

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL  
FACULDADE DE ODONTOLOGIA  
PROGRAMA DE PÓS-GRADUAÇÃO EM ODONTOLOGIA  
MESTRADO EM ODONTOLOGIA  
ÁREA DE CONCENTRAÇÃO EM PATOLOGIA BUCAL

Sofía Yocco Jaureguito

**YouTube™ como fonte de informações sobre câncer bucal:  
uma análise dos vídeos em espanhol**

Porto Alegre, 2019

Sofía Yocco Jaureguito

**YouTube™ como fonte de informações sobre câncer bucal:  
uma análise dos vídeos em espanhol**

Dissertação apresentada ao programa de Pós-graduação em Odontologia da Universidade Federal do Rio Grande do Sul, como requisito final à obtenção do título de Mestre em Odontologia. Área de concentração em Patologia Bucal.

Orientador: Prof. Dr. Vinicius Coelho Carrard

Linha de pesquisa: Câncer bucal

Porto Alegre, 2019

## **AGRADECIMENTOS**

Para minha família, por sempre me apoiar em todas as minhas decisões e me ensinar a perseguir meus objetivos e sonhos. Minhas conquistas são suas conquistas.

Para o meu marido, por sempre ter a palavra certa quando eu preciso de encorajamento e um empurrão para continuar.

À Professora Dra. Susana Vazquez por me dar essa oportunidade de treinar e continuar crescendo dentro da Instituição

A meu tutor, Professor Dr. Vinicius Carrard pela sua orientação neste processo.

À Professora Dra. Laura Cosetti por toda sua ajuda, paciência e disposição, todo o tempo dedico-me a ajudar neste trabalho.

A UFRGS e Faculdade de Odontologia de Udelar por tornarem possível a realização de meus cursos de Pós- Graduação e dissertação do mestrado.

A Florencia Lamela pela sua colaboração na coleta dos dados.

A todos meus companheiros da turma com quem compartilhei esta aventura.

## RESUMO

O câncer de boca é uma doença que requer atenção não somente dos profissionais da saúde, mas também da população em geral. É uma doença com alta taxa de mortalidade, o que resulta de sua detecção tardia na maioria dos casos. Representa um problema de saúde pública na maioria dos países, especialmente naqueles que estão em desenvolvimento. YouTube™ é um meio massivo de difusão de informação para a população, incluindo também assuntos que dizem respeito a área médica. Os usuários procuram informações específicas sobre manifestações clínicas, diagnóstico e tratamento de várias doenças, incluindo o câncer. A relevância do câncer bucal justifica a importância de se conhecer a confiabilidade desse material. Os objetivos deste trabalho foi avaliar as informações presentes no vídeos disponíveis no YouTube™, analisar seu conteúdo, qualidade e confiabilidade, bem como sua popularidade entre os usuários. Realizou-se uma busca no YouTube™ com as palavras-chave câncer oral e câncer bucal. Após aplicar os critérios de inclusão e exclusão, obteve-se uma amostra final de 38 vídeos. A maioria dos vídeos foi produzida por agências governamentais e usuários independentes, sendo apenas 5 publicados por canais universitários. Nenhum vídeo analisado mencionou a fonte de informação ou teve a qualidade considerada excelente. A popularidade dos vídeos não mostrou relação alguma com qualidade, duração, origem, tampouco confiabilidade da fonte da informação. É importante buscar estratégias que ajudem a população a identificar os vídeos úteis e confiáveis. Conclui-se que existem poucos vídeos sobre câncer de boca em língua espanhola qualificados disponíveis no YouTube™. Profissionais de saúde deveriam desempenhar um papel de protagonismo neste processo, a fim de aproveitar essa ferramenta como fonte de aumento da conscientização da população em relação ao tema.

