




# Viewer interaction with YouTube videos about hysterectomy recovery

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## Objective

We aim to evaluate hysterectomy-recovery related videos on YouTube.

## Methods

This cross-sectional study analyzed videos available through the YouTube interface. We calculated the views-per-day and interactions (comments, “thumbs up or down”) per 1,000 views for relevant videos. The publishers were categorized into patients, physicians, hospitals, media, industry, nonprofit, government and “other”. Video characteristics were compared between these categories using non-parametric tests.

## Results

We analyzed 2,092 YouTube videos related to hysterectomy recovery; 959 relevant videos published from August 30, 2006 to June 16, 2017 were included. The largest number of relevant videos were published by patients (48.6%), followed by physicians (15.8%), hospitals (12.7%), media (7.8%), and industry (7.6%). Views per day were similar between videos published by patients and physicians (median 2.1, vs median 2.6,  $p = 0.31$ ). Videos published by patients had more interaction in the form of “thumbs up” votes (median 8.6/1,000 views,  $p < 0.01$ ) and comments (median 2.7/1,000 views,  $p < 0.01$ ) as compared to other categories.

## Conclusion

Almost half of the hysterectomy videos on YouTube are posted by patients and have more viewer interaction than other categories. Physicians should consider partnering with patient advocates to improve viewer interaction.

**Keywords:** hysterectomy recovery; social media; videos; YouTube; viewer interaction

## Introduction

Hysterectomy is the second most common surgery in women with approximately 500,000 hysterectomies performed in the United States each year.<sup>[1]</sup> Multiple factors play a role in patient satisfaction after hysterectomy,<sup>[2]</sup> and research suggests that preoperative preparedness plays a role in post-surgical patient satisfaction as well.<sup>[3]</sup> Traditionally, the burden of patient preparation has been shouldered by the health care

team. Increasingly however, the Internet, specifically **social media websites**, have become a preferred vehicle for patients to seek health-related information.<sup>[4]</sup> The Pew Research Center has reported that 26% of adult Internet users “have read or watched someone else’s health experience about health or medical issues in the past 12 months.”<sup>[4]</sup>

Among social media websites, **YouTube** is second only to **Facebook** in terms of unique monthly visitors.<sup>[5]</sup> In February 2017, roughly ten years after its launch, the company reported that the video sharing platform delivers a billion hours per day of video content.<sup>[6]</sup> This explosive growth in video traffic shows no signs of slowing; some analysts predicting that, by 2022, video

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## Viewer interaction with YouTube videos about hysterectomy recovery

