Quality Assessment of Anesthesia Videos available on YouTube

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ABSTRACT

Previous research indicates patients have limited knowledge regarding anesthesia and the role of medical anesthetists [5]. Research also suggests a majority of patients experience perioperative fear, along with a fear of anesthesia [6]. Achieving patient and public recognition of anesthesia can help lessen fear and anxiety, improving surgical outcomes [5]. Our aim is to determine the quality of YouTube videos related to anesthesia information for patients. YouTube videos were searched utilizing the phrase "How does anesthesia work?" and sorted based on "Relevance" as determined by YouTube. Two medical student graders scored the top 50 videos using a modified DISCERN [8,9] ("mDISCERN") and a Global Quality Scale (GQS) [8] as quality measurement instruments. The students reached Agreed Upon Total ("AUT") scores for each video. The mean AUT mDISCERN score was 4.2 with a standard deviation of s=0.9035079. The mean AUT GQS was 3.88 with a standard deviation of s=1.171777. Tests were ran to compare videos in which healthcare providers/facilities were involved in the production ("credentialed") versus those in which either professionals were not involved, or their involvement was not disclosed ("not credentialed"). Utilizing mDISCERN, there is a higher video quality for "credentialed" videos. However, there was not a statistically significant difference for GQS scores. The scored videos were generally of good quality and did provide useful information to potential patients. Higher quality videos tended to describe the basic science and physiology behind anesthesia and also clearly explained the process of undergoing anesthesia.

Introduction

YouTube is a video sharing platform that allows viewers to access free videos. YouTube's popularity is vast, having 2.6 billion active monthly users [1]. Audiences can engage with YouTube to access videos relating to medicine and their health, contributing to YouTube serving as a dominant medium of accessing healthcare information [2]. The ubiquitous nature of YouTube makes it a natural resource for patients to gravitate toward in order to learn more about medical procedures.

Access to the internet has become a large part of medicine, but has shortcomings that health professionals must be aware of [3]. YouTube videos covering a variety of medical topics exist, yet at the current moment there is a lack of sufficient evidence to support that YouTube is an effective resource in medical education [4]. Anesthesia videos uploaded to YouTube do not have to undergo a critical review process to screen for quality and usefulness to patients. Thus, it is possible that low quality videos are readily accessible to patients.

Research indicates patients have very limited knowledge regarding anesthesia and the role of medical anesthetists [5]. It has also been found that 88% of patients experience perioperative fear, with a majority of those patients experiencing fear of anesthesia [6]. Achieving patient and public recognition of anesthesia and medical professionals providing anesthesia leads to a better-informed patient population, which can help lessen fear and anxiety, improving surgical outcomes [5].

It is critical to take into consideration that the involvement of healthcare professionals in video production may contribute to video quality. A past study found that physician and hospital uploaders had higher quality scores and provided the best quality content for YouTube videos on Frailty Syndrome [7].

We pursued this study in an attempt to characterize the quality and usefulness of information available to patients on YouTube relating to anesthesia. We expect that due to the ubiquitous nature of YouTube there will be a variety of both high- and low-quality videos. We expect that videos in which health professionals were involved in the production will be of higher quality and be more useful to patients.

Methods

Data Collection

Medical student graders overseen by a board-certified anesthesiologist principal investigator accessed the website "YouTube.com." The phrase "How does anesthesia work?" was typed into the YouTube search bar on October 22, 2022. Videos were sorted based on a YouTube settings filter for "Relevance." Videos were screened for relevance to the key phrase "How does anesthesia work?" as determined by two medical student graders. Videos were excluded if they were video recordings of patients being put under anesthesia with no explanation of the process or if the scope of the video went exceedingly beyond the topic of general anesthesia that a patient would likely be interested in.

