

Is Youtube™ an accurate source of patient-information for awareness about periodontal diseases?

Bercestte Güler, Büşra Özaltun

Kutahya Health Sciences University, Faculty of Dentistry, Department of Periodontology, Kutahya, Turkey.

Abstract

Objectives: Oral hygiene education and patient awareness are crucial for prevention and the sustainability of its treatment because of high prevalence of periodontal diseases. This study aimed to evaluate YouTube videos related to periodontal diseases and assess them comprehensively, reliability, and quality for non-professional internet users.

Methods: YouTube search was performed using the three keywords: 'periodontal disease', 'gingival disease,' and 'gum disease'. Video lengths, duration, numbers of total views, likes, dislikes, comments values were recorded. The interaction index, viewing rates and video power index (VPI) were calculated. Comprehensiveness tailor-made index was assessed for content, Global Quality Scale (GQS), and DISCERN scales were used for reliability and quality of videos.

Results: A total of 210 videos were evaluated, and 79 videos were included in the study. While 69 of the videos are useful videos, 9 of them have misleading video content. VPI values were found 2.88 ± 0.67 for useful videos and 1.78 ± 0.66 for misleading videos. The mean GQS value of the videos has seen as 2.76 ± 0.7 . According to the DISCERN score, 41.8% of the videos show poor quality. The number of videos with comprehensiveness value (2) score is 44 and the number of videos (1) score is 35.

Conclusions: YouTube videos may be used as an education source about periodontal disease for non-professional users; however, videos need to be improved in terms of content and quality. These and

similar publications may be supported for the optimization of videos to be shared on YouTube with periodontal disease and oral hygiene education.

Keywords: YouTube; oral hygiene; periodontitis; awareness; information.

Citation: Güler B, et al. (2021) Is Youtube™ an accurate source of patient-information for awareness about periodontal diseases?
Dentistry 3000. 1:a001 doi:10.5195/d3000.2021.134
Received: January 9, 2021
Accepted: March 7, 2021
Published: April 1, 2021
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Email: berceste43@gmail.com

INTRODUCTION

Periodontal diseases (PDs) affect about 90% of the worldwide population [1] and defined as the inflammatory process affecting the soft and hard tissues around teeth. [2] Gingivitis is a reversible inflammation, and periodontitis is an irreversible disease that results in alveolar marginal bone loss and clinical attachment loss. [2] The most crucial etiological cause of gingival inflammation in periodontal diseases

is plaque accumulation and biofilm formation. [3]

The bacterial biofilm layer is colonized on the root surfaces, and many undesirable consequences can occur, ranging from tooth mobility, loss of function, aesthetic disorders, and tooth loss. [4] Due to the systemic low-grade chronic inflammation of periodontitis, it can cause or induce detrimental effects on the occurrence, course, or prognosis of many different diseases. [4] In cases where good oral hygiene

and periodontal condition are healthy, general, and oral health-related quality of life has also been well reported. [5] Thus, it is reported that dentists play an important role in preventing general health problems. [6]

One of the most critical issues for the treatment of periodontal disease is that the patient understands the cause of the disease and is conscious and willing about oral hygiene and treatment. A study has shown that regular dental participants had more

information about periodontitis; however, about one-third of regular dental care users never heard of periodontitis, and the other two-thirds had better knowledge about periodontal health. [3] In the study conducted in partially edentulous patients, 68.5% of the patients were previously informed about oral care; however, only 17.3% of patients are reported to have information about the gingival disease. [7]

A study has conducted that 72% of internet users were reported to seek health information on the internet. [8] However, according to statistical information, 40% of the health content shared on social media is fake news, and 20% of it comes from the same source. [9] However, in a study evaluating the impact of social media on oral health literacy in adolescents, it was reported that Youtube and Facebook are the most effective social media. [10]

Youtube is the most widely used video sharing site in the World since 2005, and a significant number of broadcasts are added to the site dynamically every day. [11] Different results have been reached in the studies evaluating the content and quality of the publications presented in the dentistry field on Youtube. While the quality and content of videos shared on Youtube regarding gingival recessions were weak [12], it was revealed that youtube videos related to diabetes and oral health could be educational. [13] There are many studies related to Youtube and medical and dental diseases, but

according to our information, no studies have been found in the literature on periodontal diseases.

This study investigates whether Youtube can be used as a quality, educational, and accurate information source in terms of periodontal disease for non-professional.

MATERIALS AND METHODS

Study Design

This study was a cross-sectional trial of periodontal disease evaluation on the Youtube™ website. The study did not require the approval of an Ethics Board. In order to evaluate the videos and eliminate the bias, the entire search history on the search engine to be evaluated has been cleared. An account was opened with a new mail address on Youtube. In order to evaluate the information accessed by non-professional youtube users about periodontal disease, three keywords were determined: "periodontitis" "gingivitis" and "gum disease." The present study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines [14] (<http://www.prisma-statement.org/>), illustrating the outcomes of the video searches and selection process have shown in Figure 1.

