Int Ophthalmol (2018) 38:1941–1945
https://doi.org/10.1007/s10792-017-0681-5

ORIGINAL PAPER

# YouTube videos in the English language as a patient education resource for cataract surgery

**Steven S. Bae · Stephanie Baxter**

Received: 21 April 2017 / Accepted: 1 August 2017 / Published online: 28 August 2017


**Abstract**
*Purpose* To assess the quality of the content of YouTube videos for cataract surgery patient education.
*Setting* Hotel Dieu Hospital, Kingston, Ontario, Canada.
*Design* Observational study.
*Methods* "Cataract surgery," "cataract surgery for patients," and "cataract surgery patient education" were used as search terms. The first two pages of search results were reviewed. Descriptive statistics such as video length and view count were obtained. Two cataract surgeons devised 14 criteria important for educating patients about the procedure. Videos were analyzed based on the presence or absence of these criteria. Videos were also assessed for whether they had a primary commercial intent.
*Results* Seventy-two videos were analyzed after excluding 48 videos that were duplicate, irrelevant, or not in English. The majority of videos came from a medical professional (71%) and many depicted a real cataract surgery procedure (43%). Twenty-one percent of the videos had a primary commercial intent to promote a practice or product. Out of a total possible 14 points, the mean number of usefulness criteria satisfied was only 2.28 ± 1.80. There was no significant difference in view count between the most useful videos and other videos ($p = 0.94$). Videos from medical organizations such as the National Health Service were more useful ($p < 0.0001$).
*Conclusions* Cataract surgery videos are popular on YouTube, but most are not adequately educational. Patients may be receiving biased information from videos created with primary commercial intent. Physicians should be aware of the type of information patients may be accessing on YouTube.

**Keywords** Cataract surgery · Patient education · YouTube · Online · Video education

S. S. Bae
School of Medicine, Queen's University, Kingston, ON, Canada

S. Baxter (✉)
Department of Ophthalmology, Queen's University, Kingston Health Sciences Centre, 166 Brock St, Kingston, ON K7L 5G2, Canada
e-mail: baxters@queensu.ca

## Introduction

The majority of adults look online for health information [1]. As information becomes increasingly accessible with the Internet, it is important for physicians to be aware of untraditional resources that patients may be accessing, which may be helpful or misleading. YouTube is the second most popular Web site in the world and may be used as an educational resource for health information. Video is an advantageous educational medium because it is audiovisual

and can be viewed an unlimited number of times. However, content on YouTube is unregulated for scientific accuracy.

Cataract surgery videos may be particularly amenable for YouTube because the procedure is relatively short and can be captured in full. Furthermore, these videos likely generate significant interest because cataract surgery is a common procedure, with over 1.7 million procedures performed in the USA annually [2].

Patients may use YouTube as an educational resource prior to their cataract surgery, but to date no studies have reported on the quality of videos available on YouTube for patient use. The purpose of this study was to assess the quality of the content of YouTube videos as a patient education resource for cataract surgery.

## Methods

This study was exempt from ethical approval due to its observational nature and use of publicly available data. "Cataract surgery," "cataract surgery for patients," and "cataract surgery patient education" were used as search terms on YouTube on November 18, 2016. These search terms were selected based on an initial exploratory search of various terms related to cataract surgery that produced the most relevant results. The first two pages of search results (each with 20 videos per page) were reviewed. We decided on reviewing only the first two pages as they are the most accessible and easiest to find, and therefore the most representative of what the average consumer would view.

Descriptive statistics on video length, view count, likes/dislikes, number of comments, and date of upload were obtained. When likes, dislikes, or comments were disabled on the video by the uploader, they were excluded from analysis. The source of the video (i.e., medical professional, commercial product company, medical organization, patient, or other) and the type of video (i.e., animation, real procedure, physician explaining, or other) were determined. When there was more than one type (e.g., both animation and real procedure in the video), the dominant category was selected based on length of time.

To assess quality of content, two attending ophthalmologists who regularly perform cataract surgery devised a list of criteria that would be important for educating patients about the procedure. One author (SSB) used the criteria to analyze the videos based on the presence or absence of these criteria. Videos were also assessed for whether they had a primary commercial intent (i.e., to promote a specific practice or product). Student's t-tests were performed to determine whether the most useful videos were more popular, and whether videos created by medical organizations were more useful. Statistical analyses were completed on Microsoft Excel 14.0 (Microsoft Co, Redmond, WA).

## Results

Seventy-two videos were analyzed after excluding 48 videos that were duplicate or repeated (44), not in English (3), or unrelated to cataract surgery (1). Descriptive statistics of these videos are summarized in Table 1.

