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# Evaluation of YouTube Videos on Hepatocellular Carcinoma

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**Address for Correspondence:**

**Yavuzalp Solak, MD**  
Republic of Turkey Ministry of Health  
Şereflikoçhisar District Health Directorate,  
06950 Ankara, Turkey.  
Email: yavuzalp80@gmail.com

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**ORCID iDs**

Kuntay Kaplan   
<https://orcid.org/0000-0002-4446-9922>  
Yavuzalp Solak   
<https://orcid.org/0000-0001-5274-7606>

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**Author Contributions**

Conceptualization: Kaplan K, Solak Y. Data curation: Kaplan K, Solak Y. Formal analysis: Kaplan K, Solak Y. Investigation: Kaplan K. Methodology: Kaplan K, Solak Y. Project administration: Kaplan K. Resources: Kaplan K. Software: Solak Y. Supervision: Solak Y. Validation: Kaplan K. Writing - original draft: Kaplan K, Solak Y. Writing - review & editing: Kaplan K, Solak Y.

Kuntay Kaplan <sup>1</sup> and Yavuzalp Solak <sup>2</sup>

<sup>1</sup>Republic of Turkey Ministry of Health Adana City Training and Research Hospital, Adana, Turkey

<sup>2</sup>Republic of Turkey Ministry of Health Şereflikoçhisar District Health Directorate, Ankara, Turkey

## ABSTRACT

**Background:** As in every field, online information has become increasingly used in health. However, it is well known that some information online containing health advice is incorrect and may even include false statements. For this reason, it is crucial for public health that individuals reach reliable, high-quality resources when they are trying to obtain health information. Studies have been conducted on the quality and reliability of online information about many diseases, but no similar study has been found in the literature on hepatocellular carcinoma (HCC).

**Methods:** In this descriptive study, videos on YouTube ([www.youtube.com](http://www.youtube.com)) about HCC were evaluated using the Global Quality Scale (GQS) and the modified DISCERN tool.

**Results:** While 129 (89.58%) of the videos examined within the study were considered useful, 15 (10.42%) were misleading. The GQS scores of the videos considered useful were significantly higher than the scores of the misleading videos, with a median (min–max) score of 4 (2–5) ( $P < 0.001$ ). When we compared the DISCERN scores, the scores of the useful videos were significantly higher ( $P < 0.001$ ) than the scores of the misleading videos.

**Conclusion:** YouTube should be considered a complex structure where accurate and reliable health information can be presented, as well as erroneous and misleading information. Users should understand the importance of video sources and focus their research on videos from doctors, academics, and universities.

**Keywords:** Hepatocellular Carcinoma; YouTube; Education; Quality of Information

## INTRODUCTION

Hepatocellular carcinoma (HCC) is a primary liver malignancy commonly encountered in the setting of chronic liver disease and cirrhosis. Viral hepatitis B is a prevalent infection caused by the hepatitis B virus (HBV) and is the leading cause of acute and chronic liver diseases worldwide.<sup>1</sup> Surgical resection, liver transplants, and thermal ablation in selected patients are potentially curative. Noncurative approaches include intraarterial, radiation, and systemic therapies. The management of HCC is complex, and the choice of treatment approach is enhanced by multidisciplinary consensus.<sup>2</sup> A study in Korea found that the yearly HCC incidence between 2009 and 2012 was 14,000 cases and did not change considerably;

however, the prevalence gradually increased from 40,908 to 49,221, with the leading cause being HBV infection.<sup>3</sup>

The Internet has become an essential source of information in parallel with the increase in its use in society. Obtaining health information online has gradually become popular, and people have tended to use the Internet as a source of health information.<sup>4</sup> YouTube is a popular and widely used worldwide video-sharing site that allows users to share and watch videos. It can be a tool for educating patients or providing information about patients' health issues. However, there are concerns about the quality and content of the videos on this platform. YouTube's most significant handicap is that it does not contain a regulatory mechanism to control the content quality of uploaded videos. Some information may be useful, while other information may be incomplete or suspicious. The spreading of false information can harm public health.<sup>5</sup> YouTube does not provide a strict filtering facility, and anyone can effortlessly upload a video for free. Videos on YouTube vary greatly in reliability and quality. As a result, not only can these videos be deceiving or have a promotional agenda, but they can also potentially harm patient health.<sup>6</sup>

