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Özgün Araştırma Makalesi

Evaluation of Information Reliability and Quality of Youtube™ Videos About White Spot Lesions

Beyaz Nokta Lezyonlarıyla İlgili Youtube™ Videolarının Bilgi Güvenilirliği ve Kalitesinin Değerlendirilmesi

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ABSTRACT

Aim: The aim of this study was to determine the quality and reliability of the information provided by YouTube™ videos about white spot lesion.

Material and Method: YouTube™ videos were searched for the term 'white spot lesion' (WSL) by relevance. 142 videos about WSL were analyzed and 56 videos that met the inclusion criteria were evaluated. Video demographics (number of views, duration, number of likes, number of comments) viewing rate, primary purpose, video sources were determined and the reliability and the quality of the listed videos were evaluated with modified DISCERN (ModDISCERN) scale and the Global Quality Scale (GQS). Kruskall-Wallis, Mann–Whitney U test, Spearman's correlation coefficients and Intra-class Correlation Coefficient were used for statistical analyses.

Results: The majority of YouTube™ videos analyzed on WSL were uploaded by Health Institute Groups (50%), with 29% uploaded by dentists and 21% by companies. The mean/standard deviation (SD) ModDISCERN score, showing the reliability of the information in the videos, was 2.71±1.22; and the mean/SD GQS value showing the video quality was 2.71±1.14. 25% of the videos' GQS value was >3, and the reliability of the information in these videos was significantly higher than the videos with a GQS of ≤3 (3.93 vs. 2.31; P<0.001). There was a high correlation between GQS and ModDISCERN scores in all 3 video source groups (Dentist r=0.805, Company r=0.757, Health Institute Groups r=0.917; P<0.01).

Conclusion: The information reliability and video quality of most YouTube™ videos about WSL, is not sufficient. Orthodontists and dentists should direct their patients to reliable information sources about WSL.

Keywords: Internet; Orthodontics; Social media; White spot lesion; YouTube

ÖZET

Amaç: Bu çalışmanın amacı, beyaz nokta lezyonları hakkındaki YouTube™ videolarının bilgi kalitesini ve güvenilirliğini değerlendirmektir.

Gereç ve Yöntem: YouTube™ videoları alaka düzeyine göre 'beyaz nokta lezyonu' (BNL) terimi için arandı. BNL ile ilgili 142 video analiz edildi ve dâhil edilme kriterlerini karşılayan 56 video çalışma kapsamında incelendi. Video demografisi (görüntülenme sayısı, süresi, beğeni sayısı, yorum sayısı) izlenme oranı, video paylaşım amacı, video kaynakları belirlendi ve listelenen videoların güvenilirliği ve kalitesi Modifiye DISCERN (ModDISCERN) ölçeği ve Global Quality Skalası (GQS) ile değerlendirildi. İstatistiksel analizler için Kruskall-Wallis, Mann-Whitney U testi, Spearman korelasyon katsayıları ve Sınıf İçi Korelasyon Katsayısı kullanıldı.

Bulgular: BNL hakkında analiz edilen YouTube™ videolarının %50'si sağlık enstitüsü grupları, %29'u diş hekimleri ve %21'i çeşitli firmalar tarafından yüklenmiştir. Videolardaki bilgilerin güvenirliğini gösteren ortalama/standart sapma (SS) ModDISCERN skoru 2.71±1.22; video kalitesini gösteren ortalama/SS GQS değeri ise 2.71±1.14 idi. Videoların %25'inin GQS değeri >3 idi ve bu videolardaki bilgilerin güvenilirliği, GQS'si ≤3 olan videolardan önemli ölçüde daha yüksekti (3.93'e karşı 2.31; P<0.001). 3 video kaynağı grubunun tümünde GQS ve ModDISCERN puanları arasında yüksek bir korelasyon vardı (Diş Hekimi r=0.805, Firmalar r=0.757, Sağlık Enstitüsü Grupları r=0.917; P<0.01).

Sonuç: BNL hakkında paylaşılan çoğu YouTube™ videosunun bilgi güvenilirliği ve video kalitesi yeterli değildir. Ortodontistler ve diş hekimleri hastalarını BNL hakkında güvenilir bilgi kaynaklarına yönlendirmelidir.

Anahtar Kelimeler: Beyaz nokta lezyonu; İnternet; Ortodonti; Sosyal medya; YouTube

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INTRODUCTION

The negative effects of inadequate oral health on the general health of patients have been demonstrated by much scientific evidences.[1] Dental caries is one of the most common chronic diseases in the world, which can be seen at all ages and in all segments of society. The most common cause of tooth loss and pain in the mouth is dental caries.[2,3] The first stage in the development of dental caries is called a white spot lesion.

