implying that all the tools used demonstrated concordantly a low YouTube video quality on cystoscopy. Conversely, no statistically significant correlations were found between quality assessment tools and videographic characteristics. The lack of correlations may be interpreted as an independent relationship between the quality content and the users' interaction with the YouTube videos. In consequence, today videos aspects such as views, thumbs up, thumbs down or number of subscribers cannot be used as a quality indicator, in a positive or negative interpretation. For example, *Loeb et al.* recorded a negative correlation between scientific quality and viewer engagement, measured as views/mo (-0.24; $p = 0.004$) or thumbs up/views (-0.20; $p = 0.015$), indicating that even videos highly watched were characterized by poor quality information (20).

Taken together, although mostly of YouTube videos on cystoscopy are uploaded by hospitals and/or healthcare workers, the quality is still low according to PEMAT A/V score, Misinformation score and GQS. YouTube users, that may be even represented by patients undergoing a cystoscopy, could not get access to sufficiently good quality contents. In consequence, YouTube today cannot be recommended as a reliable source of medical information about this procedure. Therefore, since the Internet searching is becoming an everyday habitude, future video authors need to focus on uploading higher quality videos to provide better contents to avoid misinformation. As a practical implication, it could be useful to create a proper guideline on cystoscopy approved by urological associations with the intent to guide authors in the video making process. On the other hand, new quality assessment tools might be developed to verify medical contents which are continuously uploaded on YouTube.

Our work is not devoid of limitations. First, search results could change in every moment based on the interactions video-users, so our study represented only a frame of the current situation. Second, due to the methodology used, which allowed us to include 72 videos, contents providing different information could have been excluded. Third, some videos might not be included in our analysis due to search terms. Nonetheless, we assumed that video authors meant to use "*cystoscopy*" in the title or as keyword. Finally, the video quality assessment was a subjective evaluation. To reduce this problem, three different investigators independently analyzed the videos. Although these limitations, the present study may be considered as a snapshot of the current information on YouTube videos regarding cystoscopy.

Conclusions

Today, YouTube videos on cystoscopy are more frequently uploaded by healthcare workers, who share information about specific aspects of this procedure. However, the quality of YouTube contents on cystoscopy is still poor. Therefore, currently users interested in cystoscopy cannot rely on YouTube to get good informative material on this topic. In consequence, future authors focus on improving the quality of video contents on cystoscopy.

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Correspondence

Carmine Turco, MD
car.turco87@gmail.com

Claudia Collà Ruvolo, MD (Corresponding Author)
c.collaruvolo@gmail.com

Simone Cilio, MD
simocilio.av@gmail.com

Giuseppe Celentano, MD
dr.giuseppecelentano@gmail.com

Gianluigi Califano, MD
gianl.califano2@gmail.com

Massimiliano Creta, MD
max.creta@gmail.com

Marco Capece, MD
drmarcocapece@gmail.com

Roberto La Rocca, MD
robertolarocca87@gmail.com

Luigi Napolitano, MD
luiginap89@gmail.com

Francesco Mangiapia, MD
mangiapiaf@gmail.com

Lorenzo Spirito, MD
lorenzospirito@msn.com

Simone Morra, MD
simonemorra@outlook.com

Alberto Melchionna, MD
alb.melchionna@gmail.com

Vincenzo Mirone, MD
mirone@unina.it

Nicola Longo, MD
nicola.longo@unina.it
Department of Neurosciences, Reproductive Sciences and Odontostomatology, Urology Unit, University of Naples "Federico II", Italy

Ferdinando Fusco, MD
ferdinando-fusco@libero.it
Department of Woman, Child and General and Specialized Surgery, University of Campania "Luigi Vanvitelli", Naples, Italy