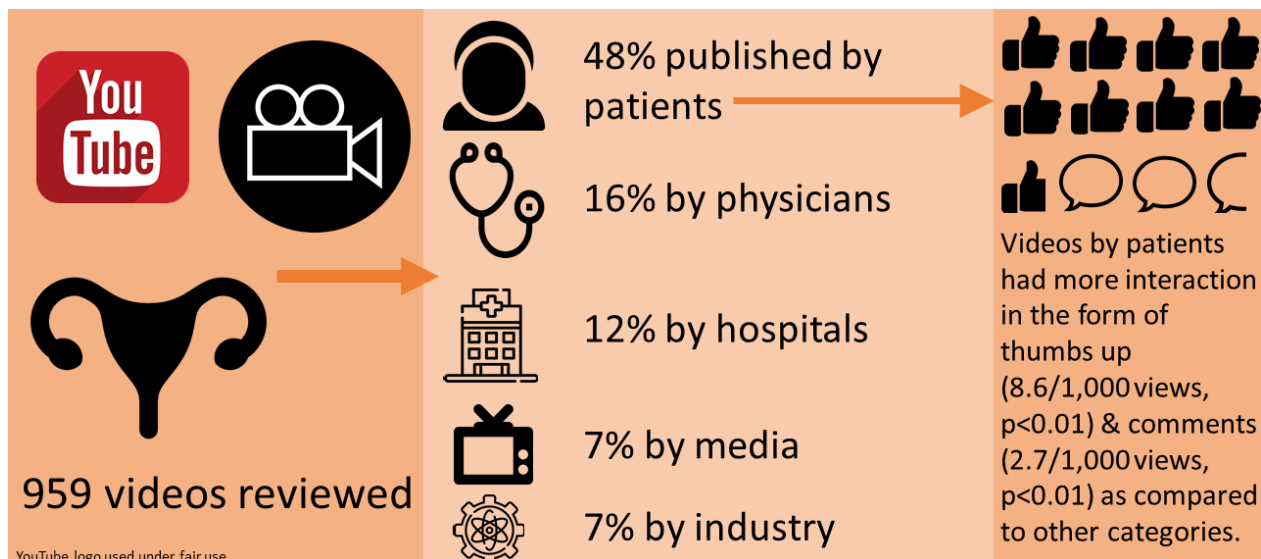


Figure 1 | Visual abstract

streaming and downloads will make up 82% of all consumer internet traffic worldwide.<sup>[7]</sup> This growth has found a natural intersection with the healthcare community through the production of videos by patients, physicians, hospitals, industry and others. Patients considering surgical treatment often have a high level of anxiety and curiosity,<sup>[8]</sup> and videos are known to be a potent teaching tool particularly suited to education surrounding surgery.<sup>[9][10]</sup> Further, the acquisition of information on YouTube allows patients to search for information that addresses their unique questions, expectations, and needs.

The healthcare fields of infectious disease, dentistry, bariatric surgery, neurology, urology, and rheumatology with various primary outcomes have analyzed relevant YouTube information.<sup>[11]</sup> Gynecologic YouTube content related to pelvic floor exercises, intrauterine devices, and sub-urethral sling procedures has also been described in the literature.<sup>[12][13][14]</sup> The objective of our study was to evaluate the currently available information on YouTube related to hysterectomy recovery. The primary objective was to compare traffic on videos produced by physicians to videos produced by patients with the hypothesis that viewers would watch videos produced by physicians more often. The secondary objective was to describe YouTube-specific metrics such as video length, number of comments, and “thumbs up” or likes versus “thumbs down” or dislikes.

### Material and Methods

This was a cross-sectional study of videos published on the YouTube platform and related to hysterectomy recovery. The University of Louisville Institutional Review Board determined this study to be exempt. We used the YouTube application programming interface (API) to identify videos in the YouTube database published in English before June 20, 2017 and related to the keywords “hysterectomy recovery.” The API search returns metadata (e.g. date of publication, number of likes, et cetera) with a unique YouTube ID number that allows reviewers to retrieve all metadata and access videos at the same point in time and does not use cookies to modify results. The search engine returned both, data related to videos matching the searched term and additional results that may be related according to YouTube’s proprietary search algorithm.

Videos were single-screened by one of four authors (SFC, ALG, CMM, JRS) and categorized as relevant or irrelevant; relevant videos were categorized according to publisher (*patient, physician, hospital, industry, non-profit, government agency, media/news, and other*). Irrelevant videos were those that the reviewer deemed unhelpful for patients searching for information about hysterectomy recovery. Date of publication, number of “thumbs up”s (likes) or “thumbs down”s (dislikes), total views, number of comments, and video length were collected for each relevant video. The number of



“thumbs up”, “thumbs down” and comments per 1000 views were calculated, as were views per day based on the number of days since publication.

Statistical tests and interaction with the YouTube API were performed using the Python programming language (Version 3.5.1, Python Software Foundation; Anaconda 2.5.0 distribution, Continuum Analytics, Inc.; Austin, Texas, United States of America). Differences between groups was analyzed using the Kruskal-Wallis test (non-parametric data) with a significance level of  $\alpha = 0.01$  set as a threshold. When differences existed, Dunn’s post hoc analysis with Bonferroni correction was performed to characterize these differences. A test of interrater reliability surrounding relevance was performed using Fleiss’ Kappa by randomly sampling 500 videos for repeat categorization by an additional author (KVM) and the senior author (JRS).

## Results

We performed our YouTube video search on June 20, 2017 and analyzed the resulting 2,092 videos. Of these, 959 videos, published between August 30, 2006 and June 16, 2017, were considered relevant to our study. The test-retest reliability of assignments of video relevance was good ( $K = 0.8$ , CI 0.7-0.8). The largest proportion of videos was published by *patients* (466, 48.6%), followed by *physicians* (152, 15.8%), *hospitals* (122, 12.7%), *media* (75, 7.8%), *industry* (73, 7.6%), *nonprofit* (63, 6.6%), *other* (8, 0.8%), and *government* (1, 0.1%). The *government* and *other* categories were excluded from further evaluation due to the low sample size of these subsets.

