



The assessment of the quality and content of YouTube videos concerning dental treatments performed under general anesthesia

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Abstract

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Aim: This study evaluates the content and quality of YouTube videos on dental procedures under general anesthesia, a crucial topic for patients with disabilities or complex medical conditions.

Materials and Methods: A cross-sectional analysis was conducted on the first 200 videos yielded by a "general anesthesia in dentistry" search on YouTube. Videos were evaluated based on 13 criteria and Video Information and Quality Index (VIQI) was used for overall quality assessment.

Results: The study analyzed 180 videos, with 115 meeting the selection criteria. These videos showed good reliability in content and Video Information and Quality Index (VIQI) scores, and were mostly uploaded by healthcare professionals from the U.S., India. Average video length was about 7 minutes. They mainly discussed reasons for choosing general anesthesia. Majority of videos (79.1%) were uploaded by healthcare professionals. Among the 115 videos, 20% were full-content, while 83.5% and 16.5% were classified as high-content and low-content, respectively. High-content videos were longer and had higher VIQI scores.

Conclusion: Majority of videos on the topic were created by professionals. The reasons for choosing general anesthesia were the most discussed topic. Despite study limitations, these YouTube videos serve as effective supplementary material for both healthcare professionals and laypersons.



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Introduction

Patients with developmental deficits, mental or physical disabilities, psychiatric problems, and complex medical backgrounds often face difficulties accessing dental services and tolerating treatment. The special healthcare requirements of patients' needs are prone to health issues, including dental problems, and can belong to any race or social class. These patients need personalized and appropriate medical treatment. Although behavioral control is effective for some patients, others may require sedation or general anesthesia to facilitate dental care [1, 2]. While sedation can be a safe and effective alternative for individuals with disabilities, maintaining the airway can be challenging for patients with severe cooperation issues [2,3]. Some patients find it difficult to remain still and keep their

mouths open during treatment. Clinicians may choose to provide complete dental rehabilitation in a single visit under general anesthesia for patients with significant impairments despite the risks [2-4]. While dental procedures typically do not endanger patients' lives, general anesthesia and sedation carry significant risks, particularly for individuals with high scores according to the American Society of Anesthesiologists (ASA) physical status classification, or those with cardiovascular, respiratory, or central nervous system issues. In order to minimize these risks, it is essential to follow a comprehensive preoperative preparation process and maintain optimal treatment conditions. The healthcare team attending to the patient must possess the necessary expertise to respond promptly and accurately when required. To further reduce risk, patients should be overseen not only by anesthesiologists and dentists but also by consulting physicians who specialize in their respective fields [5].

The internet has now emerged as a significant conduit for

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health-related information, propelled by advancements in technology. YouTube is globally recognized as the premier platform for video sharing and holds the rank of the second largest search engine, boasts a commanding presence among online information sources. This online platform reigns supreme among information providers, attracting billions of daily views from a global user base that surpasses two billion [6,7]. The increasing fame of YouTube is due to several elements. Foremost, individuals with internet connectivity can readily avail themselves of YouTube's video service through various devices such as PCs, laptops, tablets, or smartphones. The mobile phone application is the preferred access point for more than 70% of YouTube users. Consequently, this enhancement greatly improved the overall user experience of YouTube videos, making them available for users on-demand, regardless of location or time [8].

YouTube plays a crucial role in enabling users to access health-related information swiftly and conveniently. Health-related information videos on YouTube derive from a wide range of sources, including professionals, hospitals/universities, commercial entities, laypersons, and others. However, YouTube's terms of service specify that the content is the sole responsibility of the individual or entity that provides it to the platform [9]. YouTube's search results prioritize popularity, relevance, and view history over the quality of the content. This could lead to the exposure of these viewers to videos with low-quality and inaccurate health-related content [10]. A recent study showed that more than a quarter of the most viewed YouTube videos on COVID-19 contained misleading content, affecting millions of viewers worldwide [11].

