



EVALUATION OF YOUTUBE CONTENT REGARDING VARENICLINE AND SMOKING CESSATION

Musa ŞAHİN¹, Erhan KAYA²

¹Provincial Health Directorate of Adana, Ministry of Health Turkey

²Kahramanmaraş Sutcu Imam University, Faculty of Medicine, Kahramanmaraş, Turkey

Corresponding author: Musa Şahin, e-mail: dr.musasahin@hotmail.com

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Introduction. The use of varenicline, an effective way to quit smoking, has become a subject of discussion in the mainstream media, social media, and the internet due to the growing number of people trying to quit smoking. YouTube videos serve a significant purpose in the drive towards smoking cessation with the aid of the drug mentioned above. This study aimed to evaluate the content of videos related to varenicline on YouTube. **Material and methods.** Six different research terms were created for a search on YouTube. Two reviewers evaluated the videos for quality, reliability, and usefulness. After detecting useful and misleading videos, the factors affecting them as video parameters in these groups were compared. **Results.** Of the videos evaluated, 78% were classified as useful, while the remaining 22% were misleading. Video length, number of likes and the likes ratio showed no significant difference between these two groups ($p=0.264$; $p=0.075$; $p=0.798$). The DISCERN (DS) and Global Quality Scale (GQS) scores of misleading videos were significantly lower ($p=0.001$). The DS and GQS scores of the useful videos were 2.58 ± 1.11 and 2.67 ± 1.05 , respectively. **Conclusions.** Misleading videos had a higher number of views and comments compared to useful videos. It was observed that independent YouTube users and media sources are producing more misleading videos. It is very concerning that cigarette quitters do not develop awareness in decision making about the misleading information from media and independent users. In contrast, health pages, physicians, and patient experiences can guide those trying to stop smoking.

Cuvinte cheie: renunțare, conținut, educație, dezinformare, luarea deciziilor.

EVALUAREA CONȚINUTULUI DE PE YOUTUBE CU PRIVIRE LA VARENICLINĂ ȘI RENUNȚAREA LA FUMAT

Introducere. Utilizarea vareniclinei, ca modalitate eficientă de a renunța la fumat, a devenit un subiect de discuție, care suscită un viu interes, în mass-media mainstream, pe rețelele de socializare și internet, datorită numărului tot mai mare de persoane care încearcă să renunțe la fumat. O serie de videoclipurile de pe YouTube își propun ca scop popularizarea medicamentului respectiv drept un remediu eficient în tentativa de renunțare la fumat. Acest studiu și-a propus să evalueze conținutul videoclipurilor de pe YouTube care descriu acțiunea vareniclinei. **Material și metode.** Au fost creați șase termeni diferiți de cercetare pentru căutarea pe YouTube. Doi recenzenti au evaluat videoclipurile sub aspectul calității, fiabilității și utilității. După delimitarea videoclipurilor utile de cele cu un conținut înșelător, au fost comparați factorii care le afectează, precum parametrii video. **Rezultate.** Dintre videoclipurile evaluate, 78% au fost clasificate ca utile, în timp ce restul (22%) au fost înșelătoare. Durata videoclipului, numărul de aprecieri și raportul de aprecieri nu au arătat nicio diferență semnificativă între aceste două grupuri ($p=0,264$; $p=0,075$; $p=0,798$). Scorurile DISCERN și GLOBAL QUALITY ale videoclipurilor cu un conținut înșelător au fost semnificativ mai mici ($p=0,001$). Scorurile celor utile au fost $2,58\pm 1,11$ și, respectiv, $2,67\pm 1,05$. **Concluzii.** Am constatat că videoclipurile cu un conținut înșelător au avut un număr mai mare de vizionări și comentarii în comparație cu videoclipurile utile. S-a determinat că utilizatorii independenți ai YouTube și ai surselor media produc comparativ mai multe videoclipuri care induc în eroare. Este alarmant faptul că cei care decid să renunțe la țigări nu dau dovadă de spirit critic și vigilență în selectarea informațiilor care apar în mass-media sau sunt difuzate de utilizatorii independenți, ignorând, în mare parte, paginile de sănătate, medicii și experiențele pacienților care îi pot ghida, în mod eficient, să se debaraseze de viciul fumatului.