The primary endpoint was to gauge the quality of YouTube videos that appear when "How does anesthesia work?" is entered into the search bar. The secondary endpoint was to evaluate whether videos explicitly involving medical professionals were of higher quality than those not involving medical professionals. The two medical student graders scored the top 50 videos based on relevance utilizing a modified DISCERN [8,9] (mDISCERN) and a Global Quality Scale (GQS) [8] as quality measurement instruments. Utilizing 50 videos in quality review processes has been demonstrated to be an effective amount of videos in past literature [10]. In addition to their separate scoring for mDISCERN and GQS, the students met and compared scores, reaching an Agreed Upon Total ("AUT") for each video. Reaching an agreed upon score between graders allowed points of contention to be discussed, and final AUTs to be made for each video [9].

A lower score on the GQS indicated a lower quality video, and a higher GQS score indicated a higher quality video (range of GQS is 1-5) [11]. A higher mDISCERN indicated higher reliability and quality [9,11], and had a potential high score of 6.

Based on previous literature, the team adopted a low GQS to be 1-2 points and a high GQS to be 4-5 points [8]. The team also adopted a high mDISCERN to be 4-6 total points, and a low mDISCERN to be 1-3 total points.

Comparisons were made between videos with medical professionals ("credentialed") involved in video production as opposed to undisclosed/non-medical ("not credentialed") production teams to assess the difference in quality between the two groups. Videos were designated as "credentialed" based on whether it was disclosed that medical professionals/medical facilities were involved in the production of the video. "Not credentialed" was designated for videos in which it was either not disclosed whether the production included a medical professional/healthcare facility, or the video did not involve a medical professional/healthcare facility.

Table 1: mDISCERN [8,9]

DISCERN: (1 point for every "yes"; 0 points for every "no")
1. Are the aims clear?
2. Are the aims achieved?
3. Are reliable sources of information used? (i.e., publication cited, speaker is board-certified anesthesiologist or healthcare provider)
4. Is the information presented balanced and unbiased?
5. Are additional sources of information listed for patient reference?
6. Are areas of uncertainty mentioned?

Table 2: GQS [8]

GQS Score	Description
1	Poor quality, poor flow of the video, most information missing, not at all useful for patients
2	Generally poor quality and poor flow, some information listed but many important topics missing, of very limited use to patients
3	Moderate quality, suboptimal flow, some important information is adequately discussed but others poorly discussed, somewhat useful for patients
4	Good quality and generally good flow. Most of the relevant information is listed, but some topics not covered, useful for patients
5	Excellent quality and flow, very useful for patients

Data Analysis

Descriptive statistics such as mean, median, and mode were completed for the AUT mDISCERN and AUT GQS , utilizing online calculators on "Calculatorsoup.com" and "Calculator.net." Interrater reliability was calculated to determine similarity in evaluations for each mDISCERN question, each total mDISCERN for each video (mDISCERN Sum), and each GQS score assigned by the two medical student graders.

Categorical outcomes (e.g., credentialed vs. non-credentialed) were tested using Pearson's chi-squared test unless small sample sizes justified use of a Fisher's exact test instead (cell values <5). Continuous outcomes (e.g., mDISCERN and GQS) were tested for normality using Shapiro-wilk tests and ultimately tested using Mann Whitney U tests (same as Wilcoxon Rank Sum). In all cases significance was assessed at $p=0.05$. Statistical tests were carried out using R software [12,13].

Results

Of the initial 50 videos sorted by "Relevance," twelve were determined to be irrelevant and were excluded from the analysis. One of the twelve was determined to be irrelevant because it was a vlog of a day in the life of an anesthesiologist, providing little information on medicine or anesthesia. Seven of the twelve were videos of patients being put under anesthesia with no medical information; one of the twelve was a short skit of a patient asking when "when does the anesthesia kick in?" then flashing straight to a patient pretending to wake up; two of the twelve were patients emerging from anesthesia with no medical information; one of the twelve was a news station video regarding a patient claiming they were cognizant during an operation. To account for the twelve videos excluded, an additional twelve videos sorted by relevance were evaluated instead [10].

