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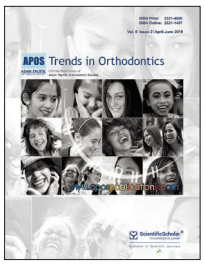

Original Article

How reliable are YouTube videos on laser-assisted surgical treatment of the gummy smile?

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ABSTRACT

Objectives: Patients frequently use social media platforms to obtain information on dental treatment. This study aimed to evaluate the quality of the content prepared for patients seeking information on laser-assisted surgical treatment of the gummy smile on the YouTube platform.

Material and Methods: Videos were searched on YouTube using the keyword "fix gummy smile" in Google Trends. Considering the exclusion criteria, 30 out of 119 videos were selected for the study. Videos were analyzed in terms of general characteristics, video uploader, video content quality (VCQ), video information and quality index (VIQI), and Global Quality Scale (GQS). Statistical significance was established at $P < 0.05$.

Results: The average VCQ of the videos was 3.07 ± 1.39 out of a maximum of 30. Most videos (46.7%) were uploaded by dentists and 23.3% by healthcare institutions. Considering the video uploader, no significant difference was found in VCQ, VIQI, and GQS ($P > 0.05$). There was a positive correlation among the interaction index, the number of likes, and the reliability score ($P < 0.05$). Moreover, reliability score showed a positively directed association with GQS, total VIQI score, and total VCQ score ($P < 0.01$).

Conclusion: Clinicians who upload content to YouTube should consider the importance and potential of YouTube to provide information to communities and create videos with more intellectual content to facilitate access to accurate information, especially related to health.

Keywords: YouTube, Gummy smile, Orthodontics, Periodontal surgery, Content analysis

INTRODUCTION

The internet provides easy access to information on health issues in today's globalized society.[1] In the early 2000s, approximately 4.5% of internet users searched for health-related information online,[2] while according to studies, this number has increased up to 80% today.[3] Social media, as one of the components of data sharing, offers patients the advantages of independent, fast, easy, and universal access to information.[4]

YouTube is one of the social media platforms that can be accessed on smartphones, tablets, and other multimedia devices. Since its establishment in 2005, it has become the second most popular website in the world. YouTube hosts more than 5 billion videos, and a typical user spends approximately 13 min on the platform every day.[5] Due to its vast visual and auditory information content, YouTube is frequently preferred by patients for information on dental treatments, especially since esthetic concerns are at the forefront[6,7] because smiling is one of the fundamental aspects of human perception of beauty.

A perfect smile is characterized by harmony between the three parameters of teeth, gingivae, and lips. Exposing gingiva over 3 mm when smiling can cause an unattractive or unnatural expression, otherwise known as a "gummy smile" (GS), which many people with aesthetic concerns complain about. Common causes of GS include excessive gingiva coverage, vertically increased upper jawbone length, short upper lip, and short or hyperactive upper lip muscles that retract too much in a full smile. This multifactorial etiology requires multidisciplinary esthetic approaches including restorative, orthodontic, and periodontal surgeries for the GS treatment. GS cases with excessive gingival coverage can be easily treated with various gingivectomy/gingivoplasty techniques such as conventional scalpel surgery, electrocautery, or laser-assisted surgery.[8] Laser-assisted approaches have a high acceptance rate due to post-treatment comfort.[9] Although these treatment alternatives are surgical procedures, patients want to be visually informed due to esthetic concerns.

YouTube is one of the main platforms used for such purposes. Since videos shared on YouTube are not previewed or rated, viewers may be exposed to accurate and inaccurate information. For this reason, YouTube videos have been evaluated in many academic studies in the field of medicine. However, these studies are limited to dentistry and no study has been found to analyze the quality of the information in YouTube video content regarding laser-assisted surgical treatment of GS.

Considering the above information, the main objective of this study was to determine the quality of information presented in YouTube videos for people seeking information about laser-assisted surgical treatment of GS and to evaluate the characteristics of the video uploaders. Our null hypothesis is that the characteristics of the uploader have no effect on the quality of the information in the video content.