Fifty-one of the videos (71%) were uploaded by a medical professional. Six videos (8%) were uploaded by a commercial product company, three videos (4%) by a patient, three videos (4%) by a medical organization, and nine videos (13%) by an unclear or other individual.

Thirty-one of the videos (43%) depicted a real cataract surgery. Fourteen videos (19%) depicted patients' experiences, thirteen videos (18%) depicted physicians explaining about the procedure, twelve videos (17%) depicted an animation of the procedure, and two videos (3%) were categorized as other.

Fifteen videos (21%) had a primary commercial intent, promoting a practice or a product.

The mean number of criteria satisfied was 2.28 (SD = 1.80), with a range of 0–9 (Fig. 1). Fifty-one

**Table 1** Descriptive statistics of cataract surgery YouTube videos

| | Mean | Range |
|---|---|---|
| View count | 76,364 | 66–1,367,228 |
| Length | 394 s | 25–1157 s |
| Age | 1325 days | 130–3048 days |
| Likes | 151 | 0–2801 |
| Dislikes | 14 | 0–300 |
| Comments | 37 | 0–995 |

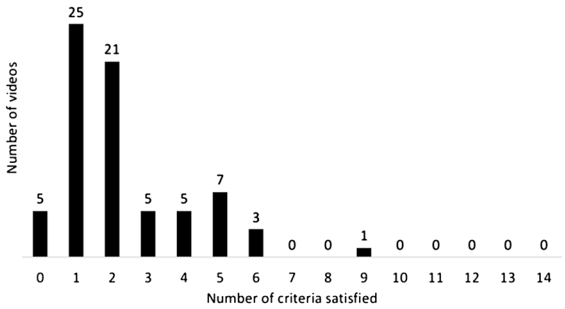


**Fig. 1** Number of criteria satisfied by cataract surgery YouTube videos

videos (71%) satisfied two or fewer criteria. Only four videos (6%) satisfied six or more criteria.

The number of videos satisfying each criteria is summarized in Table 2. The most commonly satisfied criterion was surgical technique (63%). Only nine videos (13%) described possible complications of the procedure.

There was no significant difference in view count between the most useful videos (satisfying six or more criteria set in this study) ($n = 4$, 84,574 ± 158,175) and other videos ($n = 68$, 75,882 ± 218,822, $p = 0.94$). Videos from medical organizations such as the National Health Service ($n = 3$, 6.33 ± 2.52) tended to be more useful than videos from other sources, including medical professionals ($n = 69$, 2.10 ± 1.54, $p < 0.0001$). The most useful videos based on the criteria set in this study are summarized in Table 3 with URLs provided.

**Table 2** Assessment criteria and satisfaction rates for cataract surgery YouTube videos

| | Number of videos that satisfied the criterion | % of videos that satisfied the criterion (%) |
|---|---|---|
| Preoperative | | |
| Basic cataract/lens info | 14 | 19 |
| Indications for surgery | 16 | 22 |
| Need for preoperative testing/measurements | 1 | 1 |
| Refractive goals | 11 | 15 |
| Information about IOL choice and selection | 9 | 13 |
| Perioperative | | |
| Take drops | 5 | 7 |
| Remain NPO | 1 | 1 |
| Intra-operative | | |
| Anesthesia | 21 | 29 |
| Surgical technique | 45 | 63 |
| Possible complications | 9 | 13 |
| Postoperative | | |
| Recovery | 16 | 22 |
| Drops | 9 | 13 |
| Follow-up visits | 5 | 7 |
| When they can get new glasses, if needed | 2 | 3 |

## Discussion

YouTube videos on cataract surgery are popular with some videos having over one million views. Although it is unclear what proportion of these views is attributable to patients, one reason patients may search YouTube for information is that patient education materials provided by healthcare providers are written at a difficulty level too high for patients to understand [3].

Despite their popularity, our study showed that YouTube videos on cataract surgery did not adequately educate patients about the procedure. This is despite the fact that the majority of videos were uploaded by medical professionals. Videos created by medical organizations were more useful on average than other videos. When videos are informative, studies have demonstrated that they can improve informed consent and satisfaction with cataract surgery [4, 5].

Several possible explanations may account for why most videos were found to be an inadequate educational resource. First, some videos appeared to be intended for medical trainees, focusing on the detailed steps of the procedure. Notably, these videos still appeared within the first two pages despite searching using patient-oriented terms such as "cataract surgery for patients" and "cataract surgery patient education." Cataract surgeons intending to upload videos should be aware that, although videos may be created for medical trainees, they may be viewed by patients as well. YouTube has an "Unlisted" or "Private" feature, so sharing only to the intended audience using a direct URL may be an option to consider.