Various studies have examined YouTube videos about many diseases, finding that YouTube videos can contain false information.<sup>7,8</sup> YouTube videos about HCC may also include incorrect details. However, to date, no studies have evaluated the quality of HCC-related YouTube videos. Therefore, this study aimed to assess the content, quality, and reliability of the most watched English-language YouTube videos about HCC.

## METHODS

In this descriptive research, we searched videos on YouTube ([www.youtube.com](http://www.youtube.com)) about HCC on March 15, 2022, using two different search terms: "hepatocellular cancer" and "hepatocellular carcinoma." Cookies and the browsing history were cleared before each search so that they were not affected by previous search results. The results were ordered by relevance. The top 100 videos were ranked and recorded for each search term. Internet research shows that users focus more on the first pages of the results and that 97.5% of Internet users look only at the first 10 pages.<sup>9</sup> We included the 54 videos that were obtained in both searches once. Three of the remaining 146 videos were eliminated due to irrelevance, and we completed the study with the remaining 143 videos. Parameters such as the video length, likes, comments, number of views, and video upload date were recorded while we recorded the videos. We recorded the videos in a file, and two independent evaluators scored the information quality and reliability. In cases of disagreement, the evaluators met and reached a consensus. We calculated the inter-rater reliability value. The values for daily views and likes were calculated according to the time between the upload date of the videos and the date we retrieved the videos.

### Measuring tools

The Global Quality Scale (GQS) was used to assess the quality of the videos on the YouTube platform, where the information was presented. The GQS score, designed by Bernard, ranges from 1 to 5 points, with a score of 4 or 5 points considered high quality, 3 points intermediate quality, and 1 or 2 points low quality. Previous studies in the literature have applied this method.<sup>10-13</sup>

#### Score categories

- 1 = Poor quality, poor flow of the site, most information missing, not at all useful for patients.
- 2 = Generally poor quality and poor flow; some information is listed, but many important topics are missing; of minimal use to patients.
- 3 = Moderate quality, suboptimal flow; some vital information is adequately discussed, but other information is poorly discussed; somewhat useful for patients.
- 4 = Good quality and generally good flow; most of the relevant information is listed, but some topics are not covered; useful for patients.
- 5 = Excellent quality and flow; very useful for patients.

The modified DISCERN tool was used to assess the reliability of the videos. The DISCERN scale, adapted by Singh, contains five items, with each “yes” response scoring 1 point, providing a total score ranging from 0 to 5 points.<sup>14</sup>

#### Questions

- Is the video clear, concise, and understandable?
- Are reliable sources of information used?
- Is the information presented balanced and unbiased?
- Are additional sources of information listed for patient reference?
- Are areas of uncertainty/controversy mentioned?

We evaluated the videos in terms of quality and reliability according to the source that published the tape (e.g., doctor, news agency, etc.) and the target audience (health professionals and/or patients).

Additionally, we evaluated videos as misleading if they contained false information and as useful if they did not.

#### Statistical analysis

SPSS version 15 software (SPSS, Chicago, IL, USA) was used for the data analysis. Cohen's kappa coefficient was used for reliability. We performed a conformity-to-normal distribution test for the continuous variables with the Shapiro–Wilk test. Median (minimum–maximum) values were used for the non-normally distributed data. The Mann–Whitney *U* test was used to compare the mean values that did not show normal distribution for the two independent categories. The *P* value for the significance of the statistical analysis was  $< 0.05$ .

#### Ethics statement

The YouTube platform is free and accessible to everyone. Since no humans or participants were included in our study, ethics committee approval was not necessary.