**Palavras-chave:** Câncer Bucal, Câncer oral, YouTube™

## **SUMMARY**

Mouth cancer is a disease that requires attention not only from health professionals, but also from the general population. It is a disease with a high mortality rate, which results from its late detection in most cases. It represents a public health problem in most countries, especially in developing countries. YouTube™ is a massive means of disseminating information to the population, including also medical matters. Users are looking for specific information on clinical manifestations, diagnosis and treatment of various diseases, including cancer. The relevance of oral cancer justifies the importance of knowing the reliability of this material. The objectives of this work were to evaluate the information present in the videos available on YouTube™, analyze their content, quality and reliability, as well as their popularity among users. A search was performed on YouTube™ with the keywords “oral cancer” and “oral cancer”. After applying the inclusion and exclusion criteria, a final sample of 38 videos was obtained. Most of the videos were produced by government agencies and independent users, with only 5 published by university channels. No video analyzed mentioned the source of information or had the quality considered excellent. The popularity of the videos did not show any relation with quality, duration, origin, nor reliability of the information source. It is important to look for strategies that help people identify useful and reliable videos. In conclusion, it is necessary to produce qualified videos on YouTube™, and health professionals have the role of protagonism in this process.

### **Keywords:**

Oral cancer, mouth cancer, YouTube™

## SUMÁRIO

<b>1 ANTECEDENTES E JUSTIFICATIVA</b>	<b>10</b>
<b>2 OBJETIVOS</b>	
<b>2.1 OBJETIVO GERAL</b>	<b>12</b>
<b>2.2 OBJETIVOS ESPECÍFICOS</b>	<b>12</b>
<b>2.3 HIPÓTESES</b>	<b>12</b>
<b>3 ARTIGO CIENTÍFICO</b>	<b>13</b>
<b>ABSTRACT</b>	<b>14</b>
<b>INTRODUÇÃO</b>	<b>14</b>
<b>MATERIAIS E MÉTODOS</b>	<b>15</b>
<b>RESULTADOS</b>	<b>18</b>
<b>DISCUSSÃO</b>	<b>26</b>
<b>CONCLUSÕES</b>	<b>28</b>
<b>REFERÊNCIAS</b>	<b>29</b>
<b>4 CONSIDERAÇÕES FINAIS</b>	<b>31</b>
<b>5 REFERÊNCIAS</b>	<b>32</b>

**GLOSSÁRIO**

<b>Likes</b>	<b>Positive response used by people in social networks to interact</b>
<b>Dislike</b>	<b>Negative response used by people in social networks to interact.</b>
<b>Views</b>	<b>Number of visits of a video or multimedia content</b>
<b>GQS</b>	<b>Global Quality Scale</b>
<b>SD</b>	<b>Standard deviation</b>
<b>DISCERN</b>	<b>Scale of reliability</b>

## **LISTA DE FIGURAS DO ARTIGO**

Figure 1: Formulas used to calculate interaction index and display index.

Figure 2: Flowchart of videos.

## **LISTA DAS TABELAS DO ARTIGO**

Table 1. Scoring Criteria for Setting Video Usability

Table 2. Characterization of the sample

Table 3. Evaluation of oral cancer videos according to different criteria

Table 4. Performance of the 10 best videos according to evaluation of quality, utility and reliability

Table 5. Visibility and popularity of the top 10 videos

Table 6. Comparison of videos according to source

Table 7. Comparison of videos according to duration time (min: s)

Table 8. Influence of quality on video visibility and popularity

Table 9. Influence of utility on video visibility and popularity

Table 10. Influence of reliability on video visibility and popularity



## 1 ANTECEDENTES E JUSTIFICATIVA

Nos últimos anos, há evidências de uma difusão massiva de vídeos por meios eletrônicos. A partir da sua criação no ano de 2005, o YouTube™ tornou-se a plataforma mais utilizada para a divulgação de material digital, em que mais de 100 milhões de vídeos são exibidos todos os dias. É um recurso gratuito e acessível a qualquer pessoa através de vários dispositivos como smartphones, computadores e televisores pessoais, ocupando o terceiro lugar entre os sites mais visitados do mundo. É constantemente consultado por aqueles que buscam informações sobre os mais diversos temas, incluindo informações e dados sobre saúde em geral, algumas patologias particulares, tratamentos e métodos de diagnóstico. O site adquiriu uma importante popularidade entre adolescentes entre 13 e 17 anos, tornando-se uma rede social interativa, não só de busca, mas também de publicação de informações entre as novas gerações. Os avanços tecnológicos, a acessibilidade a esses meios pelo público em geral e a crescente quantidade de informações publicadas na área médica sobre as condições de saúde-doença tornam necessário avaliar a qualidade e a credibilidade deste conteúdo, bem como conhecer os principais produtores de conteúdo a respeito do tema. (CHENG; DALE; LIU, 2008; DAILY; NAN; BRIONES, 2015; SYED-ABDUL et al., 2013).