Second, the intent of some videos appeared to be simply to show patients a live procedure. While this

**Table 3** Descriptions and URLs of the most useful cataract surgery YouTube videos

| Title | Source | View count | URL | Number of criteria satisfied |
|---|---|---|---|---|
| A patient's guide to cataract surgery | Medical organization (National Health Service) | 1270 | https://www.youtube.com/watch?v=a-NYMi_gbBQ | 9 |
| Cataract surgery with Dr. Michael Richie | Medical professional (Dr. Michael Ritchie) | 321,633 | https://www.youtube.com/watch?v=0faextOYin4 | 6 |
| Cataract surgery | Medical organization (National Health Service) | 14,808 | https://www.youtube.com/watch?v=elfbg859Epw | 6 |
| Consenting patients for cataract surgery | Medical professional (Dr. Thomas Oetting) | 584 | https://www.youtube.com/watch?v=Fwn96H-s_pE | 6 |

may satisfy a curiosity for some patients, the abundance of these videos makes it challenging to find high-quality, comprehensive educational videos.

Third, more than one-fifth of the videos were commercial in nature, either promoting a practice and product, and therefore may potentially be misleading. Many of these videos described patient testimonials on the benefits of premium intraocular lenses or laser-assisted surgery. While these testimonials may reflect genuine patient opinions, they may not be representative of the average patient outcome. Balanced information is important both for proper informed consent and the avoidance of unrealistic expectations that can lead to patient dissatisfaction.

Previous studies examining YouTube as a patient education resource in other ocular conditions are scarce. Hickman [6] found that 80 of 352 videos found on YouTube or Vimeo (another popular video-sharing site) about neurological eye movement diseases had "excellent" educational value [6]. This study only included videos that were created for an educational purpose. Guthrie et al. [7] examined the first ten pages of YouTube videos on retinitis pigmentosa and found that 82 of 162 videos were misleading, with less than one-third of videos providing useful, scientifically accurate content [7]. Overall, YouTube does not yet appear to be a strong educational resource for eye conditions, although some videos appear to be useful.

In addition to YouTube, other novel online patient resources are emerging. Over 50 smartphone applications for visually impaired patients are available [8]. They include applications for education regarding ocular conditions, vision testing (e.g., Amsler grid), and text magnification [9]. Most of the available literature only describes the types of available applications and does not evaluate their efficacy or appropriateness in their intended use. Further study is warranted in this regard.

Regardless of the modality of patient education, patient education resources should be created with accessibility in mind, in addition to accuracy and comprehensiveness. Examples of ensuring accessibility include having text alternatives for all non-text content and using high contrast ratios of text and images. A study by Lüchtenberg et al. [10] found that only 15 of 139 health information Web sites achieved a high standard of accessibility as assessed by the Web Accessibility Initiative guidelines [10]. Although not formally assessed in this study, accessibility of education resources is another important consideration so that patients can interpret information equally regardless of visual disability.

This study has some potential limitations. First, we only examined videos in the English language. Further study is warranted to examine whether our findings are replicated in videos created in other languages. Second, videos were analyzed by a single author. However, we believe the bias potential is minimal because the criteria are objective. Third, videos on the first two pages will likely shift over time. Our study evaluated the first two pages of videos, which we believe represents the videos that patients are likely to watch. High-quality videos found later may have been excluded. We did not examine sound or video quality in this study. However, in the videos that were analyzed, the audiovisual quality did not impede the comprehension of the videos' contents. Lastly, due to the large variability in view count, we could not

definitively determine whether more popular videos were more useful. A post hoc analysis showed that a total sample size of 10,396 videos was needed to detect a statistically significant difference with 80% power and an alpha error of 0.05.

As health information becomes increasingly accessible, medical professionals should be judicious in sharing medical content online. On public Web sites such as YouTube, the boundaries between what is intended for patients versus medical trainees can become blurred. While YouTube has distinct advantages in popularity and ease of access, our study found that most cataract surgery videos do not adequately educate patients about the procedure. It is recommended that patients be directed to specific videos or Web sites or be provided other resources from reputable organizations.

**Funding** No sources of funding were received for this study.

**Compliance with ethical standards**

**Conflict of interest** All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent–licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge, or beliefs) in the subject matter or materials discussed in this manuscript.

**Ethical approval** This article does not contain any studies with human participants or animals performed by any of the authors. Ethics approval is not required for this type of study.

**Informed consent** Informed consent was not required for this study.

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