The rate of publication of videos related to hysterectomy recovery grew considerably over the time frame of video publication, with an average annual growth

rate from 2007 to 2016 (the first and last full years of our analysis) of 51.7%. The highest number of video views per day was from videos in the *industry* category (median 8.5, IQR 0.5 - 33.6), followed by *physician* (median 2.6, IQR 0.8 - 17.9), *nonprofit* (median 2.4, IQR 0.6 - 12), *media* (median 2.4, IQR 0.6 - 17.5), and *patient* (median 2.1, IQR 0.6 - 8.2). There was no statistically significant difference in the number of views per day between the *patient* and *physician* groups ( $p = 0.3$ ). Videos in the *hospital* category only had 0.9 (0.3 - 3.3) views per day, significantly lower than videos in the other groups ( $p < 0.01$ ). Videos published by physicians were longer in duration than those published by hospitals (193 seconds vs. 132 seconds,  $p < 0.01$ ) and patient published videos were longer than those published by all other groups ( $p < 0.01$ ). There was a statistically significant difference in the amount of interaction users had with patient published videos compared to other groups both in terms of “thumbs up” per 1,000 views ( $p < 0.01$ ) and comments per 1,000 views ( $p < 0.01$ ). Videos published by hospitals had more “thumbs down” per view than videos in other publisher categories ( $p < 0.01$ ) (Table 1).

## Discussion

In this study, we analyzed the characteristics of the publishers of videos related to hysterectomy recovery available on YouTube and found that patients published the largest volume of content related to this topic.

Videos published by patients also received significantly more interaction in the form of comments and likes (“thumbs up”) than those from other sources.

Participant	Duration in seconds	“Thumbs up” per 1,000 views	“Thumbs down” per 1,000 views	Comments per 1,000 views	Views per day	Total views	Weeks since posting (mean, SD)
Patient N=466 (48.6%)	357* (181 - 621)	8.6* (2.7 - 20.1)	0.0** (0.0 - 0.4)	2.7* (0.2 - 8.9)	2.1 (0.6 - 8.2)	1,276 (299 - 5,985)	123 (104)
Physician N=152 (15.8%)	193** (114 - 496)	1.6 (0.5 - 3.3)	0.0 (0.0 - 0.2)	0.0 (0.0 - 0.3)	2.6 (0.8 - 17.9)	3,003 (684 - 21,569)	152 (195)
Hospital N=122 (12.7%)	188 (109 - 335)	1.9 (0.2 - 4.0)	0.0 (0.0 - 0.1)	0.0 (0.0 - 0.5)	2.4 (0.6 - 17.5)	2,984 (549 - 19,190)	210 (137)
Media N=75 (7.8%)	188 (88 - 301)	2.3 (0.7 - 6.0)	0.0 (0.0 - 0.3)	0.1 (0.0 - 0.6)	2.4 (0.5 - 12.0)	4,172 (698 - 13,839)	222 (122)
Industry N=73 (7.6%)	184 (95 - 315)	1.1 (0.2 - 2.6)	0.1 (0.0 - 0.2)	0.0 (0.0 - 0.1)	8.5 (0.5 - 33.7)	9,937 (1,004 - 47,848)	231 (147)
Nonprofit N=62 (6.5%)	132 (70 - 211)	1.4 (0.0 - 3.2)	0.0 (0.0 - 0.1)	0.0 (0.0 - 0.0)	0.9*** (0.3 - 3.3)	908 (325 - 4,605)	187 (119)

**Table 1 |** Characteristics of Videos by Category (N=950)

Numbers are reported as Median (IQR) except where otherwise stated

\*  $p < 0.01$  compared to all other groups

\*\*  $p < 0.01$  compared to hospital

\*\*\*  $p < 0.01$  compared to industry, patient and physician



Over the last decade, social media has seen a rapid increase in users due to its low cost and expanding access,<sup>[15]</sup> and users calling upon this resource for healthcare information are an expanding force. By allowing consumers to publish their videos at no cost, YouTube enables patients and providers to upload information with equal ease. We found that almost half the relevant videos in this study had been published by patients while physicians published less than one-sixth of the videos. This contrasts with other studies which have found providers, hospitals, and non-academic institutions to be the primary source of YouTube videos.<sup>[15][16][17]</sup>