INTRODUCTION

Smoking is the cause of 7.10 million deaths worldwide and 182 million Disability Adjusted Life Years (DALY) in 2017, which makes it the most significant behavioral element of the global healthcare burden and the second most predominant causal factor among all the contributors to this burden (1). Quitting methods and the war against nicotine addiction are continuously improving. Varenicline, bupropion, and nicotine band or psychotherapy consist part of effective addiction treatment. Studies have biologically proven these agents (2). Varenicline is receiving much more attention because of its effectiveness in treating nicotine addiction. It does not produce significant neuropsychiatric side-effects compared to a placebo, bupropion, or nicotine bands (3).

With the advent of the information age and the widespread use of smartphones, the internet has become an electronic communication network that provides easy access and usage regardless of location and time. Due to broad coverage and ease of use, it provides health information with effortless accessibility. It can be considered a form of media and is a common source of information. YouTube is an omnipresent website for the sharing and viewing of videos. According to Amante DJ et al., one in every two people in the USA resort to YouTube as a source of health information (4). These qualities of YouTube should be assessed, the internet can also be a misleading and wrong source of information. Video quality, video content, and the investigation of false information are the areas that have mainly been studied. Determining the characteristics and what defines these will explain how beneficial YouTube can be and which video characteristics can be trusted. In addition to high-quality content, YouTube may also contain misleading content (5).

There has been no evaluation of videos related to varenicline videos yet. Therefore, in the light of the latest developments, an examination of the quality, likes, duration, and comments of the YouTube videos on varenicline has become necessary. Therefore, this study aimed to evaluate the varenicline videos on YouTube.

MATERIAL AND METHODS

We searched on YouTube using the following key

terms: varenicline, smoking cessation varenicline, quit smoking varenicline, smoking cessation medicine, quit smoking medicine, and medication to quit smoking. Only English videos were included in the study. Videos in languages other than English, videos with poor sound quality, off-topic, and duplicated videos were excluded from the study. The search was performed on March 6, 2021. Some previous studies have used a method similar to this content analysis study (6-8). Video listings are made based on view counts. The studies on YouTube show that a great majority of users (84%) watch videos from the first three pages (9). Therefore, 360 videos were selected from the six search terms. Following the elimination of videos according to the defined criteria, 144 videos were selected for evaluation (fig. 1). Two public health specialists evaluated the videos regarding the informative quality and information content using the Global Quality Scale (GQS) and DISCERN (DS) scale.

Usefulness

Two researchers evaluated the videos under subheadings to determine if they contained misleading information. The videos that did not refer to any of the following topics were considered out of context: usage, side-effects, efficacy, the effect, the mechanism, information on the harms of smoking addiction, the psychology of the addiction, the safety of the active substance, and reference to professional help. We determined the characteristics of the misleading videos by comparing them with the beneficial ones.

Useful videos are any video, the content of which included scientifically proven information and did not contain any unscientific claims on the topics mentioned above.

Misleading videos were considered any video containing information that has not been proven scientifically or that has been scientifically proven to be wrong under any of the topics mentioned above.

Assessment of quality

The GQS is a scale used to evaluate internet streams is also suitable for evaluating the quality of YouTube videos. The GQS has a 5-point system with 1 point given to videos with the lowest quality and 5 points to the highest quality (tab. 1) (10).