MATERIAL AND METHODS

This cross-sectional study analyzing YouTube video content was conducted between February 5, 2021, and March 15, 2021. Ethics committee approval was not required for this study as it was conducted using a public website. On February 5, 2021, the first clinician (N.E.) used Google Trends to search for the most used keywords in the treatment of GS in the past 5 years. The search parameter was restricted to the "Worldwide" setting. The top five most used words in this context are as follows: "Fix GS," "GS treatment", "how to correct GS," "GS correction," and "GS laser" [Figure 1]. Thus, "fix GS" was selected as the most searched keyword. To collect accurate data, a new YouTube user account was created without any previous search history or recorded videos. Videos related to "fix GS" were searched on the YouTube website (https://www.youtube.com). The "sort by relevance" option was chosen, which was determined by YouTube using a combination of factors such as a number of views, ratings, upload dates, and "past 5 years" filters. A total of 119 videos were saved to a playlist called "GS" in the library section of YouTube. After sorting by the number of views, all videos were watched and evaluated by N.E. within 1 week. These viewings took place between 09:00 am and 12:00 noon throughout the week. There was a break of at least 3 min between two consecutive videos to allow the researcher to concentrate her attention. These timing details mentioned above were managed by the supervisor (S.S.). According to the exclusion criteria listed below, only 30 of the 119 videos remained for content analysis. The exclusion criteria were as follows:

1. The video language not being English
2. The video was lacking audio content and/or title information
3. Irrelevant to the topic
4. Repetitive video
5. Videos longer than 15 min [Figure 2].

S.S. then created a list of 30 study videos using a randomization table and assigned a unique number to each one. After the list was created, the supervisor prepared a 5-day schedule to watch a total of 30 videos and gave the list to the second clinician (S.E.M). S.E.M., a well-known and recognized expert periodontologist with more than 10 years of professional experience, watched the 30 study videos. Before watching the study videos, S.E.M. watched 10 digitally randomized non-study GS videos on YouTube twice, 15 days apart, and in two different sessions. S.E.M. rated the content of each video on a 0–10 point scale. The results of both sessions were 97.90% matched and Cohen's kappa (κ) value was 0.98, indicating that the match was "almost perfect."

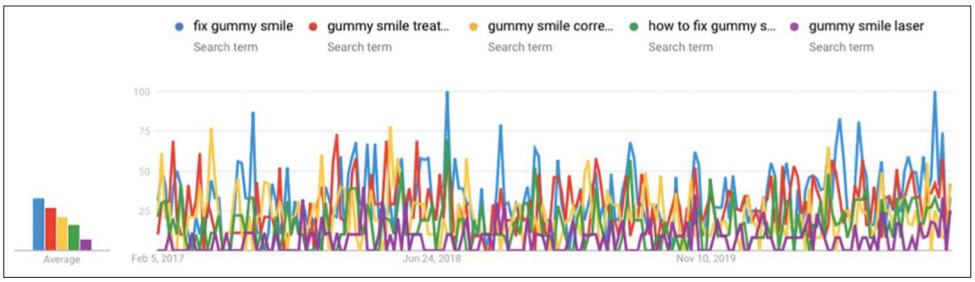

Figure 1: Results of Google Trends keyword research for GS.

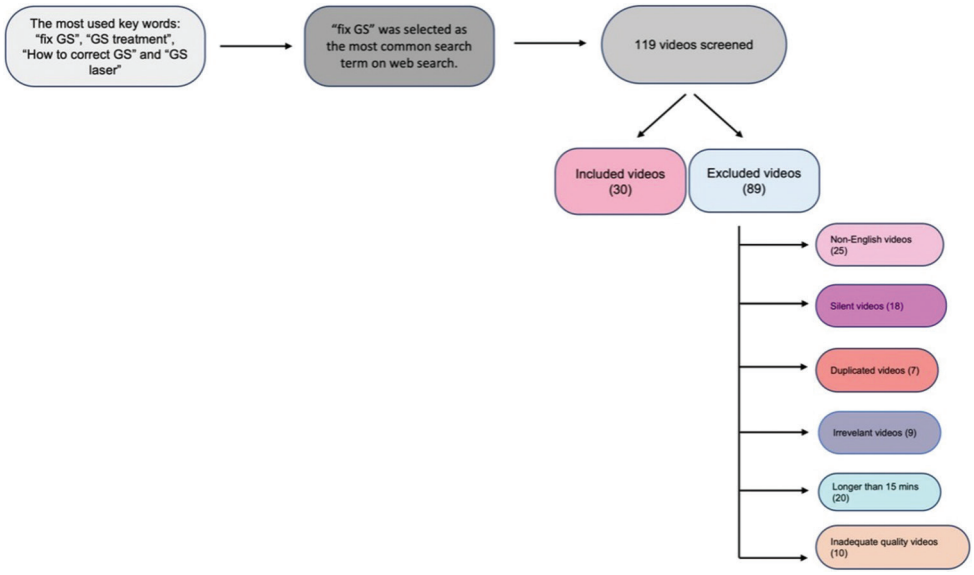

Figure 2: Video selection flowchart based on exclusion criteria.