Dentre as doenças que afetam a boca, o câncer é extremamente importante já que, mesmo em países desenvolvidos, ainda é detectado em estágios tardios. Isso resulta em um tratamento complexo com uma qualidade de vida insatisfatória. Seu prognóstico é ruim, com uma taxa de sobrevida baixa, e isso se deve principalmente a esse atraso no diagnóstico e tratamento. Estudos atribuem o à falta de conscientização do público, despreparo e desconhecimento dos profissionais de saúde em relação à doença. Portanto, ênfase tem sido colocada no rastreamento oportunista e educação dos pacientes, particularmente naqueles que se expõem aos principais fatores de risco ao câncer bucal (HASSONA et al., 2016). Diante do que foi exposto, o principal objetivo do presente estudo foi avaliar os vídeos sobre câncer bucal em língua espanhola disponíveis na plataforma YouTube™. Existem trabalhos publicados na área médica que avaliam a confiabilidade e outras características dos vídeos de saúde publicados no YouTube™. Madathil *et al.* (2015) constataram que os vídeos nesta área estão ligados a relatos de pacientes, entidades médicas e instituições de ensino e profissionais de saúde. (MADATHIL et al., 2015).

Steinberg *et al.*(2010) avaliaram vídeos do Youtube™ sobre câncer de próstata e concluíram que essa plataforma não é uma fonte confiável para pacientes entenderem e administrarem a sua doença. Instituições médicas e agências governamentais estão começando a se preocupar com a qualidade e confiabilidade das informações difundidas por meio da Internet para a população em geral, dada a possibilidade de difusão de informações confusas ou incertas. Embora haja muita informação sobre saúde nesta plataforma, as informações frequentemente são enganosas ou anedóticas, contradizendo o conhecimento bem fundamentado. Em função disso, a probabilidade de um usuário vídeos com conteúdos pouco qualificados é relativamente alta. (ABEDIN *et al.*, 2015; STEINBERG *et al.*, 2010). Em Odontologia, o YouTube™ poderia ser uma fonte útil para o ensino. Isso é especialmente importante em localidades distantes dos grandes centros, onde o acesso à cursos convencionais é dificultado pela necessidade de deslocamentos. Contudo, até o presente momento, a plataforma não parece ter sido largamente acessada. Neste sentido, uma potencial desvantagem dos vídeos online é a sua autenticidade, uma vez que muitos deles não explicitam a identidade e afiliação dos autores. (MUKHOPADHYAY; KRUGER; TENNANT, 2014). Delli. *et al*, 2016, afirmam que as fontes mais confiáveis em termos de conteúdo e qualidade são agências governamentais, canais universitários e organizações profissionais. Além da origem, outro ponto a ser considerado na análise da confiabilidade dos vídeos é a apresentação das evidências científicas que deram suporte ao conteúdo abordado no material. No que diz respeito ao câncer bucal, a qualidade dos vídeos publicados no YouTube™ em língua inglesa foi analisada por Hassona, *et al.* 2016. A partir da sua análise, os autores encontraram diversas informações controversas e/ou não condizentes com a realidade. (HASSONA *et al.*, 2016)

## **2 OBJETIVOS**

### **2.1 OBJETIVOS GERAIS**

Avaliar os vídeos em língua espanhola sobre câncer bucal disponíveis no YouTube™.

### **2.2 OBJETIVOS ESPECÍFICOS**

- Avaliar visibilidade, popularidade, qualidade, utilidade e confiabilidade dos vídeos a respeito de câncer bucal em língua espanhola disponíveis na plataforma YouTube™.

- Avaliar a influência da origem e do tempo de duração dos vídeos sobre câncer bucal em língua espanhola disponíveis no YouTube™ na sua visibilidade, popularidade, qualidade, utilidade e confiabilidade.

- Avaliar a influência da qualidade, utilidade e confiabilidade dos vídeos na sua visibilidade e popularidade.

### **2.3 HIPÓTESES**

- Os vídeos sobre câncer bucal em espanhol disponíveis na plataforma YouTube™ têm altas visibilidade e popularidade.

- Os vídeos sobre câncer bucal em espanhol disponíveis na plataforma YouTube™ apresentam qualidade e utilidade e confiabilidade baixos.