Materials and Methods

This study was conducted with the approval of the Ethics Committee of Research of Istanbul M. University, Istanbul, Turkey (E-10840098-772.02-3661). A YouTube (www.youtube.com; Google, San Bruno, Calif) search using the keyword "general anesthesia in dentistry" was conducted on January 21.02.2023.) To avoid user history-based restrictions, all computer history and cookies were cleared. The search setting was set to worldwide to broaden the search results. During the search, no filters were applied to upload date, duration, or features sections; video was selected as the type, and relevance-based ranking was chosen for sorting. To maintain consistency in ranking, the resulting videos were added to a YouTube playlist on a specific date. Given that few users look beyond the first few pages of search results, the search was limited to the first 200 videos. To ensure ranking consistency, the resulting videos were playlisted on YouTube on a set date, as search results may vary on different days. G*Power 3.1.9.2 programme was used to calculate the sample. According to the analysis, with 95% confidence interval and 95% power, it was determined that at least 26 videos should be reached, at least 13 low quality videos and at least 13 high quality videos. Videos were excluded from the study if they were in a language other than English, lacked audio, exceeded 30 minutes, were duplicates, or were unrelated to general anesthesia in dentistry. In such cases, only video properties were noted.

Basic video features, such as upload date, duration, upload country, total comments, likes, and viewing rate were recorded (viewing rate: amount of views/ number of days since upload X 100). Video sources were categorized as professionals, hospital/university, commercial, layperson, or other, while the intended audience was classified into professional, layperson, or both groups. Viewer interaction levels were assessed using interaction index and viewing rate formulas based on likes, total views, and days since the upload date, as per the study by Hassona et al (interaction index: number of likes/ total number of views X 100) [12].

One endodontist (YEH) and one anesthesia and reanimation specialist (NA) independently evaluated the videos according to 13 criteria, which included definition of general anesthesia, indications, contraindications, general anesthesia technique, advantages-disadvantages, complications, risk factors, drugs used, reasons for choosing general anesthesia, success, intra and post-operative pain, anxiety, and psychosocial impact. Each criterion was assigned one point, with a maximum total of 13 points. Videos scoring 6 or more points were considered high content, while those scoring below 5 were deemed low content.

The video information and quality index (VIQI) were used to evaluate the comprehensive audio-visual quality of the videos, employing a 5-point Likert scale ranging from 1 (low quality) to 5 (excellent quality). The index evaluates characteristics of the video such as the flow of information, its accuracy, and quality (allocating one point each for the inclusion of static images, animations, community interviews, captions, and a summary), along with precision (the alignment between the video's title and its content).

A month after the initial assessment, all videos were reassessed by the same observer for intraobserver reliability and by a second observer for interobserver reliability. Intraobserver and interobserver agreements were determined using intraclass correlation coefficients (ICCs). A guideline for evaluating ICC values were interpreted according to a predefined guideline: 'excellent' for values greater than 0.90, 'good' between 0.75 and 0.90, 'moderate' from 0.50 to 0.75, and 'poor' for those below 0.50 [13]. In cases of uncertainty, all authors reevaluated the video in question until consensus was reached.

Statistical analysis

Statistical computations were conducted using IBM SPSS Statistics 22. The compatibility of the variables with normal distribution was checked using the Shapiro Wilks test while examining the research data. It was concluded that the parameters did not adhere to a normal distribution. For data evaluation, descriptive statistical techniques (median, interquartile range (IQR), confident intervals, frequency) were implemented. Furthermore, the Kruskal Wallis Test (accompanied by the post hoc Dunn's test) was applied for comparisons involving multiple quantitative data groups. To compare two quantitative data groups, the Mann Whitney U Test was utilized. Chi-square analysis was used to compare categorical data, and Fisher Exact test was applied when the expected value was below 5 in more than 25% of the cells. The Spearman's rho correlation analysis was employed to scrutinize

relationships among parameters. The threshold for significance was established at $p < 0.05$.

Results

The study involved an analysis of 180 videos. However, 65 of these were removed from the evaluation due to certain factors: 22 videos (33.8%) were not in English, 7 videos (10.8%) were in languages other than English, 6 videos (9.2%) were replicas, 24 videos (36.9%) did not pertain to the topic, and 6 videos (9.2%) exceeded 30 minutes in length. The remaining 115 videos were subjected to comprehensive assessment.

The intraobserver reliability was good for both total content and VIQI, with ICC values of 0.862 and 0.824 respectively. Good interobserver reliability was observed with ICC values of 0.833 for total content, 0.801 and 0.804 for VIQI.