The video viewing sessions conducted by N.E. and S.E.M. during the study were organized and supervised by S.S. under the following conditions;

- Watched between 09:00 am and 12:00 noon
- There was a break of at least 3 min between two consecutive videos
- At least 7 h of sleep per day
- A well-lit and regularly ventilated environment at normal room temperature
- No external stimuli such as cell phones, computers, or televisions
- A standard distance of 1 m from the screen.

Videos were classified into four groups according to their sources: (a) Dentist/orthodontist, (b) health institutions, (c) dental companies, or (d) others (YouTubers). Furthermore, the target 39 audience of the videos was subdivided into (a) professionals, 40 (b) non-professionals, and (c) both. The gender of the 41 content provider was also included in the study. All videos were evaluated in detail and analyzed in terms of general video information, video uploaders, and video content quality (VCQ). The VCQ score,[10,11] video information and quality index (VIQI) score,[10-12] reliability score,[13,14] and Global Quality Scale (GQS) score[15] were recorded to obtain an objective assessment of the video content.

Based on these parameters, the VCQ score was calculated for each video. The content quality of the videos was assessed using the following 10 parameters: Description, benefits, procedures, complications, comparison of treatment options, prognosis, care, supportive medical practices, costs, and specialties.[10,11] For each video, each of these 10 parameters was scored based on consensus judgments on a scale of 0–3. A score of,

- 0: Video provided misleading information or no information at all
- 1: Video provided insufficient information
- 2: Video provided adequate information
- 3: Video provided comprehensive information on the topic.

After scoring each of the 10 parameters used to evaluate the content quality of the video was scored between 0 and 3, the VCQ value of that video was determined by the sum of these 10 scores. VCQ values ranged between 0 and 30, with a total score of 30 indicating that the video contained comprehensive and scientifically accurate information.

The overall quality of each video was evaluated using VIQI. This evaluation was based on a 5-point Likert scale (1 = poor quality and poor flow, 2 = generally poor quality and poor flow, 3 = moderate quality and suboptimal flow, 4 = good quality and generally good flow, and 5 = excellent quality and flow) and determined the flow of information, accuracy of the information, video quality, and the sensitivity (level of agreement between title the video and the content).[10-12]

The videos included in the study were scored according to reliability scores[13,14] and GQS,[15] which have been used in many studies. Charnock *et al*.[13] introduced consumer health information criteria for treatment decisions and Singh *et al*.[14] applied them to a 5-point Likert scale to assess the credibility of videos. A high score indicates reliable video content. The GQS scale was used to determine the quality of the videos.[15] The scale was designed so that the total score for each video was as follows: 1 point for very low quality, 2 points for low quality and limited use, 3 points for average quality, 4 points for good quality, and 5 points for very good quality.

In the final stage, the number of views, the time between upload and viewing, likes and dislikes, and the duration of the videos were recorded. With this recorded data, the viewership rates of the videos and viewers' interactions with the videos were calculated as shown by Hassona *et al.*[16]

Interaction index (%) = ([Number of likes - Number of dislikes]/[Total number of views]) × 100.

Viewing rates (%) = ([Number of views]/Number of days since upload) × 100.

Statistical analysis

Number Cruncher Statistical System 2007 software (Kaysville, Utah, USA) was used for statistical analysis. Descriptive variables were presented as mean, standard deviation, median, frequency, ratio, minimum, and maximum values. The normality of distribution was tested using the Shapiro–Wilk test for quantitative data. The results showed that the data were not normally distributed. Therefore, the Mann–Whitney U-test or Kruskal–Wallis test was used to compare the means of two or more than 2 independent groups. Spearman correlation analysis was used to show the relationship between variables. Statistical significance was established at $P < 0.05$.