The search process of determining keywords on Youtube™ was made on 04.21.2020. Eighteen thousand nine hundred videos for "periodontitis," 37700 videos for

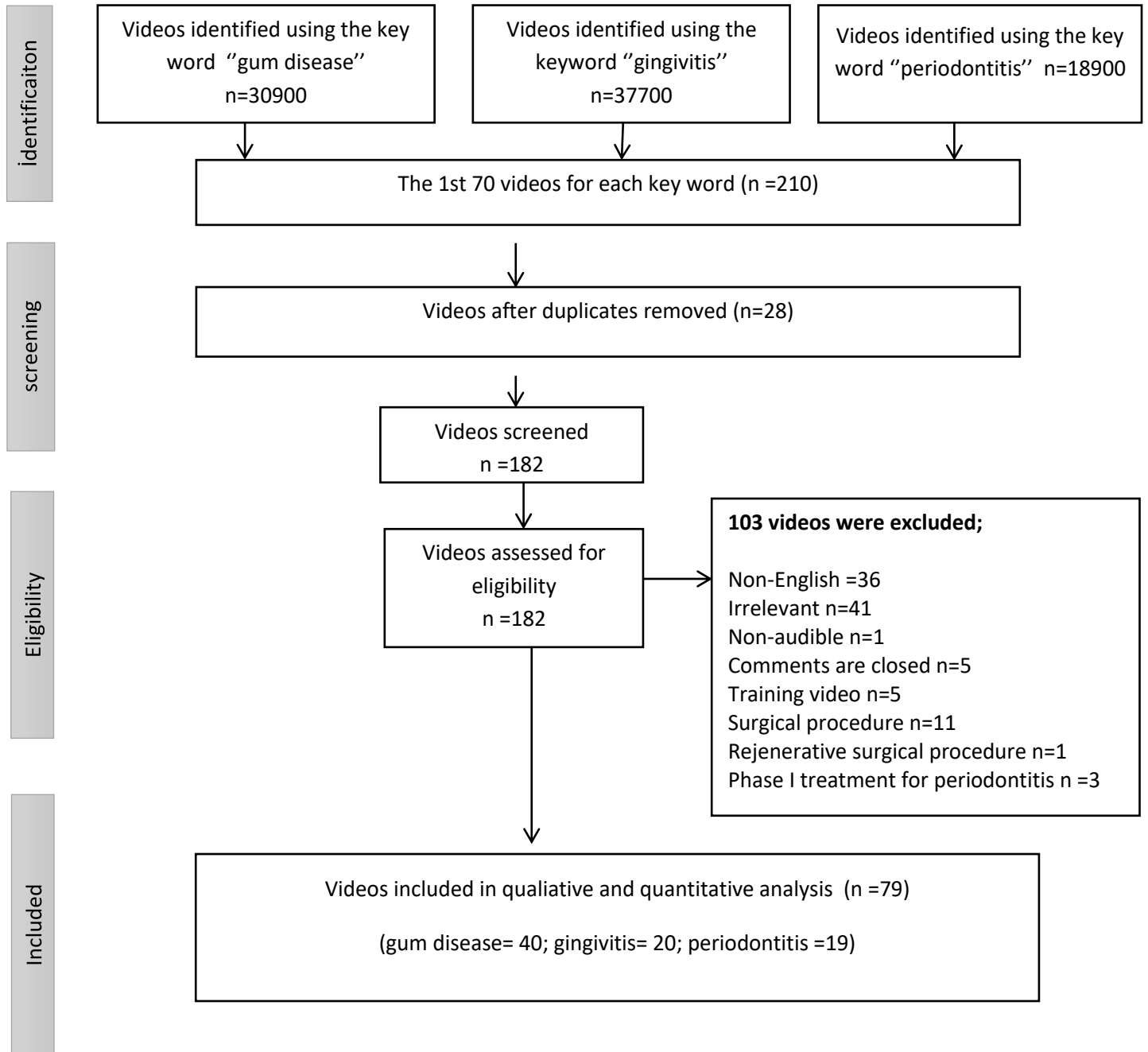
"gingivitis" and 30900 videos for "gum disease" were shared from the keywords related to the study. The first 60 videos for each keyword are included in the study. [12] All of the videos included in the study were recorded on the Youtube account opened with a separate mail address. Simultaneously, all videos were downloaded and saved in a separate folder on the hard disk. The evaluation of the videos was completed between 05.15.2020 and 05.22.2020.

A single researcher evaluated all videos. For the researcher's intraexaminer reliability calibration, each keyword, ten videos out of 70 selected videos were included and evaluated twice with DISCERN scores at three-week intervals. The overall intraexaminer reliability observer agreement calculated as weighted kappa score was 0.98 (range: 0.952-0.997).