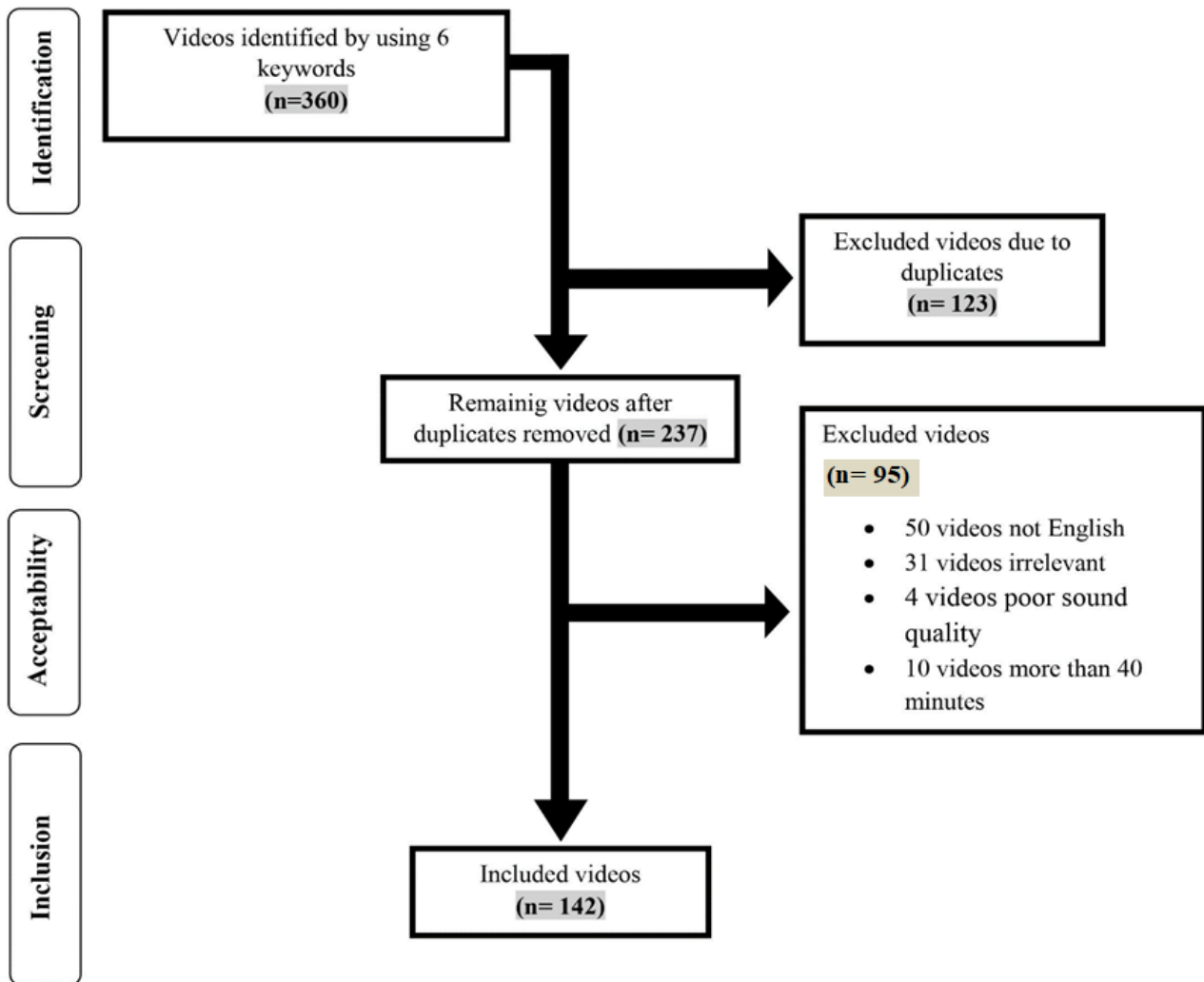


Figure 1. The study process.

Table 1. Global Quality Scale.

1.	Poor quality, poor flow, most information missing, not helpful for patients
2.	Generally poor, some information given but of limited use to patients
3.	Moderate quality, some important information is adequately discussed
4.	Good quality good flow, most relevant information is covered, useful for patients
5.	Excellent quality and excellent flow, very useful for patients

Assessment of reliability

The YouTube videos were evaluated regarding reliability by using the DS tool score. There is a different evaluation for each of the five items, with one point allocated for a “yes” response. The DS tool helps evaluate health information, and along with increasing quality, the score moves from 1 to 5. This reliability tool was previously used by Charnock (tab. 2) (11).

Video parameters

During the research, we recorded the video parameters within a file on March 6, 2021. Then, we calculated the characteristics of the videos [time since upload (days), video length (mins), the number of views, comments, likes, dislikes, and the variables derived from these, viz. views/day, likes/day, dislikes/day, comments/day, and like ratio (like/like+ dislike)].

Table 2. Modified DISCERN* reliability tool.

1.	Are the aims clear and achieved?
2.	Are reliable sources of information used?
3.	Is the information presented balanced and unbiased?
4.	Are additional sources of information listed for patient reference?
5.	Are areas of uncertainty mentioned?