In searches using the keyword "general anesthesia in dentistry" among the 115 videos that met the inclusion criteria for the study, 56 (48.7%) were uploaded from the

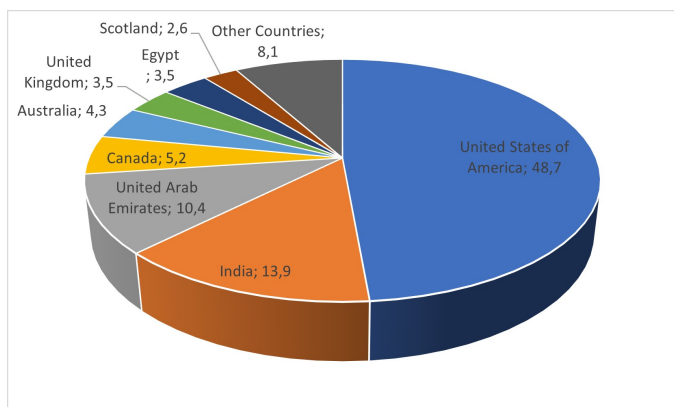


Figure 1. Distribution of videos by country of upload (%).

Table 1. Descriptive statistics of the YouTube videos.

Variables	Median	IQR	CI 95%
Video characteristics			
Number of views	10,589.00	947-65,552	-48,740.4-580,482.8
Duration in minutes	3:54	2:06-9:28	5:2-7:8
Days since upload	1,400	582-2,079	1,336.4-1,854.5
Number of comments	6	0-46	-22.9-379.7
Number of likes	51	5-473	-1751.8-9475.9
Number of dislikes	2	0-16	-13.5-153.9
Viewing rate	1019.87	129.83-4880.77	1206.4-25677.2
Interaction Index	0.59	.33-1.51	-3.1-14.2
Total Content Score	9	8-13	8.9-10.3
VIQI content assessment			
Flow of information	4	3-5	3.3-3.7
Information accuracy	4	2-4	3.2-3.6
Quality	4	2-4	3.0-3.5
Precision	3	2-4	3.1-3.6
VIQI total score	14	10-17	12.8-14.5

Table 2. Distributions of YouTube videos source of upload, target audience, video contents.

	n	%	
Source of Upload	Healthcare professionals	91	79.1
	Hospital/university	8	7.0
	Commercial Entities	2	1.7
	Layperson	12	10.4
	Other	2	1.7
Target Audience	Professional	48	41.7
	Layperson	48	41.7
	Both	19	16.6
Total Content Score	Low-content (0-6)	19	16.5
	High-content (7-13)	96	83.5
	Full-content (13)	23	20
Video Contents	Definition of general anesthesia	86	74.8
	Indications-contraindications	81	70.4
	Advantages/disadvantages	82	71.3
	Complications	77	67.0
	Risk factors	73	63.5
	Drugs used	71	61.7
	General anesthesia technique	69	60.0
	Reasons for choosing general anesthiat	92	80.0
	Clinical survival	63	54.8
	Success	59	51.3
	Intra and Post-operative pain	67	58.3
Anxiety	71	61.7	
Psychosocial impac	68	59.1	

United States of America, 16 (13.9%) from India, and 12 (10.4%) from United Arab Emirates (Figure 1). Table 1 showcases the descriptive statistics, such as the average number of views, likes, and days since the videos were uploaded. The average duration of YouTube videos on general anesthesia in dentistry was 6.63 minutes, with a mean total view count was 256285.34 and an average viewing rate was 13007.89. The mean like count was 3565.64, ranging from 0 to 296450, The videos had been uploaded, on average, 1578.23 days ago, with a range of 113 to 5678 days (Table 1).

The study highlighted that the most commonly discussed topics were reasons for choosing general anesthesia (80%), definition of general anesthesia (74.8%), advantages/disadvantages (71.3%) and indications-contraindications while the least discussed topic was success (51.3%) (Table 2).

Table 2 further displays various video characteristics such as the uploader’s identity, intended audience, and content. A significant portion of the videos (79.1%, n=91) were uploaded by healthcare professionals, with a smaller proportion by layperson (10.4%, n=12), while the rest were from laypersons and hospital/university sources. The majority of the videos were aimed at layperson and professionals, both constituting 41.7% (Table 2).

Of the 115 videos, 23 videos (20%) were included in the full-content group, while 96 videos (83.5%) and 19 videos (16.5%) were categorized as high-content and low-content, respectively (Table 2).

Table 3. Comparison of variables Low-Content and High- Content videos.