RESULTS

In this study, a total of 119 videos were analyzed for the keyword "fix GS." Following the evaluation, 30 videos were included, and 89 videos were excluded according to the exclusion criteria [Figure 2]. Descriptive statistics of the 30 YouTube videos analyzed are presented in [Table 1]. As shown in Table 1, the number of views was approximately 44 M., the mean number of likes was 223, the mean number of dislikes was 15, the mean interaction index was 4.04 ± 17.55, and the viewing rate was 3714 [Table 1].

Most of the 30 videos included in the study were uploaded by dentists (46.7%, $n = 14$). This was followed by health-related faculties or institutes (23.3%), dental companies (16.7%), and YouTubers (13.3%), respectively. Comparison of GQS, VIQI, and VCQ scores by video source did not reveal a statistically significant difference ($P > 0.05$) [Table 2].

The correlation analysis revealed a positive correlation between the number of likes and the number of views ($P < 0.001$) [Table 3]. No significant correlation was found among the number of views, duration of the video, and interaction index ($P > 0.05$). Although there was a positive correlation among the interaction index, the number of likes, and the reliability score, there was a negative correlation between the index and the time since the videos were uploaded. The reliability score showed a strong positive correlation with GQS, total VIQI score, and total VCQ score ($P < 0.001$). However, there was no statistically significant relationship between the number of views and GQS, the total VIQI score, and the total VCQ score ($P > 0.05$) [Table 3].

Table 1: Descriptive statistics of YouTube videos.

	n	Min–Max (Median)
Time since uploaded (in days)	1083	29–5711 (646)
Number of views	43M 627K	6K-54M (3658)
Number of likes	223	0–1600 (63)
Number of dislikes	15	0–102 (6)
Number of comments	38	0–300 (5)
	Mean±Sd	
Duration (sec)	256±65	68–774 (164)
Interaction index	4.04±17.55	0–96.8 (0.46)
Viewing rate	3714±154	1–18576 (1093)
Reliability score	2.17±0.65	1–3 (2)
VCQ	3.07±1.39	1–6 (3)
VIQI	10.23±2.53	6–16 (10)
GQS	2.13±0.94	1–4 (2)

Mean±Sd: Mean±Standard deviation, Min–Max: Minimum–Maximum, N: Number, Sec: Second, M: Million, K: Thousand, VCQ: Video content quality, VIQI: Video information and quality index, GQS: Global Quality Scale

Table 2: Comparison of videos in terms of their source.

	n	Mean±Sd	Min–Max (Median)	*P
VCQ				
Dentist	14	3.21±1.53	1–6 (3)	0.336
Health institution	7	2.43±0.98	1–4 (2)	
Dental company	5	2.8±1.3	2–5 (2)	
Other	4	4±1.41	2-5 (4.5)	
VIQI				
Dentist	14	10.57±2.79	6–16 (10.5)	0.639
Health institution	7	9.29±0.76	8-10 (9)	
Dental company	5	11±3.87	7–16 (10)	
Other	4	9.75±1.71	8–12 (9.5)	
GQS				
Dentist	14	2.21±1.05	1–4 (2)	0.608
Health institution	7	1.86±0.69	1–3 (2)	
Dental company	5	2±1.23	1–4 (2)	
Other	4	2.5±0.58	2–3 (2.5)	

Mean±Sd: Mean±Standard deviation, Min-Max: Minimum-Maximum, N: Number, VCQ: Video content quality, VIQI: Video information and quality index, GQS: Global Quality Scale, **Kruskal–Wallis Test P < 0.05*

DISCUSSION

In a consumer-based assessment, people prefer social media platforms over scientific platforms. For this reason, social media platforms like YouTube need to be managed or directed by professionals so that individuals who are seeking accurate information can access it. The availability of social media

Table 3: Correlation analysis.