White spot lesion is characterized by areas of sub-surface demineralization that occur beneath an intact enamel surface. The mineral content in the affected area is reduced, thus affecting the optical properties of the enamel, making these areas appear more opaque white in color compared to adjacent intact enamel.[4]

Risk factors such as poor oral hygiene, low salivary rate, and frequent carbohydrate consumption further increase the development of these initial lesions may occur frequently in patients undergoing orthodontic treatment,[2] as brackets and bands create plaque retention areas and adequate oral hygiene cannot be provided during orthodontic treatment with fixed appliances.[5] Clinically, while caries usually take at least six months to form, new WSL formation with poor oral hygiene can occur within 4 weeks of orthodontic treatment initiation.[6] According to the literature, the incidence of initial lesions after orthodontic treatment varies between 30~70% on average.[7] The high prevalence of WSLs that develop during orthodontic treatment is very worrying, so it was concluded that both patients and clinicians should be careful about caries prevention and remineralization methods.[5]

They are the first visible findings in caries formation and are considered initial lesions. If the surface is not disturbed, these lesions are at a remineralize level. Since this stage is at a reversible level, it is important and necessary to catch caries at this stage as early as possible and treat it with remineralization techniques according to the minimal intervention (MI) concept.[8] The fact that patients are knowledgeable about this issue will support this approach.

The internet has grown and spread rapidly and has become a part of daily life, has started to be used as a health communication tool today. Information on many subjects such as general health information, diseases, treatment options, and drugs can be accessed quickly and easily from the internet.[9] According to the literature, a large percentage of Internet users, such as 80%, use the internet to access health information.[10] In addition, in analyzing health information obtained from the internet, it has been reported that obtaining health information through this channel is effective for patients. It provides awareness on controlling and managing one's own or another person's health.[11]

YouTube™, an interactive video sharing platform, is visited by more than 1.9 billion users every month, making it the second most popular website worldwide after Google.[12] Not only healthcare professionals but also any internet user can generate health-related information and upload it to related websites. However, while the videos on this platform can be useful for patients, they can also contain a lot of misleading information.[13]

The scientific accuracy of the information in the health field on the internet varies. This information is directly accessible to internet users without being controlled by any institution. Therefore, the accuracy and quality of this information depend on the installer.[14] Although this situation allows users to access a lot of information, it also causes information pollution on the researched subject. Evaluating the content and accuracy of videos on various platforms aimed at informing patients is a new and necessary research topic. Researchers conduct studies examining the content of YouTube™ videos on many different topics. However, in the literature review, no study was found that analyzed the information content quality of the videos about white spot lesions. Therefore, this study aimed to evaluate the quality and accuracy of the information provided by YouTube™ videos on WSL and to analyze the effectiveness and usefulness of the videos for patients.

MATERIAL AND METHOD

YouTube™ Search Strategy

This cross-sectional study was approved by the Non-Invasive Clinical Trials Publication Ethics Committee at Nevşehir Hacı Bektaş Veli University (Reference No: 2022.03.37.). Google Trends is an online tool that allows users to determine how often select-

ed keywords in Google Search are queried over a given period,[12] this application was used at the start of the study to identify frequently used terms related to 'white spot lesion'. Search parameters were set as "Worldwide"/ "All Categories". A new YouTube™ (http://www.youtube.com) account has been created for this study so that old searches do not affect video results and rankings. Searched for the terms 'white spot lesion' by filtering the number of views by relevance on April, 5, 2022. A playlist consisting of 142 videos related to the white spot lesion was created. The inclusion criteria were: videos that in English language and lasted less than 15 minutes. Exclusion criteria were videos that had no audio or view, and repetitive videos. A total of 56 videos according to these criteria were analyzed in this study.