## RESULTS

In our study, the first 100 videos retrieved after searching for “hepatocellular cancer” and the first 100 videos retrieved after searching for “hepatocellular carcinoma” were examined. As 54 videos appeared in both searches, we excluded them from the study. In addition, we excluded 3 of the 146 videos in the study because they were irrelevant. We completed the study by examining 143 videos. These are summarized in **Fig. 1**.

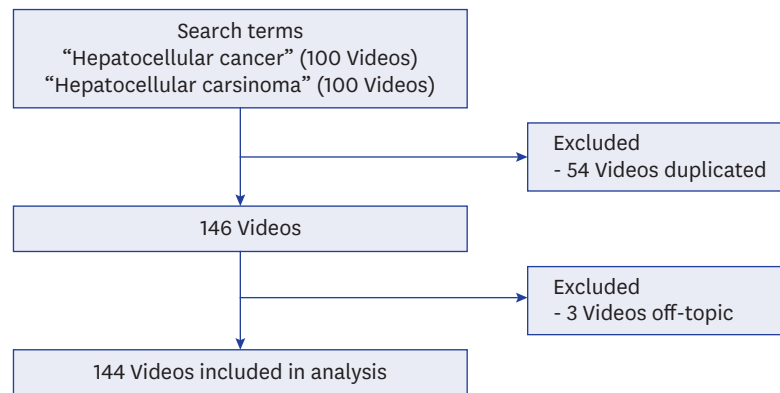


Fig. 1. The screening process for study.

Table 1. Distribution of the video contents

Video contents <sup>a</sup>	Values
Treatment	81 (56.3)
Definition	47 (32.6)
Risk factor	32 (22.2)
Diagnosis	30 (20.8)
Pathogenesis	28 (19.4)
Etiology	21 (14.6)
Symptom	17 (11.8)
Complication	15 (10.4)
Surgical technique	9 (6.3)

Values are presented as number (%).

<sup>a</sup>There is more than one topic.

Most of the videos (56.25%;  $n = 81$ ) related to treatment, followed by videos on the definition of hepatocellular cancer (32.64%;  $n = 47$ ) and videos on risk factors (22.22%;  $n = 32$ ). The lowest numbers were on surgical technique (6.25%;  $n = 9$ ) and complications (10.42%;  $n = 15$ ). The content distribution of the videos is shown in Table 1.

We evaluated 129 (89.58%) of the videos as useful and considered 15 videos (10.42%) misleading. We found the GQS scores of the useful videos to be significantly higher than the misleading videos, with a median (min–max) score of 4 (2–5) ( $P < 0.001$ ). When we compared the DISCERN scores, we found the scores of the useful videos to be significantly higher ( $P < 0.001$ ). We found the video length to be 6.68 (0.72–86.33) minutes in the useful videos, which was substantially longer than in the misleading videos ( $P = 0.001$ ). In addition, the number of views of the useful videos was less than the number of views of the misleading videos, with a median (min–max) number of 1,551 (22–290,098) views of the useful videos ( $P = 0.049$ ). Although the useful videos had a lower median value than the misleading videos in the number of daily views, likes, and comments, the difference was insignificant ( $P > 0.05$ ). Although the rate of likes was higher in the useful videos, the difference was not significant ( $P = 0.903$ ). This is shown in Table 2.

While the usefulness rate was 93.6% in the videos where the target audience was health professionals, this rate was 75.7% in the videos where the target audience was patients and 100% in the videos where the target audience was both healthcare professionals and patients. Doctors uploaded 90.3% ( $n = 130$ ) of the videos, and we found the rate of useful videos to be 92.3% in the videos uploaded by doctors, while this rate was 100% in the videos created