Variables	Low Content			High Content			p
	Median	IQR	95% CI	Median	IQR	CI 95%	
Video characteristics							
Number of views	2,694	947-2,3207	4,255.0-27,226.6	13,145	940-84,654	-60,644.9-682321.9	0.105
Duration in minutes	1.47	.49-4.28	1.2-4.0	4.13	2.25-10.30	5.7-8.7	0.001*
Days since upload	888	221-1,681	502.9-2,236.9	1,407	666-2,137	1,365.0-1907.0	0.102
Number of comments	2.5	0-29	4.0-24.8	6	0-69	-29.8-445.5	0.495
Number of likes	30	7-186	11.5-331.1	79	5-537	-2107.7	0.217
Viewing rate	574.44	169.98-2,522.84	57.31-6,126.5	1,220.62	127.96-5,488.75	-11158.8 867.7-29,737.2	0.331
Interaction Index	1	0-2	-31.5-90.9	1	0-2	.9-1.5	0.886
VIQI content assessment							
Flow of information	2	1-3	1.5-2.5	4	3-5	3.6-4.0	0.001*
Information accuracy	2	1-2	1.4-2.2	4	3-5	3.5-3.9	0.001*
Quality	2	1-2	1.3-2.0	4	3-5	3.3-3.8	0.001*
Precision	2	1-3	1.4-2.6	4	3-5	3.3-3.8	0.001*
VIQI total score	9	4-10	6.1-9.2	15	11-18	13.9-15.6	0.001*

Mann Whitney U Test *p<0.05.

Table 4. Comparison of variables Low-Content and High-Content videos.

		Low-Content (n=19)	High-Content (n=96)	p
		n (%)	n (%)	
Source of Upload	Healthcare professionals	17 (89.5%)	74 (77.1%)	¹ 0.399
	Hospital/university	2 (10.5%)	6 (6.3%)	
	Commercial	0 (0%)	2 (2.1%)	
	Layperson	0 (0%)	12 (12.5%)	
	Other	0 (0%)	2 (2.1%)	
Target audience	Professional	6 (31.6%)	42 (43.8%)	² 0.544
	Layperson	10 (52.6%)	38 (39.6%)	
	Both	3 (15.8%)	16 (16.7%)	
Video Contents	Definition of general anesthesia	11 (57.9%)	75 (78.1%)	¹ 0.117
	Indications-contraindications	7 (36.8%)	74 (77.1%)	² 0.001*
	Advantages/disadvantages	9 (47.4%)	73 (76%)	² 0.025*
	Complications	5 (26.3%)	72 (75%)	² 0.001*
	Risk factors	3 (15.8%)	70 (72.9%)	² 0.001*
	Drugs used	4 (21.1%)	67 (69.8%)	² 0.001*
	General anesthesia technique	6 (31.6%)	63 (65.6%)	² 0.012*
	Reasons for choosing general anesthesia	9 (47.4%)	83 (86.5%)	¹ 0.001*
	Clinical survival	1 (5.3%)	62 (64.6%)	² 0.001*
	Success	0 (0%)	59 (61.5%)	² 0.001*
	Intra and Post-operative Pain	2 (10.5%)	65 (67.7%)	² 0.001*
	Anxiety	3 (15.8%)	68 (70.8%)	² 0.001*
	Psychosocial impact	2 (10.5%)	66 (68.8%)	² 0.001*

¹Fisher's Exact test, ²Chi -square test *p<0.05.

There is no statistically significant difference between low and high-content video groups in terms of video view counts, time elapsed since video upload, number of comments, number of likes, viewing rate, and interaction index (p>0.05) (Table 3).

High-content videos have statistically significantly longer durations and higher scores for flow of information, information accuracy, quality, precision, and total VIQI compared to low-content videos (p=0.001) (Table 3).

Table 4 showed that high-content videos had significantly more information than low-content videos. This included aspects like indications and contraindications, advantages and disadvantages, complications, risk factors, medications used, general anesthesia techniques, reasons for choosing general anesthesia, clinical survival, intra and post-operative pain, anxiety, and psychosocial impact (p<0.05).

These results highlight the significant differences in the

Table 5. Spearman’s Rho Correlations between Total Content Score and VIQI, YouTube demographics.