Previous studies have established that health videos related to personal experience receive more views than those published by professional societies.<sup>[18]</sup> Despite this, we saw no difference in the median number of views per day between videos published on YouTube by patients and those published by physicians. However, we did find that viewers had significantly greater interaction with videos published by patients. This could be due to the healthcare belief that information around gynecologic surgery is just as valid coming from another woman as from physicians, a belief that has been detected in other women's health issues such as contraception.<sup>[19]</sup>

The popularity of YouTube is fueled by its role as both a source of health-related information and a tool for social interaction and discussion.<sup>[11][20]</sup> A review of infertility-related videos found that personal videos elicited more engagement than informational-educational videos and appeared to resonate with viewers, providing a platform for reassurance, validation and niche support which is consistent with our findings.<sup>[20]</sup> This may be an important factor, especially while managing patient expectations regarding post-operative care which may differ from the information available on YouTube. Increasingly, patient advocates have fostered physician-patient partnerships and helped to bridge gaps in communication.<sup>[21]</sup> An expanded role for patient advocates may include social media to improve physician outreach and viewer interaction with physician social media content. Physicians should consider partnering with patient advocates who can more accurately and consistently describe their surgical experience.

Our study is not without limitations. We do not know the minimum duration that must elapse before a view is counted by YouTube, so views that are counted do not necessarily indicate that the viewer consumed all entire video's content. Videos published in languages other than English were beyond the scope of this study, so videos about hysterectomy meant to access

populations of a specific culture or location may not be included in this study. Although this study was designed specifically to search for videos related to hysterectomy recovery, greater than half the videos returned by the YouTube search algorithm were considered irrelevant and might impact patient perception during a real-world search. This study was limited to videos published up to 2017. Based on the growth of social media, the videos pertaining to hysterectomy recovery have likely increased over the last three years. However, given the 12-year data and almost 1,000 videos analyzed, we postulate that trends in viewer interaction remain constant. Lastly, this study was not designed to assess the quality or accuracy of videos available. As previous studies have addressed the inaccuracies in health information found online,<sup>[22][23][24][25]</sup> we cannot assume that all videos are of equal merit. Further research is needed to evaluate the educational impact of videos produced for patients and could provide a more complete understanding of which videos are most useful to patients considering hysterectomies and other gynecologic surgeries. Additional research should also focus on qualitative assessment of viewer comments to incorporate viewer experience and feedback with YouTube hysterectomy videos.

Despite these limitations, this study has several merits. We provide a novel discussion of the use of YouTube by different groups to disseminate information surrounding hysterectomy or post-hysterectomy recovery. We limited the study to videos intended for patient consumption as opposed to attempting to describe and categorize all hysterectomy-related videos, which would include a vast number of surgical videos aiming at surgical training as opposed to patient preparedness. Lastly, we ensured that our reviewers who were recording subjective categorization and information about the videos agreed, particularly about video inclusion in the study.

In conclusion, almost half the YouTube videos on hysterectomy recovery are published by patients and although videos published by patients and physicians receive similar views per day, patient published videos receive greater interaction from viewers. Physicians should consider partnering with patient advocates to improve viewer interaction. Further research is needed to qualitatively examine viewer comments, judge the quality of video publications and the best use of social media to affect patient postoperative outcomes.



## Additional information

### Author contributions

- A Gupta: Project development, Manuscript writing
- K Meriwether: Project development, Data review, Manuscript editing
- S Petruska: Project development, Manuscript editing
- S Fazenbaker-Crowell: Data collection, Manuscript editing
- C McKenzie: Data collection, Manuscript editing
- A Goble: Data collection, Manuscript editing
- J Stewart: Project development, Data collection and analysis, Manuscript editing

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None.

### Competing interests

The authors declare no relevant conflicts of interest.

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None.

### Ethics statement

This study was deemed exempt by the Institutional Review Board because of the public nature of the data used.

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