**Table 2.** Detailed characteristics of YouTube videos according to their contents and usefulness

Variables	Total (n = 144)	Useful (n = 129)	Misleading (n = 15)	P value
Video length, min	5.38 (0.72–86.33)	6.68 (0.72–86.33)	2.23 (1.08–15.63)	<b>0.001*</b>
Views	1,645 (22–290,098)	1,551 (22–290,098)	3,720 (395–44,276)	<b>0.049*</b>
Views/day	1.54 (0.02–116.97)	1.27 (0.02–116.97)	3.22 (0.51–15.47)	0.064
Likes	17 (0–1,197)	14 (0–1,197)	19 (2–431)	0.139
Likes/day	0.02 (0.00–0.69)	0.01 (0.00–0.69)	0.03 (0.00–0.19)	0.214
Dislikes	2 (0–56)	2 (0–56)	3 (0–26)	0.307
Comments	1 (0–103)	1 (0–103)	3 (0–40)	0.075
Likes ratio <sup>a</sup>	0.96 (0–1)	0.96 (0–1)	0.94 (0.78–1)	0.903
Quality and reliability scores				
GQS <sup>b</sup>	4 (2–5)	4 (2–5)	3 (2–3)	<b>&lt; 0.001*</b>
DISCERN <sup>b</sup>	4 (1–5)	4 (1–5)	1 (1–2)	<b>&lt; 0.001*</b>
Target audience				
Healthcare professionals	94 (65.3)	88 (93.6)	6 (6.4)	
Patient	37 (25.7)	28 (75.7)	9 (24.3)	
Both	13 (9.0)	13 (100)	0 (0)	
Video source				
Physician	130 (90.3)	120 (92.3)	10 (7.7)	
News agencies	7 (4.8)	4 (57.1)	3 (42.9)	
Patients	4 (2.8)	2 (50)	2 (50)	
Organization/association	2 (1.4)	2 (100)	0 (0)	
University	1 (0.7)	1 (100)	0 (0)	
Country				
USA	107 (74.3)	97 (90.7)	10 (9.3)	
India	10 (6.9)	9 (90)	1 (10)	
United Kingdom	5 (3.5)	5 (100)	0 (0)	
Switzerland	4 (2.8)	2 (50)	2 (50)	
Singapore	4 (2.8)	4 (100)	0 (0)	
Canada	3 (2.1)	3 (100)	0 (0)	
Norway	2 (1.4)	2 (100)	0 (0)	
Unclear	2 (1.4)	2 (100)	0 (0)	
Other	7 (4.8)	5 (71.4)	2 (28.6)	
	(Austria, Bangladesh, Denmark, France, Georgia, Meksica, Nepal)	(Austria, France, Georgia, Meksica, Nepal)	(Bangladesh, Denmark)	

Data presented as number (%), total column, column percentage, useful and misleading column row percentage) or median (minimum–maximum).

GQS = global quality scale.

<sup>a</sup>Like ratio: like/[like+dislike]; <sup>b</sup>DISCERN modified DISCERN score, GQS GQS score.

\*P values less than 0.05 that are considered statistically significant are marked in bold.

by universities and organizations. While the usefulness rate was 57.1% in the videos uploaded by news agencies, we found the lowest useful video rate in the videos published by patients, at 50.0%. While 74.3% (n = 107) of the videos included in the study were from the United States, we found the useful video rate in these videos to be 90.7%. India followed the United States with 6.9%, with a usefulness rate of 90%. We found a usefulness rate of 100% in the videos uploaded from the United Kingdom, Singapore, Canada, and Norway. This is shown in **Table 2**.

## DISCUSSION

These days, when we live in the Internet age, access to information is very easy, but it is difficult to find the right, reliable, and sufficient information source. Studies show that 8 out of 10 Internet users use the Internet to search for health-related information.<sup>15</sup> Patients who think that health professionals do not adequately inform them turn to online searches for additional information. Social media also has great potential for people to interact with cancer-related information.<sup>16,17</sup> YouTube is an open-access video-sharing platform that includes educational videos. It has been shown to be more effective in disseminating information and influencing

behavior compared to sites such as Facebook and Twitter.<sup>18</sup> The popularity of YouTube, which provides easily accessible information where visuality is at the forefront, is increasing.