	Time since upload	Total number of views	Number of likes	Number of dislikes	Number of comments	Duration	Interaction index	Viewing rate	Reliability score	GQS	Total VIQI score	Total VCQ score
Time since upload												
r	1	0.377*	0.185	0.299	0.000	−0.099	−0.364*	−0.056	−0.241	−0.229	−0.115	−0.224
P	-	0.040	0.327	0.109	0.683	0.601	0.048	0.769	0.020	0.224	0.544	0.233
Total number of views												
r	0.377	1	0.817*	0.806*	0.783**	0.000	0.120	0.846*	−0.118	−0.022	0.122	−0.099
P	*0.040	–	*0.000	*0.000	0.000	0.163	0.529	*0.000	0.535	0.907	0.522	0.603
Number of likes												
r	0.185	0.817**	1	0.790**	0.905**	0.324	0.504**	0.810**	0.026	0.230	0.251	0.197
P	0.327	0.000	–	0.000	0.000	0.081	0.005	0.000	0.891	0.222	0.182	0.297
Number of dislikes												
r	0.299	0.806**	0.790**	1	0.704**	0.225	0.140	0.684**	−0.117	−0.104	0.066	0.105
P	0.109	0.000	0.000	–	0.000	0.233	0.459	0.000	0.539	0.583	0.731	0.582
Number of comments												
r	0.000	0.783**	0.905**	0.704**	1	0.338	0.458*	0.850**	0.000	0.195	0.263	0.164
P	0.683	0.000	0.000	0.000	–	0.068	0.011	0.000	0.815	0.301	0.161	0.386
Duration												
r	−0.099	0.000	0.324	0.225	0.338	1	0.334	0.218	0.048	0.000	0.026	0.365*
P	0.601	0.163	0.081	0.233	0.068	–	0.072	0.247	0.801	0.102	0.891	0.047
Interaction index												
r	−0.364*	0.120	0.504**	0.140	0.458*	0.334	1	0.336	0.382*	0.491**	0.000	0.518**
P	0.048	0.529	0.005	0.459	0.011	0.072	–	0.070	0.037	0.006	0.059	0.003
Viewing rate												
r	−0.056	0.846**	0.810**	0.684**	0.850**	0.218	0.336	1	0.032	0.126	0.220	0.000
P	0.769	0.000	0.000	0.000	0.000	0.247	0.070	–	0.868	0.508	0.243	0.947
Reliability score												
r	−0.241	−0.118	0.026	−0.117	0.000	0.048	0.382*	0.032	1	0.649**	0.596**	0.471**
P	0.020	0.535	0.891	0.539	0.815	0.801	0.037	0.868	–	0.000	0.001	0.009
GQS												
r	−0.229	−0.022	0.230	−0.104	0.195	0.000	0.491**	0.126	0.649**	1	0.453*	0.634*
P	0.224	0.907	0.222	0.583	0.301	0.102	0.006	0.508	0.000	–	0.012	*0.000
Total VIQI score												
r	−0.115	0.122	0.251	0.066	0.263	0.026	0.000	0.220	0.596**	0.453*	1	0.437*
P	0.544	0.522	0.182	0.731	0.161	0.891	0.059	0.243	0.001	0.012	–	0.016
Total VCQ score												
r	−0.224	−0.099	0.197	0.105	0.164	0.365*	0.518**	0.000	0.471**	0.634**	0.437*	1
P	0.233	0.603	0.297	0.582	0.386	0.047	0.003	0.947	0.009	0.000	0.016	-

Spearman correlation, r: Correlation coefficient, Correlation coefficient is significant at the level *P<0.05 (two tailed), **P<0.001 (two tailed). VCQ: Video content quality, VIQI: Video information and quality index, GQS: Global Quality Scale

platforms allows easy access to a wide range of information sources and services. Al-Silwadi *et al*.[6] investigated the role of social media and its impact on patients undergoing orthodontic treatment. They concluded that online media

such as YouTube provide audiovisual data that can increase orthodontic patients' knowledge about their treatment. However, the ease of access to medical information shared by non-specialists carries some risks. Although some of the studies that have measured the quality of information accessed through social media have evaluated other platforms,[17-19] most of the studies have examined YouTube.[20,21]

YouTube is one of the social media platforms that distinguish itself from professional scientific services by offering its users rich visual content and easy access to information, hence, the reason patients prefer it frequently. However, the validity of the information on YouTube has been brought into question given the ease of sharing videos and the non-standardized nature of the uploaded video content.[22] Clinicians should, therefore, keep in mind that no matter how accurate the video content is, people can interpret it differently.