Inclusion and Exclusion Criteria

As a criterion for inclusion in the study, it is based on the videos being published for patient educational information with content related to the clinical presentation, aetiological factors, and periodontal disease treatment options. English and audible videos are also included in the study. The criteria for exclusion are as follows: 1) non-English, 2) conference or school lectures, 3) Non-relevant videos are defined as videos not communicating any of the abovementioned aspects of periodontal diseases, 3) Duplicate

Figure 1: Prisma Flow Chart Search Strategy



videos, 4) About regenerative/respective surgical technique, 5) Videos that give information about periodontology in academic language for professionals, 6) Videos that closed to comments, 7) Non-audible (Table 1).

Interaction index (%) = [number of likes – number of dislikes / total number of views]x100.

Video power index (VPI) = (number of likes / number of likes – number of dislikes) x100.

medicine); (c) Personal experience: During personal periodontal treatment / after periodontal treatment.

categorized according to source into 5 groups:

(a) independent users; (b) government/news agencies; (c) university channels/professional organizations; (d) health information websites; (e) medical advertisements/for-profit companies.

Table 1. Exclusion Reasons

Reason	SEARCH TERM			
	Gum disease	Gingivitis	Periodontitis	Total
Irrelevant	14	11	16	41
Duplicate	0	12	16	28
Non-English	2	22	12	36
Non-audible	1	0	0	1
Closed Comments	1	2	2	5
Education for professionals	0	2	3	5
Surgical Procedure	10	1	0	11
Regenerative Surgical Procedure	0	0	1	1
Phase I Treatment	2	0	1	3
Total	30	50	51	131

VIDEO QUALITY EVALUATION INDEXES

Global Quality Scale

The quality of the information provided by included videos was evaluated called Global Quality Scale (GQS), based on the quality of the video, the availability of information, and the usefulness for the patients. [18]

DISCERN Scoring System

The reliability was assessed using the DISCERN tool (https://www.discern.org.uk/discern_instrument.php), a questionnaire based on a standardized set of criteria for judging the reliability and quality of written health information on treatment choices.

DISCERN instrument focusing on the source of information, including references and dates of publication, description of treatments, short-term and long-term benefits of the treatments including risks, and the effects of treatment of choice on the

Demographic measurements

Each term was searched separately to gather the following quantitative information: category (useful, misleading, personal experience), total view, video length, mean duration, view count, number of likes and dislikes, number of comments, video quality degree, duration of the video (min) were recorded. The video's interaction index, viewing rate, and video power index (VPI) were calculated using the following formulas [15,16]:

Viewing rate (%) = [number of views / number of days since upload] x 100

Videos meeting including criteria were evaluated, and the above-mentioned information was recorded in a Microsoft Excel© 2016 spreadsheet.

Video Classification

All selected videos were as two classified systems:

based on the useful, misleading, or as personal experience-based [17]

Useful: Scientifically correct information about the etiology, treatment or prognosis of the disease; (b) Misleading: Containing scientifically unproven and false information currently available (herbal therapy, alternative

quality of life. [19]

Both GQS and DISCERN surveys are scored on a 5-point Likert scale. (5 = good quality criteria, 2–4 = quality criteria partially good, 1 = bad quality criteria).

COMPREHENSIVENESS TAILOR-MADE INDEX

A tailor-made comprehensiveness index (CI) was used to evaluate the videos based on their content in terms of clinical presentation, aetiological factors, and management options. [12] The following scores were used: (0) when videos did not mention any clinical presentation, aetiological factors or management options; (1) when videos mentioned one clinical presentation and one aetiological factor and did not describe treatment options; (2) for videos that reported at least two clinical presentations, at least two aetiological factors, and at least one treatment information.

Statistical Analyses

Statistical analysis was carried out on the IBM SPSS Statistics for Windows, Version 22.0 statistical software (IBM Corporation, New York, NY, USA). The Cohen κ statistical method was used to calculate intra-examiner reliability. The normality of continuous variables was investigated through the use of the Kolmogorov–Smirnov test, and categorical variables were analyzed using the χ^2 test. Logistic regression analysis was performed to measure the extent to which the independent variable explained the dependent

Table 2. Video Characteristics

	Useful videos	Misleading videos	Patient views	Total
	Mean \pm SD	Mean \pm SD	Mean \pm SD	
	(min - max)	(min - max)	(min - max)	
Number of videos (%)	69 (87.3%)	9 (11.3%)	1 (1.2%)	79
Total view	95358.7 \pm 03743.8 (39-183512)	78259.6 \pm 91243.7 (2313 - 253645)	13590	92375.5 \pm 285300.5
Video length	3.03 \pm 2.61 (0.39 - 13.42)	4.09 \pm 4.18 (1.08 - 14.35)	10.38	3.24 \pm 2.92
Duration on YouTube(month)	60.71 (3 - 137)	58.56 \pm 47.37 (10 - 154)	58	60.43 \pm 41.7
Number of likes	282.25 \pm 727.45 (0 - 4945)	384.33 \pm 450.81 (0 - 1395)	58	291.04 \pm 695.7
Number of dislikes	26.22 \pm 88.95 (0 - 646)	19.44 \pm 24.64 (0 - 67)	3	25.15 \pm 83.5
Interaction index%	0.74 \pm 1.12 (-0.69 - 7.69)	1.20 \pm 1.08 (0 - 3.05)	0.4	0.78 \pm 1.11
Viewing rate	48.73 \pm 137.03 (0 - 1018)	45.56 \pm 61.40 (2 - 200)	7	47.84 \pm 129.5
Number of comments	38.88 \pm 104.73 (0 - 586)	31.89 \pm 27.87 (0 - 77)	12	37.75 \pm 98.26
Video Power Index	104.96 \pm 36.16	94.85 \pm 36.3	105.45	103.81 \pm 35.85
Global Quality Scale	2.88 \pm 0.67	1.78 \pm 0.66	3	2.76 \pm 0.7