Interrater reliability was found to be 100% for both Questions 1 and 2 from the mDISCERN. Question 3 had an interrater reliability of 96%; Question 4 had an interrater reliability of 98%; Questions 5 and 6 both had an interrater reliability of 92%. Interrater reliability for mDISCERN totals (mDISCERN Sum) was 84%. GQS interrater reliability was 56% (Table 3).

Table 3. Interrater Reliability

(N=50)	Inter-rater Reliability		Summary Statistics		
Variable	**Agree-ment**	**Cohen's Kappa**	**Range**	**Mean**	**SD**
Question 1	100%	n/a	1-1	1	0
Question 2	100%	n/a	1-1	1	0
Question 3	96%	0.915	0-1	0.64	0.485
Question 4	98%	n/a	0-1	0.98	0.141
Question 5	92%	0.751	0-1	0.18	0.388
Question 6	92%	0.822	0-1	0.38	0.490
mDiscern Sum	84%	0.769	3-6	4.2	0.904
GQS	56%	0.385	1-5	3.8	1.172

The mean AUT mDISCERN score was 4.2 with a standard deviation of s =0.9035079; median AUT mDISCERN was 4; mode of AUT mDISCERN was 4 (appearing 23 times). The maximum AUT mDISCERN score was 6 and the minimum score was 3 (Table 4). The mean AUT GQS was 3.88 with a standard deviation of s =1.171777; median AUT GQS was 4; mode was 5 (appearing 20 times). The minimum AUT GQS score was 1 and the maximum was 5 (Table 4).

Table 4. mDISCERN and GQS AUT Descriptive Statistics

	mDISCERN	GQS
Sample Size (n)	n=50	n=50
Mean	4.2	3.88
Median	4	4
Mode	4	5
Minimum	3	1
Maximum	6	5
Standard Deviation	0.9035079	1.171777
Standard Error	0.1277753126	0.1657142925
Variance	0.81632653	1.3730612

Four videos received the maximum scores possible in both the AUT total mDISCERN and AUT GQS scales. This signifies an AUT mDISCERN of 6 points and an AUT GQS of 5 (Table 5).

Table 5. Information on Top Scoring Videos

Video Title	Uploader	Upload Date	AUT mDISCERN	AUT GQS
We Finally Know How Anesthesia Works	SciShow	September 5, 2020	6	5
We Still Don't Know How Anesthesia Works | Answers With Joe	Joe Scott	April 7, 2020	6	5
How Does Anesthesia Actually Put You to Sleep?	The Infographics Show	December 28, 2020	6	5
What Do We Know about General Anesthesia?	Demystifying Medicine McMaster	November 27, 2017	6	5

Thirty of the evaluated videos involved healthcare professionals/facilities ("credentialed") and twenty videos either did not involve a healthcare professional/facility or did not disclose such information ("not credentialed").

The median AUT mDISCERN for "credentialed" videos was 4.4 with a standard deviation of 0.56. The median AUT mDISCERN for "not credentialed" video creators/producers was 3.9 with a standard deviation of 1.21. The Wilcoxon test comparing "credentialed" vs. "not credentialed" videos for AUT mDISCERN scores was statistically significant (p=0.0116,Table 6). The mean AUT GQS score for "credentialed" videos was 3.7 with a standard deviation of 1.11. The mean AUT GQS score for "not credentialed" videos was 4.1 with a standard deviation of 1.25.

There was not a statistically significant difference between AUT GQS scores for "credentialed" and "not credentialed" videos (*p*=0.1611, Table 6).

Question 3 resulted in a statistically significant difference (Table 6), as it asks, "Are reliable sources of information used? (i.e., publication cited, speaker is board-certified anesthesiologist or healthcare provider)." Given many of the credentialed videos were produced by board-certified anesthesiologists and healthcare providers, this resulted in mainly "yes" responses to question 3 for the "credentialed" videos, and mainly "no" responses for "not credentialed" videos.