*From charnock (11)

Video sources

Video sources were categorized under seven main groups: (a) independent users, (b) physicians, (c) health institutions, (d) academic/ journals, (e) consumer/patients, (f) pharmacy companies, and (g) Agencies/ TV channel.

Ethics

Since the video-sharing site YouTube is free and open to everyone, ethical approval was not required for the study.

Statistical analysis

Data processing and statistical analyses were performed using SPSS vn.15 software. Descriptive statistics were stated as mean± standard deviation, median, minimum, and maximum values. When comparing the determinants of video quality, the *Student's t-test* or the *Mann-Whitney U-test*, based on normality tests, and the *Chi-squared test* were used to understand the differences between groups. Conformity of the variables to normal distribution was based on the *Shapiro-Wilk test* and *Kolmogorov-Smirnov test*. A value of $p < 0.05$ was considered statistically significant.

RESULTS

Out of 360 videos initially identified, 310

(%86.1 were English, while 50 (%13.9) videos were non-English, thus, being excluded. The duplicates (123 videos), non-English (50 videos), irrelevant videos (31 videos), videos longer than 40 mins (8 videos), and videos with poor sound quality (4 videos) were removed, whereas 144 videos remained. The remaining 144 videos were then analysed and separated into two categories: useful or misleading. The Kappa scores used to examine inter-rater agreement were 0.81 and 0.84 for the GQS and DS tools, respectively. Misleading information was determined in 34 videos (23.6%).

These videos were examined under specific subheadings. It was determined that 76.6% of the videos mentioned the side-effects of the drug, 62.1% contained information about its effectiveness, 40% stated the mechanism of action, 37.9% listed the social, economic and health problems caused by the addiction, 37.3% referred individuals to professional care, 37.3% provided information on the safety of the active substance, 31.7% mentioned other treatment options, 28.5% mentioned the medicine usage, 10.3% stated situations in which the drug is contraindicated, and 17.9% the physiology of the addiction (tab. 3). Videos that did not include any misleading information under any subheadings were accepted as useful.

Table 3. Distribution of items, n (%).

Items*	n	%
Usage	41	28.5
Side effects	111	76.6
Contraindications	15	10.3
Effectiveness	90	62.1
The mechanism of effectiveness	5	40.0
Hazards of addiction	55	37.9
Other treatment options	46	31.7
The physiology of addiction	26	17.9
Referral to professional care	54	37.3
Safety	54	37.3

*There is more than one topic, n: number, %: percentage

The reliability of the information of the video content varied according to the video source. Useful information was provided most often by physicians (90.9%), health institutions (94.7%), academicians/journals (100%), pharmaceutical

company (100%), and consumers (patients) (85.2%). News Agencies/TV channels and independent users predominantly uploaded misleading videos (tab. 4).

Table 4. Distribution of useful videos by sources, n (%).

Video Source	Total (n=142) (100%)	Useful (n=111) (78%)	Misleading (n=31) (22%)	P
Independent users	7 (100%)	1 (14.3%)	6 (85.7%)	<0.001
Doctors	11 (100%)	10 (90.9%)	1 (9.1%)	
Health Facility	19 (100%)	18 (94.7%)	1 (4.3%)	
Academic institutions/journals	14 (100%)	14 (100%)	0 (0%)	
Pharmacy company	16 (100%)	16 (100%)	0 (100%)	
Consumer	61 (100%)	52 (85.2%)	9 (14.8%)	
Agencies/ TV channel	14 (100%)	0 (0%)	14 (100%)	

The video parameters were grouped into two categories: useful or misleading. More recent videos were seen to contain less misleading information (p<0.001). The duration of the videos had no significant impact on their usefulness. Videos containing misleading information were significantly longer than useful videos (p=0.014). The number of useful and misleading videos did not differ (p=0.075), however, the misleading

videos had more dislikes (p=0.012). The number of comments was higher in misleading videos (p=0.004). Views/days ratio (p=0.327) and dislikes/days ratio (0.069) were not significantly different between the groups. Misleading videos had a higher comments / day ratio (p=0.011) and lower GQS and DS tool scores (p<0.001) (tab. 5).

Table 5. Baseline characteristics of videos.