variable. Statistical significance was set at $p < 0.05$.

RESULTS

Video Characteristic

A total of 210 videos were evaluated; however, 79 videos were included in the study to be evaluated for three keywords in total. After the initial evaluation, 131 videos were excluded, and exclusion reasons were shown in Table 1. Information about whether the videos included in the study are animated or not was recorded. 19 of the 79 videos included are animated videos. While 69 (87.3%) of the included videos were useful videos, 9 (11.3%) were included in the misleading, and one was included in the patient view classification. The view values for useful videos is 95358.68 ± 303743.79 , while it is 78259.56 ± 91243.71 for misleading and 13590 for patients' views. While mean length video was 3.03 ± 2.61 min, it was found 4.09 ± 4.18 min in misleading videos, and 10.38 min in patients' view. The mean duration on YouTube was 60.71 months for useful videos, 58.56 ± 47.37 months for misleading videos, 58 months for patients' views. Mean likes değeri 282.25 ± 727.45 for useful videos, 384.33 ± 450.81 for misleading videos, 58 for patients' views. Mean dislike values were founded 26.22 ± 88.95 for useful videos, 19.44 ± 24.64 for misleading videos, 3 for patient's views. Mean comment number values were found 38.88 ± 104.73 for useful videos, 31.89 ± 27.87 for

misleading videos, 12 for patient views. Video characteristics are shown in Table 2.

Mean interaction index for useful videos $0.74 \pm 1.12\%$, misleading videos $1.20 \pm 1.08\%$, patients views 0.4% . Mean viewing rate 48.73 ± 137.03 for useful videos, misleading videos 45.56 ± 61.40 , patient views for 7 . Video power index values were found 2.88 ± 0.67 for useful videos and 1.78 ± 0.66 for misleading videos. (Table 2)

The videos included in the study; 25 (31.6%) are independent users, 4 (5.1%) are university channel-professional organization, 6 (7.6%) are health information websites; 44 (55.7%) were published by medical advertisements/for-profit companies. (Figure 2).

Global Quality Scale Scores

When the quality assessments of all periodontal disease-related videos were made with GQS, it was reported that no videos published to date on YouTube show excellent quality. While 9 (11.3%) of the included videos received the definition of good quality and generally good flow, that is (4) score, 45 (56.9%) received the score with the definition of moderate quality (3). 22 (27.8%) of the videos got the (2) score with the definition of generally poor quality and flow. Eventually, 3 (3.8%) of the videos received a score with the definition of poor quality, poor flow of the video, most information missing, (1). Mean GQS was found to be 2.76 ± 0.7 (Table 3).

Table 3. Global Quality scale (GQS)

Score	Definition	Number of videos (%)
1	Poor quality, poor flow of the video, most information missing, not at all useful for patient	3 (3.8%)
2	Generally poor quality and flow, some information listed but many important topics missing, of very limited use to patients	22 (27.8%)
3	Moderate quality, suboptimal flow, some important information adequately discussed but others poorly discussed, somewhat useful for patient	45 (56.9%)
4	Good quality and generally good flow. Most of the relevant information is listed but some topics are not listed. Useful for patient	9 (11.3%)
5	Excellent quality and flow, very useful for patient	0 (0%)

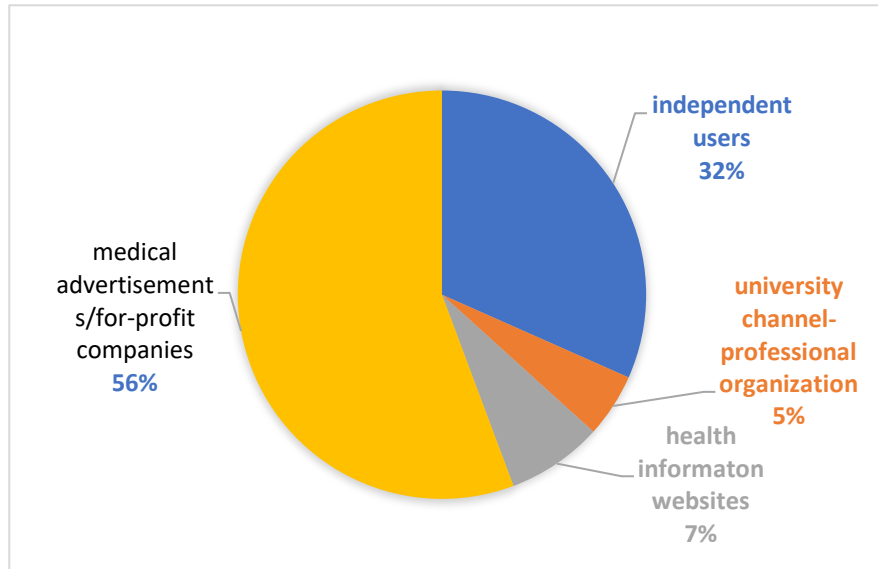


Figure 2. Source of uploaded videos.