In contrast, online access to information positively affects patient satisfaction. However, it can also cause various problems in the doctor–patient relationship due to patients' inadequacy in evaluating the accuracy of information.<sup>19,20</sup> Many studies have shown that health-related videos on YouTube can include useless or harmful content, which has led to an increase in the number of publications examining health-related YouTube videos. Approximately 2,000 scientific publications investigating health-related YouTube videos were published up to 2018.<sup>21</sup> However, a study examining the content of YouTube videos about hepatocellular cancer and evaluating the quality of the content has not been found in the literature. The present study is the first in its field.

Hepatocellular cancer, the most common liver cancer, comprising 80–90% of primary liver cancers, ranks fifth among all cancers and third among all cancer-related deaths. Its importance is gradually increasing with rising incidence, and, as with most cancers, early diagnosis significantly increases one- and five-year survival.<sup>22,23</sup> Diagnosis at an advanced stage also reduces the possibility of treatment. In liver cancers, cases that are not detected at an early stage show a significant decrease in one-year survival.<sup>24</sup>

Early diagnosis ensures prolonged survival and leads to better care, lower morbidity, and a higher quality of life.<sup>25</sup> Early detection of HCC often allows for curative and effective treatments and increases survival. However, patients with HCC are usually diagnosed in the late stages when therapeutic approaches are limited, and they therefore have a poor prognosis. Currently, curative treatments, resection, and especially transplantation, can improve survival and potentially offer a long-term cure in patients diagnosed early.<sup>26</sup> In patients with an early diagnosis, 5-year survival can be up to 70% with surgical treatment.<sup>27</sup>

In this study, the fact that most of the videos (56.25%) on HCC related to treatment can be associated with the fact that the patients first search for treatment after a cancer diagnosis, and the videos' emphasis on the treatment aspect in cancer-related videos is due to the limited treatment possibilities in late diagnosis. In a study in which YouTube videos about bladder cancer were examined, treatment-related content was in first place, included in 41% of the videos. In a study evaluating YouTube videos about anal cancers, treatment-related videos took first place, with 43.9% of the videos, in line with our study.<sup>28</sup>

Despite the importance of early diagnosis of cancer, there are not enough YouTube videos about early cancer diagnosis. In our study, 20.83% of the videos were on early diagnosis, 11.8% were on symptoms, and 22.22% were on risk factors, addressing both prevention and early diagnosis. In a study on videos on bladder cancer, 24% of the videos were about symptoms. A study examining YouTube videos about anal cancers found this rate to be 26.3%. Increasing such video content, which includes primary and secondary cancer prevention, is vital for public health.<sup>16,28</sup>

A total of 89.5% of the videos in our study were evaluated as useful, and the GQS and DISCERN scores of the useful videos were significantly higher than those of the misleading videos. These results show that the videos we considered useful were quality videos, thus adding objectivity to the study. Research shows that videos uploaded by health professionals and organizations are of better quality and more useful than videos uploaded by others.

In our study, similar to the literature, we found videos published by doctors, universities, and health organizations to be more useful.<sup>18,29-31</sup> As seen in the available YouTube videos, this situation has also yielded similar results in studies conducted in local languages. For example, in a study of YouTube videos in Korean about gout disease, the usefulness rate was found to be 75%; 55.2% of the videos were uploaded by health information websites, 27.6% by physicians, and 14.3% by academic/professional sources. In contrast, the most misleading and personal experience videos were those uploaded by autonomous users.<sup>32</sup>

While the rate of useful videos was higher in this study in the videos targeting health professionals, the lower rate of usefulness in videos targeting patients can be explained by the fact that doctors and health organizations share more educational videos within the community. This situation also shows the importance of doctors informing patients via YouTube. The public needs to use YouTube, which is used by the public as a source of access to more information, to access accurate and reliable information in the health field.

In studies that examined health-related YouTube videos, the video duration was longer in the useful videos, similar to our study.<sup>30,31</sup> Likewise, the study focusing on YouTube videos in Korean indicated that most videos uploaded by doctors, academic/professional resources, and health information websites that were considered useful had a long duration.<sup>32</sup> This can be explained by the fact that long video durations allow for more detailed narration, and the usefulness rate of the videos published by health professionals and organizations is higher. These groups make videos of longer durations to provide more straightforward narration.