- Vídeos produzidos por organizações profissionais e canais universitários têm mais visibilidade, popularidade, qualidade, utilidade e confiabilidade do que os demais.

- Vídeos mais longos têm menos visibilidade e popularidade, embora tenham mais qualidade, utilidade e popularidade.

- Origem e duração dos vídeos disponíveis em espanhol sobre o câncer bucal estão relacionadas com visibilidade, popularidade, qualidade, confiabilidade e utilidade.

- Vídeos com mais qualidade, utilidade e confiabilidade mais populares e tem mais visibilidade.

### 3 ARTIGO CIENTÍFICO

\*Este manuscrito está formatado nas normas do periódico MEDICINA ORAL, PATOLOGÍA ORAL Y CIRUGÍA BUCAL (ISSN 1698-6946 – Impact factor: 1.671, Qualis B1)

#### **YouTube™ as a source of information on oral cancer: an analysis of Spanish-language videos**

Sofia Yocco-Jaureguito<sup>a</sup>, DDS; Luan Nathiel Santana Kovalski<sup>a</sup>, Master degree's student; Ronell Bologna-Molina<sup>b</sup>, DDS, PhD; Marco Antonio Trevizani Martins<sup>c</sup>, DDS, PhD; Manoela Domingues Martins<sup>c</sup>, DDS, PhD, Vinicius Coelho Carrard<sup>c,d</sup>, DDS, PhD

<sup>a</sup> Department of Oral Pathology, School of Dentistry, Univesidad de la República, Montevideo, Uruguay.

<sup>b</sup> Molecular Pathology Area, School of Dentistry, Universidad de La Republica (UDELAR), Montevideo, Uruguay.

<sup>c</sup> Oral Pathology Department, School of Dentistry, Universidade Federal do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil.

<sup>d</sup> Telehealth Rio Grande do Sul, Universidade Federal do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil.

Corresponding author:  
Vinicius Coelho Carrard  
Rua Ramiro Barcelos 2492/503  
Bairro Santana  
CEP 90035-003 - Porto Alegre, RS, Brazil  
Phone/fax:  
E-mail: vccarrard@gmail.com

**Abstract**

**Aim:** This cross-sectional study aimed to analyse the content of videos in Spanish on oral cancer available on the virtual platform known as YouTube™.

**Material and Methods:** The search on the platform (www.youtube.com) was conducted on June 6, 2018, using the key words "Oral cancer" and "Mouth cancer". The first 120 videos were submitted to exclusion and inclusion criteria. The final sample was consisted by 38 videos. Each video had information on visibility and popularity retrieved from the YouTube platform to calculate viewing rate and interaction index. Furthermore, the quality, usefulness and reliability of videos have been assessed.

**Results:** In general, the videos had irregular performance in the evaluations. Their popularity presented no association with origin, duration or quality. The most popular videos in terms of their interaction whit the public, did not present good quality and the sources of the information were not cited. Most of the videos was produced by government agencies and independent users, with only 5 published by university channels. No video analyzed mentioned the source of information or had the quality considered excellent. The popularity of the videos did not show any relation with quality, duration, origin, nor reliability of the information source.

**Conclusions:** Although there are many videos in Spanish about oral cancer, very few are produced by health professionals, so the fidelity of the information is doubtful. Whereas the popularity of the videos is not related to their quality, duration or usefulness, in this work we find that these features are not very prominent among the sample.

**Keywords:** Oral cancer, mouth cancer, YouTube

## **Introduction**

The worldwide computer network (Internet) has allowed the exchange of all types of information, through many ways and forms. Recently multimedia and audio-visual content has gained great popularity among the new generations as a tool for study and learning. Created in 2005, YouTube™ has become the most widely used sharing platform, recording the publication of approximately 100 million videos (1). Even patients use this medium and the informational networks in general, to understand their health conditions and possible pathologies in addition to the recommended medical treatments.

Even oral cancer, a disease that has acquired great concern worldwide (2) due to its incidence and mortality, the problems caused by the delay in its diagnosis, the complexity of its treatment and its survival, has its place within the searches in this platform by users. Is ranked in position 10 among its incidence, and is considered a relevant problem of global health. For these reasons, the monitoring and evaluation of the content of videos produced by different users of this platform is essential, given its dissemination and the scope that this entails. This study aimed to evaluate the influence of the origin and duration of Spanish – language oral cancer videos on the YouTube™ platform on their visibility, popularity, quality, usefulness and reliability.