DISCERN Scale

The average DISCERN scale score was 2.01 ± 1.06 . In the questions used for DISCERN scoring, how many answers were given for each Likert scale is shown in Table 4 in detail. A significant portion of the uploaded videos clearly stated their purpose and provided information on the subject. However, when 90% of the information sources used to create the video and which information sources are used are not explicitly mentioned in the video. It has been reported that 51% of the videos are partially balanced and unbiased. While 45% of the videos do not give information about additional sources of information, 73% do not refer to the uncertain areas. 65% of the videos talk about the treatment options partially or entirely, but 30% do not give the benefits of the treatments. Only 13% of videos about future situations in untreated cases provide full information, while 93.7%

do not give any information about the effect of treatment options on quality of life. As a result, only 2.5% of the videos can be used as a reliable source in terms of broadcast quality. One reference is provided in only one video.

Comprehensive Tailor-Made Index

Content evaluation of the evaluated videos related to periodontal disease was done with the Comprehensive Tailor-Made Index. According to this index, approximately 50% of the clinical presentation videos mention gingival bleeding, gingival erythema, gingival edema, and tooth loss. Approximately 25% of the videos mention gingival recession and halitosis. (Table 5).

As aetiological factors, 74.6% of the videos mentioned plaque and biofilm. Poor oral hygiene and calculus were mentioned in the video by 31(39.2%) and 28(35.4%). Incompatible prosthetic-orthodontic structures,

restorations, and fillings etiological factor is mentioned in 5 (6.3%) videos. The secondary effect of parafunctional movements on periodontal tissues is not mentioned in any of the included videos.

Information about Phase I periodontal treatment and modification of brushing techniques, Proper oral hygiene education for the treatment of periodontal diseases was mentioned by 33 (41.7%), and 39 (49.4%) videos, respectively. While the number of videos mentioning Phase II surgery periodontal treatment is 11 (13.9%); The number of videos mentioning the elimination of risk factors is 10 (12.65%). While the number of videos providing information about the use of mouthwash is 18 (22.8%), the use of desensitizing agents after periodontal treatment is not mentioned in any video. Thirty-five of the videos scored (1) according to this index, while 44 videos scored (2).

3.5. Relationship between dependent and independent variables

As a result of the regression analysis between DISCERN and video length, GQS, and video length, no statistically significant relationship was shown. ($p > 0.05$) Again, no statistically significant relationship was found in the regression analysis conducted between DISCERN and viewing ratio and GQS and viewing ratio. While analyzing the relationship between VPI and GQS ($p > 0.05$), no statistically significant relationship was shown ($p = 0.729$), but a statistically significant

relationship was provided between VPI and DISCERN ($p = 0.036$).

Table 4: DISCERN questions scores frequencies

	1	2	3	4	5
	(No)		(Partially Yes)		(Yes)
1. Are the aims clear?	2 (2.5%)	6(75.9%)	18(22.8%)	18(22.8%)	35(44.3%)
2. Does it achieve its aims?	2 (2.5%)	10(12.6%)	14(17.7%)	24(30.3%)	29(36.7%)
3. Is it relevant?	1(1.26%)	4(5.1%)	7(8.86%)	8(10.13%)	59(74.7%)
4. Is it clear what sources of information were used to compile the publication? (Other than the author or producer)	72(91.1%)	2 (2.5%)	2(2.5%)	1(1.3%)	2(2.5%)
5. Is it clear when the information used or reported in the publication was produced?	74(93.7%)	3(3.8%)	_____	_____	2(2.5%)
6. Is it balanced and unbiased?	13(16.4%)	13(16.4%)	26(32.9%)	12(15.2%)	15(18.9%)
7. Does it provide details of additional sources of support and information?	45(56.9%)	15(18.9%)	18(22.7%)	1(1.26%)	_____
8. Does it refer to areas of uncertainty?	73(92.4%)	3(3.8%)	2 (2.5%)	1(1.26%)	_____
9. Does is describe how each treatment works?	14(17.7%)	19(24.1%)	24(30.4%)	14(17.7%)	8(10.1%)
10. Does the publication describe the benefits of each treatment?	30(38.0%)	18(22.8%)	21(26.6%)	8(10.1%)	2(2.5%)
11. Does it describe the risks of each treatment?	74(93.7%)	2(2.5%)	2(2.5%)	1(1.3%)	_____
12. Does it describe what would happen if no treatment is used?	14(17.7%)	11(13.9%)	22(27.8%)	19(24.1%)	13(16.5%)
13. Does it describe how the treatment choices affect overall quality of life?	74(93.7%)	1(1.3%)	4(5.1%)	_____	_____
14. Is it clear that there may be more than one possible treatment choice?	40(50.6%)	20(25.3%)	12(15.2%)	5(6.3%)	2 (2.5%)
15. Does it provide support for shared decision-making?	33(41.8%)	22(27.9%)	18(22.8%)	4(5.1%)	2 (2.5%)
16. Based on the answers to all of the above questions, rate the overall quality of the publication as a source of information about treatment choices	33(41.8%)	22(27.9%)	18(22.8%)	4(5.1%)	2 (2.5%)