In a study examining YouTube videos about prostate cancer, the highest rate of publishing videos of less than 5 minutes was in videos by patients and news channels sharing personal experiences. The study showed that videos between 5–10 minutes were mostly published by professional societies and independent doctors, while medical institutions mainly published videos longer than 15 minutes as lecture content.<sup>33</sup> In our study, the useful high-quality videos had lower viewing numbers, and studies in the literature show that low-quality videos have higher viewing numbers.<sup>18,30</sup> Another interesting finding in our study was that the number of likes of the videos in the useful group was lower. Similar to our study, studies in the literature have shown that good videos receive fewer likes.<sup>30</sup> These findings may relate to the fact that long video durations distract the viewer and do not provide the expected benefit or that viewers may avoid watching long videos. However, videos with longer durations are more beneficial. These data show that health professionals and organizations should publish videos on YouTube within scientifically determined optimal times.

The incidence is higher in countries where hepatitis B is endemic. HCC is largely a complication of cirrhosis of the liver. HBV and HCV are the dominant causes of cirrhosis and, thus, HCC.<sup>34</sup> We believe that HCC cases that may develop as a result of HBV and HCV infections can be prevented largely due to education and primary health care. It should be emphasized that HCC may be among the cancers that can be largely prevented with the information in videos developed in this context. In our study, the YouTube videos published about HCC were generally about diagnosis and treatment alternatives. In this context, protective and preventive medicine should be emphasized. Both HBV and HCV infections can be reduced, and the HCC that will consequently develop will also indirectly decrease.

Of the videos included in our study, 74.3% were uploaded from the United States, with a usefulness rate of 90.7%. In other studies examining health-related YouTube videos, most

videos were uploaded from the US, and the region where medical YouTube videos were watched the most was North America.<sup>35-37</sup> The fact that medical videos are watched the most in North America can be associated with the lack of a free social health insurance system that covers the whole society in the USA. Thus, people seek health-related information more from the Internet than from healthcare providers they have to pay. This high demand may have resulted in US YouTube authors uploading more health-related videos.

As examples, only the first 100 videos were selected for each search. The study's limitations include the potential for the videos to change widely due to the dynamic operation of YouTube and the absence of a study examining YouTube content related to hepatocellular cancer, which allows no opportunity to compare and discuss this with another study of the same content. Despite these limitations, this study has the potential to fill a large gap in the literature. It touches on a subject that has not been addressed before. Considering that YouTube is not the only video platform for public access to information, it would be beneficial to conduct more video reviews and evaluate and compare different social media platforms in future studies.

YouTube should be thought of as a complex structure where accurate and reliable health information can be presented alongside inaccurate and misleading information. Although the rate of misleading videos in the current study was relatively low, Internet users should be careful when searching for information on YouTube. At this stage, users should understand the importance of the sources of videos and focus their research on videos from doctors, academics, and universities. Considering that the cause of a significant part of HCC is HBV and HCV, people can be informed with videos about protective and preventive measures. Health professionals, universities, and organizations should be encouraged to produce more videos about health.