Related Video Assessment

All videos included in the study were reviewed in detail by a restorative dentistry specialist experienced in WSL. Video demographics that URL links, number of video views, duration of the video, uploading time, number of "likes", and number of comments were recorded. Video resources were divided into three groups: (1) dentist, (2) company, and (3) Health Institute Groups. Viewing rates were calculated with the following formula;

$$\text{Viewing rate}\,(\%) = \frac{\text{number of views}}{\text{number of days since upload}} \times 100$$

Assesment Scales (Modified DISCERN & GQS)

The ModDISCERN tool was used to evaluate the reliability of the listed videos and the Global Quality Scale (GQS) was used to evaluate the overall video quality. DISCERN is a tool used to evaluate the quality and reliability of online and written health-related information, and a ModDISCERN scale consisting of 5 questions is used to evaluate information in visual media (Table 1).[15] The GQS consisting of 5 questions was used as a second tool to evaluate the quality and usefulness of the videos for patients (Table 2). Scores were determined by calculating the total score of each video. Videos with a total GQS score of ≤3 were classified as low to poor quality, and videos with a score of >3 were classified as good to excellent quality.[16]

Table 1. Modified DISCERN for evaluation of the reliability of videos

Serial Number	Questions
1.	Are the aims clear and achieved?
2.	Are reliable of information used (i.e. publication cited, speaker is a board certified practitioner)?
3.	Is the information presented balanced and unbiased?
4.	Are additional sources of information listed for patient reference?
5.	Are areas of uncertainty mentioned?

Table 2. Global Quality Scale (GQS) used to rate videos containing information about WSL on YouTube™

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

Statistical Analyses

The software SPSS (SPSS Inc Statistical Package for Social Sciences, version 20.0, Chicago, IL, USA) was used for the statistical analyses. The normality of data distribution was assessed by the Shapiro-Wilk test. Kruskal Wallis test was performed for comparison of the video demographics between groups. Mann Whitney U test used for comparing YouTube™ parameters to GQS value. Spearman's correlation coefficients were also calculated to assess the possible correlations between the ModDISCERN, GQS, and YouTube™ parameters. Intra-class correlation coefficients (ICC) were calculated to define intra-rater reliability. Statistical significance was performed on the $p<0.05$ level.

RESULTS

Of the 142 videos that were initially determined, videos without audio content (n=33), videos lasting more than 15 minutes (n=25), videos that were not in English language (n=8), irrelevant videos (n=15), and repetitive videos (n=5) were excluded, and ultimately 56 videos that met the inclusion criteria were evaluated.

Descriptive statistics for the videos are shown in Table 3. The mean/standard deviation (SD) ModDISCERN score, showing the reliability of the information in the videos, was 2.71±1.22; and the mean/SD GQS value showing the video quality was 2.71±1.14. The mean/SD number of video comments was 18.80±66.46, and the mean/SD number of likes was 156.48±470.92.

Comparison of YouTube™ videos about WSL to source of information is shown in Table 4. The majority of YouTube™ videos analyzed on WSL were uploaded by Health Institute Groups (50%), with 29% uploaded by dentists and 21% by companies. Although there was no statistically significant difference (p=0.571), the highest viewing rate was in the Health Institute Groups. Likewise, the number of comments and likes was higher in this group. No statistically significant difference was found between video sources and ModDISCERN scores and GQS values (p>0.05).

Comparison of WSL videos on YouTube™ according to the GQS values is shown in Table 5. 25% of the videos' GQS value was >3 (good to excellent quality, n=14), and 75% of the videos' GQS value was ≤3 (low to poor quality, n=42). The reliability of the information of the videos' GQS value >3 was significantly higher than the videos with a GQS of ≤3 (3.93 vs. 2.31; p<0.001). Although there was no statistically significant difference in other parameters between the groups, it was determined that the number of views of the videos with a GQS of ≤3 was higher than that of videos with a GQS of >3.

Table 3. Descriptive statistics of the WSL related YouTube™ videos (n=56)

Variables	Minimum	Maximum	Mean	SD
Number of views	7.00	193437.00	11606.75	28957.98
Duration (minute)	0.24	12.57	4.38	3.22
Number of likes	0.00	3300.00	156.48	470.92
Number of comments	0.00	473.00	18.80	66.46
Modified DISCERN	1.00	5.00	2.71	1.22
Global Quality Scale (GQS)	1.00	5.00	2.71	1.14
Viewing rate	0.55	70375.00	3127.82	10477.83

SD: Standart Deviation. WSL: White spot lesion.

Table 4. Comparison of YouTube™ videos about WSL to source of information

	Dentist (n=16) Mean (SD)	Company (n=12) Mean (SD)	Health Institute Groups (n=28) Mean (SD)	p*
Number of views	6331.25 (20514.66)	10043.08 (11323.36)	15291.46 (37289.20)	0.106
Duration (minute)	5.42 (3.96)	2.57 (2.12)	4.56 (2.92)	0.077
Number of likes	78.94 (219.94)	68.17 (92.27)	238.64 (638.26)	0.656
Number of comments	7.31 (22.51)	1.33 (1.44)	32.86 (91.08)	0.320
Modified DISCERN	2.56 (1.09)	2.67 (1.23)	2.82 (1.31)	0.702
Global Quality Scale (GQS)	2.56 (1.15)	2.92 (1.08)	2.71 (1.18)	0.707
Viewing rate	1886.17 (5987.83)	584.77 (865.91)	4927.21 (14009.49)	0.571

*Result of Kruskal Wallis Test. SD: Standart Deviation. WSL: White spot lesion.