Table 6. Finalized scores to questions, total modified DISCERN, and GQS scores for "credentialed" (N=30) and "not credentialed" (N=20) video presenters

Variable	Response	Credentialed[a]		Not Credentialed[b]		x^2 *p*-value
		n	%	n	%	
Question 1	Yes	30	100	20	100	n/a
Question 2	Yes	30	100	20	100	n/a
Question 3	Yes	28	93.3	4	20	*<0.0001**
Question 4	Yes	30	100	19	95	0.4000[c]
Question 5	Yes	4	13.3	5	25	0.4542[c]
Question 6	Yes	10	33.3	9	45.0	0.5925
Variable	**Response**	**mean**	**SD**	**mean**	**SD**	**Wilcoxon p-value**
Discern (Sum)	0-6	4.4	0.56	3.9	1.21	*0.0116**
GQS	0-5	3.7	1.11	4.1	1.25	0.1611

*Bold italics indicates significant result at *p*=0.05

[a]Video presenter affiliation: credentialed = M.D., healthcare facility, healthcare professional

[b]not-credentialed= all others

[c]Tested with Fisher's exact test due to expected cell counts below 5

Discussion

To our knowledge, this study is the first quality assessment of YouTube videos on how anesthesia generally works. YouTube videos available to provide information on "How does anesthesia work?" were generally of good quality and did provide useful information to potential patients. Videos that stated the involvement of healthcare professionals in the video production had a higher quality based on mDISCERN scores, but there was not a statistically significant difference while utilizing GQS scores.

The mean AUT GQS was 3.88. The median AUT GQS was 4, indicating "Good quality and generally good flow. Most of the relevant information is listed, but some topics not covered…" The mode AUT GQS was 5 (appearing 20 times), which is notable considering a 5 conveys "excellent quality and flow, very useful for patients." Our criteria for high GQS was 4-5 points [8]. Thus, our median and mode AUT GQS scores fall within the high GQS range, indicating high quality videos.

The mean AUT mDISCERN score was 4.2; median AUT mDISCERN was 4; and mode of AUT mDISCERN was 4 (appearing 23 times), conveying that 4 out of the 6 statements (Table 1) were answered "yes." In keeping with the designation of 4-6 points indicating a high reliability and quality mDISCERN, the mean, median, and mode of AUT mDISCERN suggests a high reliability and quality of YouTube videos available relating to general anesthesia information.

Utilizing mDISCERN, it appears there is a higher video quality when healthcare professionals are involved in production (p=0.0116). However, there was not a statistically significant difference while utilizing GQS scores.

Future studies should focus on the quality of anesthesia-related YouTube videos between production involving healthcare professionals/facilities, and production not directly involving healthcare professionals/facilities.

Due to the fear-provoking nature of surgery and anesthesia, it is understandable that patients would seek information prior to a surgical procedure online on a platform as ubiquitous as YouTube. If patients type "How does anesthesia work?" into the YouTube search bar and sort by "Relevance," they will be met with a plethora of videos. Although in our analysis of the top 50 videos sorted by "Relevance," 12 of the 50 were irrelevant, there was also a generally high quality of videos. Higher quality videos tended to describe the basic science and physiology behind anesthesia in an easily digestible manner. The higher quality videos, especially the four videos which scored the maximum values on both mDISCERN and GQS (Table 5), explained to viewers what one may expect from the anesthesia team on the day of surgery, clearly explained the process of undergoing anesthesia, and also indicated that there are areas of uncertainty in anesthesia, as individual patients may respond differently to anesthesia.

Limitations

Potential limitations include the discernment of video relevancy as determined by the medical student graders, as well as the potential for subjectivity in the mDISCERN and GQS scoring. It is also important to note that YouTube videos can be uploaded or taken down readily. Thus, the videos evaluated in this study may differ from the top 50 videos sorted by "Relevance" on any other given day. An additional shortcoming is that not all videos clearly stated who was involved in the production of the video, and whether a medical professional or healthcare system was involved. Thus, those videos were categorized as "not-credentialed."

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