## REFERENCES

1. Gilles H, Garbutt T, Landrum J. Hepatocellular carcinoma. *Crit Care Nurs Clin North Am* 2022;34(3):289-301. [PUBMED](#) | [CROSSREF](#)
2. Madihi S, Syed H, Lazar F, Zyad A, Benani A. A systematic review of the current hepatitis B viral infection and hepatocellular carcinoma situation in mediterranean countries. *BioMed Res Int* 2020;2020:7027169. [PUBMED](#) | [CROSSREF](#)
3. Hong YM, Yoon KT, Cho M, Kang DH, Kim HW, Choi CW, et al. Trends and patterns of hepatocellular carcinoma treatment in Korea. *J Korean Med Sci* 2016;31(3):403-9. [PUBMED](#) | [CROSSREF](#)
4. Velasco E, Agheneza T, Denecke K, Kirchner G, Eckmanns T. Social media and internet-based data in global systems for public health surveillance: a systematic review. *Milbank Q* 2014;92(1):7-33. [PUBMED](#) | [CROSSREF](#)
5. Madathil KC, Rivera-Rodriguez AJ, Greenstein JS, Gramopadhye AK. Healthcare information on YouTube: a systematic review. *Health Informatics J* 2015;21(3):173-94. [PUBMED](#) | [CROSSREF](#)
6. Zimba O, Gasparyan AY. Social media platforms: a primer for researchers. *Reumatologia* 2021;59(2):68-72. [PUBMED](#) | [CROSSREF](#)
7. Nibha S, Sharma A. Analysis of the most viewed Hindi YouTube videos on breast cancer. *Indian J Cancer*. Forthcoming 2022.
8. Laforet PE, Yalamanchili B, Hillyer GC, Basch CH. YouTube as an information source on BRCA mutations: implications for patients and professionals. *J Community Genet* 2022;13(2):257-62. [PUBMED](#) | [CROSSREF](#)



9. Jansen BJ, Spink A. An analysis of web documents retrieved and viewed. In Arabnia HR, Mun Y, editors. Proceedings of the International Conference on Internet Computing, IC 03; 2003 June 23-26; Las Vegas, NV. p. 65-9.
10. Bernard A, Langille M, Hughes S, Rose C, Leddin D, Veldhuyzen van Zanten S. A systematic review of patient inflammatory bowel disease information resources on the World Wide Web. *Am J Gastroenterol* 2007;102(9):2070-7.  
[PUBMED](#) | [CROSSREF](#)
11. Kocyigit BF, Akaltun MS, Sahin AR. YouTube as a source of information on COVID-19 and rheumatic disease link. *Clin Rheumatol* 2020;39(7):2049-54.  
[PUBMED](#) | [CROSSREF](#)
12. Şahin M, Kaya E. Understandability and actionability of education materials about syphilis on YouTube. *Sex Res Soc Policy* 2022;19(4):1989-95.  
[CROSSREF](#)
13. Kaya E, Solak Y, Koçyiğit BF. YouTube as a source of information about gonorrhoea. *Cent Asian J Med Hypotheses Ethics* 2022;3(2):103-10.  
[CROSSREF](#)
14. Singh AG, Singh S, Singh PP. YouTube for information on rheumatoid arthritis--a wakeup call? *J Rheumatol* 2012;39(5):899-903.  
[PUBMED](#) | [CROSSREF](#)
15. Wasserman M, Baxter NN, Rosen B, Burnstein M, Halverson AL. Systematic review of internet patient information on colorectal cancer surgery. *Dis Colon Rectum* 2014;57(1):64-9.  
[PUBMED](#) | [CROSSREF](#)
16. Loeb S, Reines K, Abu-Salha Y, French W, Butaney M, Macaluso JN Jr, et al. Quality of bladder cancer information on YouTube. *Eur Urol* 2021;79(1):56-9.  
[PUBMED](#) | [CROSSREF](#)
17. Chou WY, Hunt Y, Folkers A, Augustson E. Cancer survivorship in the age of YouTube and social media: a narrative analysis. *J Med Internet Res* 2011;13(1):e7.  
[PUBMED](#) | [CROSSREF](#)
18. Carneiro B, Dizon DS. Prostate cancer social media: in YouTube we trust? *Eur Urol* 2019;75(4):568-9.  
[PUBMED](#) | [CROSSREF](#)
19. Desai T, Shariff A, Dhingra V, Minhas D, Eure M, Kats M. Is content really king? an objective analysis of the public's response to medical videos on YouTube. *PLoS One* 2013;8(12):e82469.  
[PUBMED](#) | [CROSSREF](#)
20. Sechrest RC. The internet and the physician-patient relationship. *Clin Orthop Relat Res* 2010;468(10):2566-71.  
[PUBMED](#) | [CROSSREF](#)
21. Drozd B, Couvillon E, Suarez A. Medical YouTube videos and methods of evaluation: literature review. *JMIR Med Educ* 2018;4(1):e3.  
[PUBMED](#) | [CROSSREF](#)
22. Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. *Int J Cancer* 2010;127(12):2893-917.  
[PUBMED](#) | [CROSSREF](#)
23. Axelrod DA, van Leeuwen DJ. *Hepatocellular carcinoma*. Medscape; 2008.
24. John S, Broggio J. *Cancer survival in England: national estimates for patients followed up to 2017*. Newport, UK: Office for National Statistics; 2019.
25. Neal RD, Tharmanathan P, France B, Din NU, Cotton S, Fallon-Ferguson J, et al. Is increased time to diagnosis and treatment in symptomatic cancer associated with poorer outcomes? systematic review. *Br J Cancer* 2015;112 Suppl 1(Suppl 1):S92-107.  
[PUBMED](#) | [CROSSREF](#)
26. de Lope CR, Tremosini S, Forner A, Reig M, Bruix J. Management of HCC. *J Hepatol* 2012;56(Suppl 1):S75-87.  
[PUBMED](#) | [CROSSREF](#)
27. Tsuchiya N, Sawada Y, Endo I, Saito K, Uemura Y, Nakatsura T. Biomarkers for the early diagnosis of hepatocellular carcinoma. *World J Gastroenterol* 2015;21(37):10573-83.  
[PUBMED](#) | [CROSSREF](#)
28. Basch CH, Kecojevic A, Berdnik A, Cadorett V, Basch CE. An analysis of widely viewed YouTube videos on anal cancer. *Int J Prev Med* 2017;8:74.  
[PUBMED](#)
29. Kumar N, Pandey A, Venkatraman A, Garg N. Are video sharing web sites a useful source of information on hypertension? *J Am Soc Hypertens* 2014;8(7):481-90.  
[PUBMED](#) | [CROSSREF](#)