Table 5. Comparison of WSL videos on YouTube™ according to GQS values

	GQS scores ≤ 3 (n=42) Mean (SD)	GQS scores >3 (n=14) Mean (SD)	p*
Number of views	12 255.38 (32702.24)	9660.86 (13019.11)	0.880
Duration (minute)	3.89 (2.80)	5.86 (4.01)	0.083
Number of likes	165.12 (525.58)	130.57 (257.11)	0.426
Number of comments	19.48 (74.34)	16.79 (35.37)	0.587
Modified DISCERN	2.31 (1.05)	3.93 (0.83)	**<0.001**
Viewing rate	3123.28 (11417.62)	3141.44 (7302.91)	0.354

*Result of Mann Whitney U Test. SD: Standart Deviation. GQS: Global Quality Scale.

Table 6. Spearman correlation coefficients between Modified DISCERN, GQS values and YouTube™ parameters

		Number of views	Duration (minute)	Number of likes	Number of comments	Modified DISCERN	GQS	Viewing rate
Dentist	**Modified DISCERN**	0.211	0.443	0.184	0.376	-	0.805**	0.189
	GQS	0.318	0.683**	0.178	0.366	0.805**	-	0.298
Company	**Modified DISCERN**	0.148	0.677*	0.360	0.128	-	0.757**	0.273
	GQS	0.278	0.677*	0.300	0.219	0.757**	-	0.190
Health Institute Groups	**Modified DISCERN**	0.017	0.406*	0.161	-0.109	-	0.917**	0.130
	GQS	0.084	0.337	0.249	-0.105	0.917**	-	0.208

Significance levels, *p < 0.05; **p < 0.01. GQS: Global Quality Scale.

Spearman correlation coefficients between ModDISCERN, GQS values and YouTube™ parameters are shown in Table 6. There was a high correlation between GQS and ModDISCERN scores in all 3 video source groups (Dentist r=0.805, Company r=0.757, Health Institute Groups r=0.917; P<0.01). There was a high correlation between the reliability & quality of the videos and the duration of the videos uploaded by companies (r=0.677) and there was a moderate correlation between the reliability & quality of the videos and the duration of the videos uploaded by Health Institute Groups.

Half of the videos that selected randomly, were re-evaluated 1 month later from the first evaluation by the same researcher with the purpose of determining the ICC. Correlation coefficients “rs” were calculated by comparing the first and second ModDISCERN scores and GQS values with each other. The ICC for ModDISCERN scores and GQS values, was found to be very close to 1.00, (MD rs=0.950, GQS rs=0.882).

DISCUSSION

Social media has serious interaction with users with its features such as view, comment, like, and dislikes. In the rapidly spreading digital age, patients are increasingly using the internet to learn about their medical conditions, prevention or treatment options for diseases and to make informed decisions, by finding the opportunity to access a lot of information quickly, easily, inexpensively and without getting tired and it seems that users are influenced by the content in this area.[17] However, on this platform where there is no restriction on information sharing, these advantages can often turn into disadvantages. There are various studies in the literature evaluating the content of YouTube™ videos.[18-19] However, in the literature review, no study was found about the information content quality of the YouTube™ videos about WSLs. Therefore, this is the first study aimed to evaluate the quality and accuracy of the YouTube™ videos on WSL and to analyze the effectiveness and usefulness of the videos for patients.

Dental caries is one of the important health problems affecting all age groups and is a chronic disease that affects the quality of life of the individual when it progresses. The early stage of caries that has not yet cavitated, called a white spot lesion, can be remineralized. Repair of early lesions by remineralization makes a significant contribution to reducing the number of caries, and missing and filled teeth.[2] Therefore, patients need to be aware of this issue in caries management. Since YouTube™ contains both visual and audio information, it has been shown that patients prefer this platform more frequently to obtain health-related information.[20] In this study 56 of 142 YouTube™ videos about WSL were evaluated by a researcher experienced in WSL field. 28 of them were uploaded by Health Institute Groups, 16 of them were uploaded by the dentist and 12 of them were uploaded by the company. There was no difference between video sources in terms of number of views, ModDISCERN scores and GQS values. While previous studies found that these scores were higher in videos uploaded by healthcare professionals,[17,21] no difference was found in this study evaluating videos related to WSL.