		Total Score	Content VIQI
Total Content Score	r	1	
	p	.	
VIQI	r	0.797	1.000
	p	0.001*	.
Number of views	r	0.238	0.273
	p	0.010*	0.003*
Duration in minutes	r	0.330	0.397
	p	0.001*	0.001*
Days since upload	r	0.097	0.000
	p	0.301	0.999
Number of comments	r	0.136	0.206
	p	0.168	0.035*
Number of likes	r	0.180	0.298
	p	0.054	0.001*
Viewing rate	r	0.207	0.293
	p	0.026*	0.002*
Interaction Index	r	-0.002	0.144
	p	0.981	0.125

Spearman’s Rho Correlations *p<0.05.

Table 6. Comparison of scores according to source of upload and target audience.

		Total Score	VIQI
		Median (IQR)	Median (IQR)
Source of Upload	Healthcare professionals	10 (7-13)	15 (10-18)
	Hospital/university	9.5 (6-15)	10 (9.5-17.5)
	Commercial	9 (9-9)	12 (11-13)
	Layperson	8 (8-10.5)	9.5 (8-11.5)
	Other	12 (12-12)	10 (8-12)
	¹ p	0.832	0.027*
Target audience	Professional	10 (8-12)	16 (12-18.5)
	Layperson	9 (7.5-13.5)	12.5 (9.5-17)
	Both	9 (7-13)	11 (8-16)
	² p	0.994	0.007*

¹Mann Whitney U Test, ²Kruskal Wallis Test *p<0.05.

Due to the small sample size of n=1 at the hospital/university, it was not included in the comparison.

quality and comprehensiveness of content between high- and low-content videos (Table 4).

There is a statistically significant positive relationship (p=0.001) between Total Content score and VIQI, indicating a strong association (79.7%). Furthermore, a moderate positive relationship (33%) exists between Total Content score and video duration, as well as between VIQI score and video duration (39.7%), both of which are statistically significant (p=0.001). However, no statistically significant relationships were found between Total Content score and other video characteristics or the interaction in-

dex (p>0.05) (Table 5).

There was a statistically significant difference (p=0.027) in VIQI scores among the sources from which the videos were uploaded, with videos uploaded by healthcare professionals having significantly higher VIQI scores (p=0.030) compared to those uploaded by laypersons. Similarly, there was a statistically significant difference (p=0.007) in VIQI scores among the target audiences, where videos targeted at professionals had significantly higher VIQI scores (p=0.015) compared to those targeted at laypersons and both groups (p=0.047) (Table 6).

Discussion

As the appeal of online platforms for sharing information continues to rise, there’s a corresponding surge in internet users either seeking or posting content about health-related videos. YouTube, a worldwide sensation known for its vast array of video content, often has higher appeal for both patients and professionals over other social media tools [14,15]. Yet, the user-friendly nature of video sharing coupled with a lack of standardization raises questions about the authenticity of the information available on YouTube [14].

As YouTube gains prominence as a significant source of internet-based medical information, research into the quality of the available content has escalated [1]. This has prompted us to evaluate the content, quality, and adequacy of videos related to "general anesthesia in dentistry" on the platform.

Peoples living with unique conditions such as mental impairments, dementia, physical restrictions, movement disorders, behavioral issues, and chronic health conditions, alongside those with heightened anxiety, children, and those undergoing traumatic procedures may require more than just local anesthesia during dental treatment. Thus, it is imperative to choose an appropriate method of anesthesia for these procedures [2].

General anesthesia is applied as a last resort to patients who cannot be treated with conscious or sedation for dental treatment. Especially with the development in anti-anxiety drugs and conscious sedative techniques, there is less need for general anesthesia. General anesthesia has advantages such as the patient being completely unconscious, no need for cooperation in the treatment, complete removal of pain, providing amnesia, the effect starting quickly, and drug titration can be done to achieve the desired effect. However, it also has disadvantages such as the need for comprehensive preoperative evaluation of patients, suppression of the patient’s protective reflexes, suppression of vital functions, the need for a team of professionals, the need for special anesthesia equipment, and the need for a recovery room after anesthesia. The patient being unconscious provides an advantage as well as leading to a disadvantage [3,4]. Both the American Dental Association and the American Academy of Pediatric Dentistry have outlined recommendations concerning the application of general anesthesia by dental professionals and the discretionary use of sedation and general anesthesia in pediatric patients [16,17].

Many patients and their families planning dental treatment with anesthesia trust the information on the inter-

net, especially on YouTube, for easy and cheap access to information about treatment options. However, YouTube, like with all its video content, does not impose any restrictions or content supervision on medical videos, leading to a significant reduction in their content quality [18]. Therefore, the accuracy and adequacy of YouTube videos made for information and awareness about various strategies are important.