Parameters	Useful (n=111)		Misleading (n=31)		P value
	Median (min-max)	Mean± SD	Median (min-max)	Mean± SD	
Numbers of days on YT	1940 (76-44258)	2557.9±4212.6	2771 (509-4922)	2678.1±1527.1	<.001
Length of videos (sec.)	218 (34-2220)	333.2±259.1	290.5 (57-962)	363.8±266.7	.264
Numbers of views	3854 (39-477988)	15469.5±48011.8	8763.5 (287-2705764)	189951.7±542923.2	.014
Numbers of likes	23 (0-2600)	101.4±277.8	42.5 (1-34000)	2775.8±8297.1	.075
Numbers of dislikes	3 (0-130)	6.5±15.0	6 (0-896)	61.1±176	.012
Numbers of comments	10 (0-473)	32.3±65.6	15 (0-1829)	144.3±351.8	.004
Views/day	2,13 (0.0-198.8)	10.3±25.5	3.5 (0.0-2365.2)	162.6±474.8	.069
Likes/day	0.0 (0-1.7)	0.1±0.2	0.0 (0.0-43.9)	2.7±8.9	.327
Dislikes/day	0.0 (0-0.1)	0.0±0.0	0.0 (0-0.8)	0.6±0.2	.069
Comments/day	0.0 (0-0.5)	0.0±0.1	0.0 (0.0-2.4)	0.2±0.4	.011
Like ratio	0.9 (0-1.0)	0.8±0.2	1.0 (0.5-1)	0.9±0.2	.798
Modified DISCERN	3 (0-5)	2.6±1.1	1 (0-3)	1.3±0.7	<.001
GQS score	3 (1-5)	2.7±1.1	1 (1-3)	1.5±0.6	<.001

DISCUSSIONS

In the previous studies regarding the internet and health, participants mostly used the internet as a primary source of health information with-

out consulting doctors or other sources (12). In addition to being increasingly attractive in every field of life, YouTube has an increasing fascination for those seeking health information.

These videos presented by YouTube with open access do not have any supervision mechanism for the quality, content, and information reliability. Anybody with access can be affected by the low-quality videos and content with distorted reality (13).

Evaluations initiated by Keelan J. et al. for the first time are followed and updated by researchers (14-16). YouTube is an independent video archive of thousands of patient experiences on varenicline. The abandonment of a paternalistic attitude in medicine with the effect of improvements in medical approaches has made patients more proactive. YouTube videos determine what stance and tone should be adopted by the patients (17). YouTube can cause the spread of wrong and misleading information (18). These study findings showed that YouTube was used to broadcast videos about varenicline. The parameters examined in this study included the quality of the videos, the sources uploading the high-quality videos, video parameters, and the quantitative characteristics of accurate and misleading information.

Considering the tendencies of viewers on YouTube, it is evident that misinformation is essential in video choice, and these videos had higher viewing rates. In the first step, we assessed whether the videos were beneficial and reviewed them under separate subheadings. Some parameters were added to be able to evaluate the videos more objectively, and this enabled a more beneficial assessment of varenicline. Even if some videos do not meet all the criteria, they might be more beneficial than others regarding the areas covered.

The three leading topics in the videos showed side effects (76.6%), efficacy (62.1%), and the mechanism of action (40%). Side-effects and the mechanism of action of varenicline were very popular on this platform. However, the first-hand source that gave the most information was patient videos.

The researchers examined YouTube videos on different topics. In the analysis of previous studies, the study made by McMullan M. et al. found 77% of the useful videos, another study by Erdem and Sisik found 78.3%. In contrast, Singh AG et al. reported a misleading rate of 30.4%. In the current study, the rate of useful videos was 78%, showing a high usefulness rate similar to those

recorded in the other studies (14, 19-20). The reasons for such high rates of usefulness were that videos included patient experiences, health pages, physicians and academic sources. The popularity bases behind the misleading videos were that they were uploaded by TV channels/agencies and independent users. Varenicline has been the subject of controversy since it first appeared, so there has been a great deal of misleading information about it. The media, in particular, has encouraged this situation. There was a high usefulness rate in another study of videos that used health web pages, patients, and trainers (13). According to a study conducted by Şahin A. et al., universities and academic institutions or magazines uploaded few videos, whereas healthcare workers produced more useful videos (14). Despite the low participation, it has been shown in studies that information provided by experts proved to be more beneficial, and sources are critical regarding access to accurate information. The producers of misleading and useful videos must be categorized (18). It is concerning that people seek health information on the internet as a primary source, and 75% do not consider the source of information (21). Among the sources categorized in the current study to detect healthy and correct information sources, there was seen to be more distorted information provided by agencies/tv channels and independent users.