## **Materials and Methods**

### Sample

#### Selection of the videos

A search was performed on the YouTube™ platform ([www.youtube.com](http://www.youtube.com)) of videos with the keywords "cancer oral" and "cancer bucal" on June 6, 2018. The first 60 videos of each search were gathered according to method recommended by a previous study (15). After exclusion criteria were applied to determine the studies for the further evaluation. The selection of the videos was made by two dentists, assistants of the Department of Oral Pathology of the Faculty of Dentistry of the UdelaR.

## Exclusion Criteria

Some exclusion criteria were applied to discard studies that not match the study purposes (2). Videos on oral cancer in animals; videos in languages other than that of interest; videos without sound; duplicate videos; videos about other cancers; videos showing the surgical treatment of cancer; anti-smoking propaganda videos; videos describing search results; visibly produced videos for the specialized public on the theme (presentations in congresses or lectures / lectures).

## Review of videos

User Interaction: From each video, the following information was collected: date of publication, number of views, number of positive responses, "likes", number of negative responses "dislikes" and their duration. With these data, the interaction and visualization parameters could be calculated, as can be seen in Figure 1.

Figure 1. Formulas to be used to calculate index of interaction and index of visualization (2).

$$\left( \frac{\text{number of likes} - \text{number of dislikes}}{\text{total number of views}} \times 100\% \right) \quad \left( \frac{\text{number of views}}{\text{number of days since upload}} \times 100\% \right)$$

Index of interaction

Index of visualization

## Quality of the videos (Global Quality Scale - GQS)

The quality of the videos was evaluated according to the GQS (3) that analyses the information coming from the videos, each assigning a score following certain characteristics:

- Poor quality, reduced video stream, lacking most of the information, is not at all useful for patients
- In general, poor quality and poor flow, some information listed, but many important issues are missing, very limited use for the patient

- Moderate quality, suboptimal flow, some important information is adequately discussed, but others little discussed, a little useful for patients
- Good quality and excellent overall flow. Most of the relevant information is listed, and the topics are not addressed, useful to patients
- Excellent quality and flow, very useful for patients

### Usefulness of videos

The usefulness of the videos was evaluated according to their content (2): for example, if one of the risk factors related to oral cancer was mentioned, if they mentioned signs or symptoms related to this pathology and in this respect some representative image was shown and, finally, if the video promotes prevention through early diagnosis or cessation of risk factors. The scoring system is shown on Table 1.

Table 1. Usefulness analysis criteria

<b>Video mentions main risk factors</b>	<b>Score</b>
Smoke	2
Alcohol	1
Sun exposure	1
Tobacco chewing	1
<b>Video mentions major signs and symptoms of malignant lesion</b>	
Color alteration (red/white)	1
Nodule	1
<b>Video shows representative images</b>	1
Video promotes prevention through early diagnosis and/or through the cessation of risk factors	1
Ulcer / pain	1
<b>Total</b>	<b>10</b>

### Reliability of videos (DISCERN questionnaire)

The reliability of the videos was qualified following a questionnaire proposed by Singh *et al.* 2012 (5) in which different aspects of the videos conveyed their content:

Are the goals clear and achieved?

Are the sources of information used reliable?

Is the information present balanced and unbiased?

Are additional sources of information listed for patient referral?



Are the areas of uncertainty mentioned?

Each affirmative answer is given one point, and then the sum is made (score ranging from 0 to 5).

#### Assessment of origin

As for the origin of the videos, they were divided into 6 groups:

- 1- Independent users
- 2- Governmental / news agencies
- 3- University Channels
- 4- Professional organizations
- 5- Health information sites
- 6- Medical Ads / Companies

#### Statistical analysis

The Mann - Whitney U test was used to evaluate the influence of the origin and duration of the videos on visibility, popularity, utility, reliability, overall quality scale. The variables were dichotomized based on their medians to evaluate the influence of the duration time and the quality of the videos. The level of significance was set at 95% ( $p < 0.05$ ). Sources' categories were gathered to allow the application of the statistical testes.