YouTube videos have been reported on various topics related to oral health and dentistry, such as early childhood caries, orthognathic surgery, and root canal treatment.[20-23] Such dental research is limited, as no studies have yet been conducted to assess the quality of information presented in YouTube videos on laser-assisted surgical treatment of GS. Even using appropriate search phrases, people and physicians have difficulty obtaining information due to redundant content. A total of the 119 videos found in our search for "fix GS," 89 were either irrelevant, lacked audio or video, or were repetitive. After excluding the redundant videos that did not meet our ideal criteria, we analyzed the remaining 30 YouTube videos for content quality. Videos uploaded by the YouTubers have a social purpose by enabling them to share their own experiences, but videos produced by healthcare institutions often have more educational content.

Many studies that examine the quality of health-related YouTube videos have reported poor information content.[14,16,24] The quality of information on disease processes in some medical fields including orthopedics, neurology, and rheumatology has previously been assessed, and their findings were that the quality of the information was poor.[14,18,22] Within the surgical field, studies assessed the content quality of online information related to some surgical interventions such as orthognathic surgery, dental implants, and head-and-neck cancer[16,25] and the findings were compatible with the majority of former studies.[14,18,22] When we evaluated the content quality of videos, we found that the videos on laser-assisted surgical treatment of GS were inadequate VCQ with a mean of 3.07. The majority of videos scored low in terms of their usefulness to patients and the accuracy of the information portrayed. None of the videos analyzed cited the source of published information or justified claims relating to benefit and performance. The vast of videos were scored with low points in terms of the comparison of the different treatment options, complications, and cost-effectiveness. Insufficient information about GS in aforesaid videos causes the possibility of negatively influencing patients regarding treatment of GS.

The content-related knowledge of the uploader of the videos is one of the factors that can affect VCQ. Several former studies reported that most YouTube videos were uploaded by patients.[20,26] According to Knösel *et al*.,[27] the quality of YouTube videos provided by patients appeared to be poor. Similarly to our study, the value of the VCQ score did not show a statistically significant difference in terms of the YouTube video source. Our findings showed that more than half of the videos in this study were posted by professionals. However, uploaders' content-related knowledge did not make a notable difference in VCQ scores. The results of the study about the content quality of YouTube videos on the clear aligners conducted by Sadry and Buyukbasaran[28] were compatible with our findings in terms of the video source.

On average, good quality and reliable videos have a longer span but reduce viewers' attention.[29] Sadry and Buyukbasaran also stated that viewers' attention span decreases in long videos.[28] In our study, we found that long videos are mostly uploaded by non-expert users. These videos often included non-medical topics such as the personal lives of the uploaders. Prolonged video durations were assumed as a cause for these findings. Interestingly, we found a weak positive correlation between the duration and the total VCQ score of the videos. However, no association was found between the number of likes, duration, and views of videos and VCQ.

Considering all of them, the null hypothesis, that the uploaders of the videos about laser-assisted surgical treatment GS on YouTube do not affect the content quality of the videos, have been accepted.

Given the controversial nature of online medical information, there are still many patients who continue to trust their doctors more about their medical conditions than they trust any online information.[30] YouTube content is highly dynamic and constantly changing as both interests and the time spent watching videos change over time. Long videos can generate large amounts of data, which can be extremely difficult to analyze. One thing to note, however, is that YouTube metrics such as subscribers, likes, and dislikes can potentially be manipulated. However, with the popularity of YouTube and its potential use as an important source of medical information, it is crucial to direct patients to appropriate resources. While videos uploaded by individuals often serve a social function, by allowing them to share their personal experiences, those produced by any medical establishment have more likely to contain educational content.[5]

Consequently, there is a lack of content about laser-assisted surgery of GS treatment on YouTube and dentists might

consider producing videos and sharing them on YouTube. In addition, clinicians can refer their patients to videos with accurate content on YouTube to increase collaboration and promote successful treatment outcomes.

CONCLUSION

When searching for the keyword "fix GS" on YouTube, many of the results were unreliable and many of them were taken out of context, making it difficult to find accurate information. Therefore, dental professional organizations, dental clinics, and dentists should consider uploading peer-reviewed videos on YouTube about laser-assisted surgery and GS treatment. Additional research is also required to examine the quality of information on laser-assisted surgical treatments and GS corrections on various social media platforms so that we have in-depth knowledge and understanding of the true impact of these videos. Only when we get sufficient validation, data will be able to explain the true nature and consequences of these videos to our patients, community, and relevant authorities. To this end, healthcare professionals should be aware of the content of video-sharing platforms and refer their patients to accurate and reliable e-information sources.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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