Fixed orthodontic treatments are frequently applied with the effect of increasing aesthetic concerns.[22] White spot lesions (WSLs) are a common side effect seen in fixed orthodontic treatments due to co-factors, such as a long treatment process, inadequate oral hygiene, and failure to change eating and drinking habits.[23] Demineralization occurs in the enamel under the influence of acidogenic bacteria in the dental plaque, and WSLs can be formed as a result of the dissolution of the hydroxyapatite crystals.[22] WSL is noticed by the patient when the WSL areas appear more opaque due to the difference in light reflection properties between the lesion area and the adjacent healthy enamel tissue.[24] After debonding process, although some spontaneous regression can be seen in WSLs with brushing and hygiene habits, some WSLs may not improve easily depending on the severity of the lesion and may affect the patient's satisfaction with the tooth appearance.[25] Some untreated WSLs can lead to dental caries and the need for restorative treatment. Guzmán-Armstrong *et al*.[25] recommend in their study a waiting period of at least 6 months before treating these lesions.In a meta-analysis, the incidence rate of new WSL developing during orthodontic treatment was 45.8%, and the prevalence rate in patients receiving orthodontic treatment was 68.4%.[26] Although these decalcifications are known to occur more frequently in patients receiving fixed orthodontic treatment, different epidemiological studies report a widely variable prevalence rates of WSLs in patients receiving orthodontic treatment of 2% to 97%.[27,28] It is a known fact that it is quite high and alarming, and that both patients and orthodontists pay attention to effective WSL prevention measures.[26] For this reason, it was concluded that especially orthodontic patients should be informed about WSL by the right sources.

Considering the descriptive features in this study, it was seen that the number of views and number of likes, were lower than in another study in which the videos about caries were evaluated.[29] While the number of views for the most-watched video in this study was 193437 it is considerably lower than the number of views of 1114735 for the most-watched video in the study using the search term "dental caries". This suggests that patients frequently search the internet about caries, but they do not have enough information about this reversible WSL stage.

The information quality of the videos analyzed in this study was generally found to be low. Videos with a GQS value ≤3 (low to poor quality, n=42) were 75% of all videos. However, the information content and reliability of the videos with poor or low quality according to the GQS value were also found to be insufficient. Many of the videos about WSL, regardless of the download source, did not include comprehensive information such as the causes of WSL, treatment alternatives, and additional references to obtain further relevant information. In addition, some videos contained false information about WSL that would mislead patients. Therefore in this study, most of the videos had low modDISCERN scores and GQS. Similarly, some previous studies evaluating medical and dental YouTube™ videos have reported that these videos have limited content and have low scores for reliability and video quality.[16,20,30]

There are no standards or restrictions in social media sharing related to health issues.[16] In this study, it was determined that WSL related videos were mostly uploaded by different Health Institute Groups and also shared by lay people apart from dentists or or-

thodontists. This has controversial results in terms of the information reliability of the related videos. Regulation and supervisory boards should be established for posts on medicine, dentistry and health science in any social media field.

There are some limitations of this study due to the dynamic content of the YouTube™ virtual environment. This study includes videos uploaded up to a certain time interval, and even at the time of publication of the article, new videos on WSL may have been included in the system and search results may have changed. However, the demographic data entered for each video (like the number of likes and dislikes, comments, viewing rates) is open to manipulation by the uploaders and may affect the provision of objective results.[16] While searching for YouTube™ videos about WSL, it should not be forgotten that although the most popular words from Google Trends applications are searched, different videos can be accessed by entering different keywords. Although the videos related to WSL were evaluated by an expert researcher in this field with ideal evaluation scales such as GQS and modDISCERN and also the ICC was found to be very close to 1.00 in this study, it should be noted that different researchers may obtain different evaluation results.

CONCLUSION

YouTube™ is a social media platform that patients frequently refer to health information and can easily access. WSL is an aesthetic and physiological problem that should be diagnosed early and should be given due care, especially in orthodontic patients. The quality and information reliability of YouTube™ videos about WSL was generally inadequate, so it would be appropriate for dentists and orthodontists to direct their patients to the right sources for accurate and up-to-date information about WSL. However, certain restrictions should be imposed on the sharing of general health status on social media, and misinformation of patients should be prevented.

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