#### **Results**

The search for the keyword "cancer oral" yielded a total of 158,000 videos, of which the first 60 were selected. On the other hand, the search under the keyword "cancer bucal" showed a result of 14.300 items, of which the first 60 videos were also selected. Figure 2 presents a diagram depicting excluded and included videos.

Figure 2. Videos flowchart

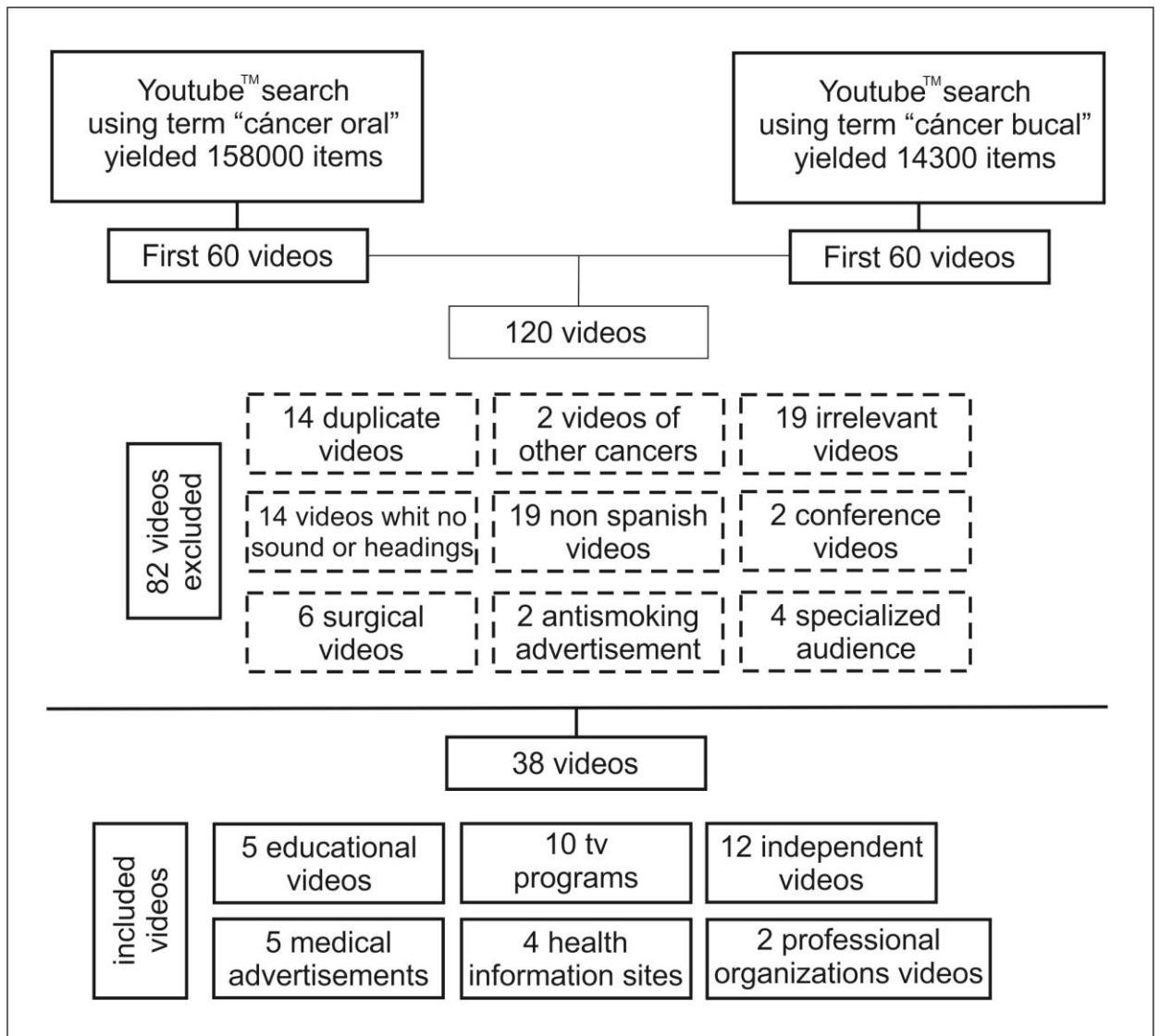


Table 2. Characterization of the sample.