Table 5: Comprehensiveness tailor-made index frequencies of evaluated videos.

Clinical presentation		Aetiological factors		Management options	
Gingival bleeding	45 (56.9%)	Biofilm-plaque	59 (74.6%)	Phase I periodontal treatment	33 (41.7%)
Gingival erythema	40 (50.6%)	Parafunctional habits	0	Modification of brushing techniques, accurate oral hygiene education	39 (49.4%)
Gingival edema	36 (45.6%)	Poor oral hygiene	31 (39.2%)	Phase II surgery periodontal treatment	11 (13.9%)
Gingival recession	20 (25.3%)	Calculus	28 (35.4%)	Elimination of risk factors	10 (12.65%)
Mobility	9 (11.4%)	Incompatible prosthetic- orthodontic structures, restorations and fillings	5 (6.3%)	Use of moutwash	18 (22.8%)
Hypersensitivity	7 (8.8%)			Use of desensitizing agents	0
Tooth loss	32 (40.5 %)				
Halitosis	21 (26.6%)				

DISCUSSION

There are studies evaluating videos on Youtube as periodontal disease, gingival recession model, the relationship between diabetes and oral health, parent education about oral hygiene. However, to our knowledge, this study is the first study to evaluate the quality of video content as a periodontal inflammatory disease. A significant part of the videos evaluated as a result of this study provides comprehensiveness values that provide useful information about periodontal disease. However, when the quality and reliability of the videos were evaluated, low values were obtained. [12,13]

Most studies utilizing Youtube as a search engine have used 60-200 videos. [20] The majority of Youtube users scan only the first 30 videos. [21] Therefore, 70 videos for each keyword were included in our study.

In one study, the researchers cleaned the internet search browser and scanned through the incognito tab to prevent robot learning [22]; however, in another study, no information was found to clear the browser history [23].

In one study, 81.9% of the videos do not provide information on where to find oral cancer or more information. [15] A report on the gingival recession reported that 37% of the videos had reliable reference documents according to DISCERN scores. [12] In our study, it is not clear what information sources are used to compile the broadcast in 91.1% of the videos.

In a study that questioned whether Youtube could be an information source about oral cancer, the interaction index was found to be 0.3 ± 0.68 . [15] In a study presented, 30% of all evaluated videos contain

misleading information, while 76% of these videos are reported to be of poor quality. [23] In a study evaluating Youtube videos about genioplasty, interaction index, like and dislike number is not a suitable source of information for genioplasty, since it gives higher wrong information in videos that fall under the misleading group. [24] Longer videos have been reported to contain more misleading information for genioplasty. [24] In our study, the interaction index was higher in misleading videos than useful videos. While the duration of misleading and usefulness videos on YouTube was similar, the number of likes was found higher in misleading videos

In a study by Koller et al. about hip arthritis, only 2-4% of Youtube videos were reported to be of good quality. [25] In the studies about videos on Youtube about dental implants, it was

also emphasized that they are in poor quality and content in terms of education. [23,26,27] When all reliability scores are evaluated, it can be said that the quality content of the videos related to periodontal disease can be very diverse, and the content quality is moderate in this study.

Less than 10% of videos about burning mouth syndrome are categorized as good/excellent, and lower quality videos have been reported to show higher views, and it has also been reported that the videos uploaded by professionals take longer, but patient views have more views and likes. [28] Mean completeness score related to root canal treatment is only 22% complete when evaluated in terms of all etiology, symptoms, procedure, postoperative approach, and progression. [29] In a presented study, it has been reported that the content of Youtube videos evaluated for parent oral hygiene education will be useful but contains incomplete information. It has been reported that healthcare professionals can think of uploading more content to Youtube as a reason for having more useful content. [30] As a result of this study, a significant portion of the videos evaluated was included in the classification providing useful information about periodontal disease. When comprehensiveness was evaluated, it was found that at least 55.6 percent, at least two etiological factors, at least two clinical findings, and at least one treatment method were mentioned. The videos

that he never mentioned about treatment constitute 44.4%. Compared to the studies presented concerning periodontal disease, it can be said that in our study, it provided more information in terms of content related to periodontal inflammation. However, low values were found in terms of reliability and quality of the studies.