According to a previous study, it was found that viewers tend to lose interest in videos that are excessively prolonged in order to include more content [19]. The average length of all the videos examined was 6.63 minutes. However, when comparing high- and low-content videos, the mean durations were 7.47 and 2.42 minutes, respectively. This suggests that despite having more content, viewers still lost interest in longer videos. Therefore, it is crucial for new video content to present subjects within reasonable time frames that are acceptable to viewers.

The videos were grouped into two distinct categories: high-content and low-content, based on the presence of predetermined topics. These topics were established based on their frequent occurrence in book chapters and reviews related to the topic [1,4,20]. Contrary to the studies examining other health-related topics on YouTube, it was noteworthy that the number of videos with high content was significant [14,21,22].

There were 23 videos (20%) that discussed all 13 specified contents in the research, and this rate was significantly higher compared to studies conducted on YouTube in the field of health-related videos [23-25]. The prevalence of our established criteria in the video content can likely be attributed to the fact that a significant majority of the video uploaders are healthcare professionals (79.1%). While the reasons for choosing general anesthesia (80%) and the definition of general anesthesia (74.8%) were the most frequently identified content in YouTube videos, only 51.3% of these videos mentioned 'success' and 54.8% discussed 'clinical survival'. It is believed that in order to explain topics like 'success' and 'clinical survival', long-term post-operative follow-ups should be performed in the videos, and these data need to be shared. However, since it is more difficult to obtain this data, far fewer videos have covered these topics.

An important observation from the study was that the overall VIQI score was significantly higher for the group of videos with high content. The qualitative assessment of these videos indicated superior scores in aspects such as information flow and accuracy, as well as overall quality and precision. Videos offering a more diverse and precise range of content are perceived as more beneficial for patients. This finding helps clarify the link between the comprehensiveness of the content and the VIQI scores.

Videos uploaded by professionals and those targeting professionals had significantly higher VIQI scores compared to those uploaded by laypersons or targeting laypersons. Even though the proportion of videos targeting professionals (41.7%) and laypersons (41.7%) was equal in this study, the majority of the videos were uploaded by professionals (79.1%). As a result, this is contrary to other study evaluating health-related YouTube videos [26]. VIQI scores were notably high, with a mean score of 13.57 out of a

total of 20 points.

Contrary to previous studies, this research revealed that the percentage of individual videos uploaded by layperson users was found to be low (37.6%) [14, 27]. It has been observed that laypersons should upload a greater quantity of high-quality videos, incorporating their personal experiences with general anesthesia in dentistry.

Limitations

This study has certain limitations. Firstly, the results only reflect the information available at the time of the search due to the ever-changing nature of YouTube. Additionally, the study focused on English language videos, which primarily represent English-speaking countries. It is important to consider that YouTube content is dynamic, with continuously changing search results, and variables such as viewing rates, likes, dislikes, and comments can be manipulated. As of November 2021, YouTube has removed the public dislike count on all videos [28]. Therefore, unlike other studies, our research was unable to utilize dislike data. Furthermore, YouTube's algorithm does not provide detailed demographic data, limiting the ability to determine the social/educational background or age of viewers. Future studies could consider employing content analysis and questionnaires targeting both laypeople and specialists to address these limitations.

Conclusion

YouTube serves as a very rich source of knowledge on the subject of general anesthesia applied in dentistry. The current research indicates that the majority of YouTube videos concerning this topic were produced primarily by professionals, lending credibility to their content. Discussions about why general anesthesia is selected featured as the most frequently addressed theme. Considering the limitations of this research, the conclusion can be drawn that YouTube videos that explain dental procedures carried out under general anesthesia can be seen as an effective supplemental resource for audiences ranging from healthcare professionals to laypersons.

Conflict of interest

The authors have reported no conflicts of interest in relation to this work.

Financial disclosure

The authors confirmed that this study was conducted without any financial backing.

Ethical approval

For this study, Istanbul Medipol University Ethical approval was obtained from the Non-Interventional Clinical Research Ethics Committee (E-10840098-772.02-3661).

Authorship contributions

Concept: AT, NA, YEH. Design: AT, NA, YEH. Data Collection or Processing: AT, NA, Analysis or Interpretation: AT, NA, YEH. Literature Search: NA, YEH. Writing: AT, NA, YEH

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