30. Duran MB, Kizilkan Y. Quality analysis of testicular cancer videos on YouTube. *Andrologia* 2021;53(8):e14118.  
[PUBMED](#) | [CROSSREF](#)
31. Pons-Fuster E, Ruiz Roca J, Tvarijonaviciute A, López-Jornet P. YouTube information about diabetes and oral healthcare. *Odontology* 2020;108(1):84-90.  
[PUBMED](#) | [CROSSREF](#)
32. Koo BS, Kim D, Jun JB. Reliability and quality of Korean YouTube videos for education regarding gout. *J Korean Med Sci* 2021;36(45):e303.  
[PUBMED](#) | [CROSSREF](#)
33. Basnet B, Bhattarai S, Khanal A, Upadhyay M, Baruwal A. Quality of YouTube patient information on prostate cancer screening. *Proc Bayl Univ Med Cent* 2019;32(3):361-3.  
[PUBMED](#) | [CROSSREF](#)
34. Monto A, Wright TL. The epidemiology and prevention of hepatocellular carcinoma. *Semin Oncol* 2001;28(5):441-9.  
[PUBMED](#) | [CROSSREF](#)
35. Samuel N, Alotaibi NM, Lozano AM. YouTube as a source of information on neurosurgery. *World Neurosurg* 2017;105:394-8.  
[PUBMED](#) | [CROSSREF](#)
36. Chen Z, Zhu H, Zhao W, Guo H, Zhou C, Shen J, et al. Estimating the quality of YouTube videos on pulmonary lobectomy. *J Thorac Dis* 2019;11(9):4000-4.  
[PUBMED](#) | [CROSSREF](#)
37. Tackett S, Slinn K, Marshall T, Gaglani S, Waldman V, Desai R. Medical education videos for the world: an analysis of viewing patterns for a YouTube channel. *Acad Med* 2018;93(8):1150-6.  
[PUBMED](#) | [CROSSREF](#)