42.7% of videos about oral cancer were uploaded by healthcare professionals; in educational videos related to oral cancer, most of the videos talk about etiology, risk factors, and early detection, while the percentage of videos talking about management and prognosis is around 11-17%. [15] It has been reported that useful videos about oral cancer have been seen more recently. [15] In the study presented by Menziletoglu et al., it was reported that better quality videos take longer. [26] In a study evaluating youtube videos about disc herniation, the DISCERN reliability index and JAMA index with VPI were found, and no statistically significant difference was found. [16] However, videos uploaded by physicians have been reported to have higher content and quality. [16] However, in our study, a statistically significant relationship was found between DISCERN scores and VPI. It can be interpreted that higher quality and reliable videos can have more power.

In our study, 210 videos were included for three different keywords, but 41 of them were excluded because they were

irrelevant, 28 were due to duplication, and 36 were non-English. In this study, only the English videos were evaluated. However, evaluating youtube sources that provide information about periodontal diseases related to each country's language can be considered an information source for patients worldwide.

There are some limitations to our study. Firstly, although the search history has been cleared and a search is made through a new mail account, the geographic region where the search was done may affect the results, in order not to affect the search results on Youtube. In our study, only three keywords related to periodontal disease were selected. However, searches based on symptoms such as "gingival bleeding, gingival edema" may give different results. Also, as the third limitation, Youtube is a dynamic social media platform, and videos can be deleted continuously, and new videos can be added. Therefore, the quality and content of the videos may change according to the search time. There are many filters in the Youtube filter section, such as 4K, HD, subtitle, creative commons, 3D, and view count. In articles about Youtube and dentistry, filters are not generally used, but different results can be obtained after applying them. Only English videos were included in our study; however, videos uploaded in other languages with English subtitles were not evaluated. It may be important to include these videos as

well, to increase the number of data analyzed.

It has been reported that patients do not tend to share or change the information they have previously obtained from different sources with their medical doctors. [31] In the study have mentioned that the videos uploaded by medical professionals to Youtube are reported to be unprofessional in terms of content, reliability, and quality. [16] Health professionals were considering that Youtube can be an essential source of dental treatment leading today.

CONCLUSION

The study has shown that Youtube videos about the periodontal disease can be illuminating in content but contain incomplete information. The fact that there were no high-quality informative videos in our study suggests that there is a need to create more professional, evidence-based, and higher-quality videos. YouTube videos may be used as an education source about periodontal disease for non-professional users; however, videos need to be improved in terms of content and quality.

ACKNOWLEDGMENTS

The authors do not have any conflict of interest in the companies whose any concern are included in this article. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

REFERENCES

1. Prevalence of periodontal disease, its association with systemic diseases and prevention. Nazir MA. *Int J Health Sci (Qassim)*. 2017 Apr-Jun;11(2):72-80. PMID: 28539867.
2. A new classification scheme for periodontal and peri-implant diseases and conditions - Introduction and key changes from the 1999 classification. Caton JG, Armitage G, Berglundh T, Chapple ILC, Jepsen S, Kornman KS, Mealey BL, Papapanou PN, Sanz M, Tonetti MS. *J Clin Periodontol*. 2018 Jun;45 Suppl 20:S1-S8. PMID: 29926489.
3. Regular dental attendance and periodontal health knowledge: A cross-sectional survey. Varela-Centelles P, Diz-Iglesias P, Estany-Gestal A, Blanco-Hortas A, Bugarín-González R, Seoane-Romero JM. *Oral Dis*. 2020 Mar;26(2):419-428. PMID: 31785179.
4. Supportive periodontal therapy (SPT) for maintaining the dentition in adults treated for periodontitis. Manresa C, Sanz-Miralles EC, Twigg J, Bravo M. *Cochrane Database Syst Rev*. 2018 Jan 1;1(1):CD009376. PMID: 29291254.
5. The benefit of dental care to an elderly population assessed using a sociodental measure of oral handicap. Fiske J, Gelbier S, Watson RM. *Br Dent J*. 1990 Feb 24;168(4):153-6. PMID: 2310635.
6. Oral hygiene and the need for treatment of the dependent institutionalised elderly. Montal S, Tramini P, Triay JA, Valcarcel J. *Gerodontology*. 2006 Jun;23(2):67-72. PMID: 16677178.
7. Evaluation of partially dentate patients' knowledge about caries and periodontal disease. Ribeiro DG, Jorge JH, Varjão FM, Pavarina AC, Garcia PP. *Gerodontology*. 2012 Jun;29(2):e253-8. PMID: 21235624.
8. Evaluating asthma websites using the Brief DISCERN instrument. Banasiak NC, Meadows-Oliver M. *J Asthma Allergy*. 2017 Jun 16;10:191-196. PMID: 28670135.
9. The spread of medical fake news in social media—the pilot quantitative study. Waszak PM, Kasprzycka-Waszak W, Kubanek A. *Health policy and technology*, 2018 7(2), 115-118.
10. Social media in adolescent health literacy education: a pilot study. Tse CK, Bridges SM, Srinivasan DP, Cheng BS. *JMIR Res Protoc*. 2015 Mar 9;4(1):e18. PMID: 25757670.
11. Social media use by health care professionals and trainees: a scoping review. Hamm MP, Chisholm A, Shulhan J, Milne A, Scott SD, Klassen TP, Hartling L. *Acad Med*. 2013 Sep;88(9):1376-83. PMID: 23887004.
12. Medical reliability of a video-sharing website: The gingival recession model. Hamdan AA, Shaqman M, Abu Karaky A, Hassona Y, Bouchard P. *Eur J Dent Educ*. 2019 May;23(2):175-183. PMID: 30633844.
13. YouTube information about diabetes and oral healthcare. Pons-Fuster E, Ruiz Roca J, Tvarijonaviciute A, López-Jornet P. *Odontology*. 2020