<b>Variable</b>	
<b>Origin</b>	<b>n (%)</b>
Independent users	7 (18.4%)
Professional organizations	5 (13.2%)
Government agencies / news	15 (39.5%)
University channels	5 (13.2%)
Health information sites	4 (10.5%)
Medical advertisement/ Companies	2 (5.2%)
<b>Publication Time (days)</b>	
Mean (SD)	614.0 (849.6)
Min – Max	39 – 3530
<b>Duration (m)</b>	
Mean (SD)	1:48 (0:55)
Min – Max	0:48 - 6:00
<b>Views</b>	
Mean (SD)	192.0 (278,006.8)
Min – Max	48 – 1,714,541
<b>Likes</b>	
Mean (SD)	1.5 (493.9)
Min – Max	0 – 2,986
<b>Dislikes</b>	
Mean (SD)	0.0 (129.8)
Min – Max	0 – 799

Table 2 shows the characteristics of the sample. Most analysed videos were produced by government agencies (n=15) and by independent users (n=7). The videos mean duration was 1.48 minutes, ranging from 1 to 31 minutes. The video with the highest visibility had 1,714,541 views, whereas the least viewed displayed 48 views.

Table 3. Evaluation of videos according to different variables.

<b>Variable</b>	
<b>Interaction index</b>	
Mean (SD)	1.3 (0.9)
Min – Max	0.0 – 4.4
<b>Viewing rate</b>	
Mean (SD)	29.5 (14,766.4)
Min – Max	9 – 90,573
<b>Usefulness (1-10)</b>	
Mean (SD)	4.5 (1.9)
Min – Max	3 – 10
<b>Reliability (0-5)</b>	
Mean (SD)	2.0 (1.1)
Min – Max	0 – 4
<b>Quality n (%)</b>	
Poor	8 (21.1%)
Limited	8 (21.1%)
Moderate	19 (50%)
Good	3 (7.8%)
Excellent	0 (0%)

Table 3 presents the videos performance in relation to interaction index, viewing rate, usefulness, reliability and quality. According to its usefulness, some videos had the major score (10 points), but the average was on the range of  $4.5 \pm 1.9$  points. About the quality of the videos, mostly were qualified as moderate ( $n=19$ ), and a large number of them had a qualification of poor ( $n=8$ ) and limited ( $n=8$ ). Despite only 3 videos were qualified as good quality none of them had an excellent score. According the table, the reliability of the videos was catalogued with a score of  $2.0 \pm 1.1$ . Considering the fact that the scale was from 0 to 5 points, the overall performance of videos may be considered poor.

Table 4. Performance of the 10 best videos according to quality, usefulness and reliability

Title – Channel	Origin	Publication Time (days)	Duration (s)	Quality	Usefulness	Reliability	Total
1.Cancer oral signos y síntomas	GOV	1,595	178	4	8	4	16
2.C5n cáncer bucal	GOV	2,964	179	3	10	3	16
3. Autoexamen Cáncer Oral- Proyecto “El cáncer también afecta a la boca”.	UNIV	1,537	305	4	8	3	16
4.Cáncer oral. T.14	GOV	2,125	1,875	3	9	3	15
5.El padecimiento del cancer bucal es muy frecuente	GOV	920	125	3	8	3	14
6.Cancer bucal ud puede prevenirlo	PROF	1,705	1,236	1	10	3	14
7. Cáncer de boca. Casos Clínicos	UNIV	1,137	127	3	9	1	13
8.Carcinoma epidermoide oral “El cáncer letal”	IND	1,345	190	3	6	3	12
9. Cáncer en la boca por infecciones, tabaco y alcohol.	EMP	1,846	246	3	6	3	12
10. Cáncer de boca y lengua: causas, síntomas y tratamiento.	PROF	756	214	3	6	3	12

Origin: IND= Independent users, UNIV= University channels, PROF= professional organizations, EMP= medical advertisement/companies. GOV= government agencies.