The number of likes and comments determines the popularity of videos on Youtube. In the comparisons between misleading and valuable videos in terms of the number of views, there was much higher internet traffic for misleading videos. A high view count does not necessarily imply that the information provided is credible (22). In a study conducted on diabetes, similar results were recorded. Considering the higher popularity of the misleading videos, it presents a high risk that people get information from them without making a qualitative evaluation. There is a need for greater support from the sources of helpful health information or magazines or a user of a particular drug to continue real stories and to increase the viewing of videos produced by these sources. People and institutions should support these people (3). Similar results were obtained in a study in which methotrexate injection videos were examined.

Thus it can be understood that the number of videos containing accurate and useful YouTube information is sufficient. However, at the same time, there is the indisputable fact that the viewers do not watch the videos in a highly competent manner (18).

The popularity and viewings are open to manipulation. They can be increased by viewers referred by a group of people to a video intentionally. Therefore, the number of dislikes of the videos and formulas derived from those should be used as an indication. Erdem H. and Sisik A. reported that helpful and beneficial videos had higher rates of views and likes (19). The manipulation of the viewing numbers is possible; it can be assumed that as the misleading videos were viral. However, by looking at dislikes/days, it is evident that the viewers could not distinguish video quality and did not give likes to valuable videos. In the current study, misleading and useful videos were compared into two categories considering the fundamental qualities. The comments/day rates demonstrated that people talked much more about the misleading and distorted videos as they had more comments and interaction. The distorted information sparks controversies among the viewers. It has also been noticed that information coming from television shows attracts more comments and views (23).

CONCLUSIONS

1. Smoking is one of the most important preventable causes of death. YouTube still serves as a platform that affects the approach of individuals to smoking cessation and is a primary source of information for those planning to stop smoking. As an information source, it is an active component that may be either a facilitative or an obstructive tool in the fight against smoking.
2. Health researchers and those wishing to stop smoking may encounter new videos of varying content. They may make much use of these videos by evaluating patient videos and informative health clues. However, at the same time, they risk being exposed to and influenced by YouTube videos that try to attract more attention through the spread of misleading and false information. YouTube users typically cannot distinguish between valuable and misleading videos on varenicline use. As a healthy source of information, health pages, healthcare professionals, doctors, and academicians upload only few videos and do not contribute sufficiently to spreading healthy and helpful information.
3. There is a need for greater support and contributions. Comments of varenicline users that include personal experiences result in helpful videos based on the correct narrative of past experiences. Generally, viewers can watch these videos and obtain useful information even if these videos are not very inclusive and highly qualified. There are valuable videos on varenicline, but they might not be of high quality or comprehensive. Individuals who wish to stop smoking are unaware of the distorted information uploaded by the media and independent users. In contrast, health pages, doctors, and patient experiences can be helpful guides for stopping smoking.

The current study determined significant differences between the groups regarding the DS tool and GQS points. These results showed that videos are of higher credibility when they are of higher quality. The average GQS point and DS tool credibility points were 2.67 ± 1.05 and 1.35 ± 0.73 , respectively, for useful videos and significantly lower at 1.47 ± 0.56 and 1.35 ± 0.73 for misleading videos ($p < 0.001$). The DS tool and GQS scores of the useful and misleading videos were consistent and similar within the groups. The useful videos of the current study were found to be lower in quality than those in the study by Erdem H. et al., however the mean score points obtained were similar to those in the study made by Singh AG et al. (19, 20).

There were some limitations to this study. Although the study was designed based on the evaluations of two observers and several criteria were applied in the evaluation process, the results were the subjective interpretations of the persons that evaluated the videos. This study constitutes a snapshot of YouTube on a specific date, but the content might have changed as YouTube is dynamic platform. The fact that the study only included English speaking videos can also be considered a limitation as the content of the videos on YouTube may vary with the language.

CONFLICT OF INTERESTS

The authors report there are no competing interests to declare.

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ETHICS APPROVAL

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