Jan;108(1):84-90. PMID: 31396751.

14. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gøtzsche PC, Ioannidis JP, Clarke M, Devereaux PJ, Kleijnen J, Moher D. PLoS Med. 2009 Jul 21;6(7):e1000100. PMID: 19621070.

15. YouTube as a source of information on mouth (oral) cancer. Hassona Y, Taimah D, Marahleh A, Scully C. Oral Dis. 2016 Apr;22(3):202-8. PMID: 26718020.

16. A Quality Analysis of Disc Herniation Videos on YouTube. Gokcen HB, Gumussuyu G. World Neurosurg. 2019 Feb 2:S1878-8750(19)30246-3. PMID: 30721774.

17. YouTube as a source of information on cardiopulmonary resuscitation. Murugiah K, Vallakati A, Rajput K, Sood A, Challa NR. Resuscitation. 2011 Mar;82(3):332-4. PMID: 21185643.

18. YouTube as a source of information on COVID-19 and rheumatic disease link. Kocyigit BF, Akaltun MS, Sahin AR. Clin Rheumatol. 2020 Jul;39(7):2049-2054. PMID: 3244760.

19. DISCERN: an instrument for judging the quality of written consumer health information on treatment choices. Charnock D, Shepperd S, Needham G, Gann R. J Epidemiol Community Health. 1999 Feb;53(2):105-11. PMID: 10396471.

20. Is content really king? An objective analysis of the public's response to medical videos on YouTube. Desai T, Shariff A, Dhingra V, Minhas D, Eure M, Kats M. PLoS One. 2013 Dec 18;8(12):e82469. PMID: 24367517.

21. YouTube: a gauge of public perception and awareness surrounding epilepsy. Lo AS, Esser MJ, Gordon KE. Epilepsy Behav. 2010 Apr;17(4):541-5. PMID: 20236867.

22. Who is providing dental education content via YouTube? Dias da Silva MA, Pereira AC, Walmsley AD. Br Dent J. 2019 Mar;226(6):437-440. PMID: 30903071.

23. Quality of YouTube TM videos on dental implants. Abukaraky A, Hamdan AA, Ameera MN, Nasief M, Hassona Y. Med Oral Patol Oral Cir Bucal. 2018 Jul 1;23(4):e463-e468. PMID: 29924766.

24. Are YouTube™ videos a reliable source of information about genioplasty? Ayranci F, Buyuk SK, Kahveci K. J Stomatol Oral Maxillofac Surg. 2021 Feb;122(1):39-42. PMID: 32360751.

25. YouTube provides irrelevant information for the diagnosis and treatment of hip arthritis. Koller U, Waldstein W, Schatz KD, Windhager R. Int Orthop. 2016 Oct;40(10):1995-2002. PMID: 27029480.

26. Are YouTube videos related to dental implant useful for patient education? Menziletoglu D, Guler AY, Isik BK. J Stomatol Oral Maxillofac Surg. 2020 Dec;121(6):661-664. PMID: 32045688.

27. Social media patient testimonials in implant dentistry: information or misinformation? Ho A, McGrath C, Mattheos N. Clin Oral Implants Res. 2017 Jul;28(7):791-800. PMID: 27279455.

28. The usefulness of YouTube™ videos as a source of information on burning mouth syndrome. Fortuna G, Schiavo JH, Aria M, Mignogna MD, Klasser GD. J Oral Rehabil. 2019 Jul;46(7):657-665. PMID: 30919986.

29. YouTube as a patient-information source for root canal treatment. Nason K, Donnelly A, Duncan HF. Int Endod J. 2016 Dec;49(12):1194-1200. PMID: 26551481.

30. YouTube™ quality as a source for parent education about the oral hygiene of children. Duman C. Int J Dent Hyg. 2020 Aug;18(3):261-267. PMID: 32416034.

31. YouTube for information on rheumatoid arthritis--a wakeup call? Singh AG, Singh S, Singh PP. J Rheumatol. 2012 May;39(5):899-903. PMID: 22467934.