Table 5: Performance of the 10 best videos according to quality, usefulness and reliability

Title – Channel	Origin	Publication Time (days)	Duration (s)	Views	Viewing rate	Likes	Dislikes	Interaction index
1.Cancer oral signos y síntomas	GOV	1,595	178	10,605	665	20	4	0.15
2.C5n cáncer bucal	GOV	2,964	179	703	24	3	1	0.28
3. Autoexamen Cáncer Oral-Proyecto “El cáncer también afecta a la boca”.	UNIV	1,537	305	130,821	8,511	401	46	0.27
4.Cáncer oral. T.14	GOV	2,125	1875	182,880	8,606	573	113	0.25
5.El padecimiento del cancer bucal es muy frecuente	GOV	920	125	1,575	171	6	0	0.38
6.Cancer bucal ud puede prevenirlo	PROF	1,705	1,236	320	11	1	1	0.17
7. Cáncer de boca. Casos Clínicos	UNIV	1,137	127	2,071	182	8	1	0.34
8.Carcinoma epidermoide oral “El cáncer letal”	IND	1,345	190	26,781	1,991	142	8	0.5
9. Cáncer en la boca por infecciones, tabaco y alcohol.	EMP	1,846	246	75,000	4,036	187	12	0.23
10. Cáncer de boca y lengua: causas, síntomas y tratamiento.	PROF	756	214	6,692	885	35	6	0.43

Origin: IND= Independent users, UNIV= University channels, PROF= professional organizations, EMP= medical advertisement/companies. GOV= government agencies.

Tables 4 and 5 showed the top 10 videos according to different evaluation criteria (GQS, utility and reliability). Among these videos are those from university channels (n = 2), professional organizations (n = 2), medical or commercial advertisements (n = 4) and some independent users (n=2). A wide variability among the different criteria of evaluation and analysed parameters with predominance of videos produced by medical companies may be observed. The origin of these videos did not influence visualization, popularity, quality and utility, but shows quite varied results. The videos that present the highest scores (9 and 10) also present high scores of quality and reliability. Among the top 10 videos, those produced by university channels did not present the highest score in terms of quality (Table 4).

Table 6. Comparison of the videos according to their origin

	Independent users or companies advertisement (n=24)		University channel, professional organization and health websites (n=14)		P
	Mean (SD)	Median P25-P75	Mean (SD)	Median P25-P75	
<b>Duration (s)</b>	339 (387)	192 (125-378)	393 (326)	276 (140-608)	0.29
<b>Views</b>	90,663 (348,664)	1,419 324-17,927	34,371 (52,332)	4,380 403-83,551	0.50
<b>Viewing rate</b>	4,779.0 (18,397.0)	125 30-1,241	2,677.0 (4,336.0)	400 33-5,171	0.70
<b>Likes</b>	174 (612)	3.0 10-26.0	112 (173)	15.0 2.8-241.0	0.26
<b>Interaction index</b>	0.6 (1.0)	0.3 0.1-0.5	0.6 0.7	0.3 0.2-0.9	0.63
<b>Quality</b>	2.4 (0.9)	3 2.0-3.0	2.5 (1.0)	3.0 1.8-3.0	0.81
<b>Usefulness</b>	5.9 1.9	6.0 4.3-7.8	6.4 1.9	6.0 4.8-8.0	0.46
<b>Reliability</b>	1.7 (1.1)	2.0 1.0-2.8	1.8 (1.1)	2.0 1.0-3.0	0.81

Mann-Whitney test

The videos that presented the highest scores (9 and 10) also presented high scores of quality and reliability, but were not classified as very useful. The videos duration was not a factor that influenced the interaction of the videos and the number of views (Table 6)

Table 7. Comparison of videos according to duration in minutes.

	Up to 04:01 (n=19)		More than 04:01 (n=19)		p value
	Mean (SD)	Median P25-P75	Mean (SD)	Median P25-P75	
<b>Views</b>	9.360 (23.531)	834 336-6.692	130.847 (388.036)	6.525 391-109.205	0.20
<b>Viewing rate</b>	489 (962)	67 26-647	7.521 (20.523)	477 35-8.494	0.14
<b>Likes</b>	25 (46)	5.0 1.0-20.0	278 (682)	14.0 0.0-401.0	0.09
<b>Interaction index</b>	0.5 (0.6)	0.3 0.1-0.6	0.6 (1.0)	0.3 0.2-0.4	0.80
<b>Quality</b>	2.7 (0.9)	3.0 2.0-3.0	2.2 (1.1)	2.0 1.0-3.0	0.16
<b>Usefulness</b>	6.2 (1.7)	6.0 5.0-8.0	6.0 2.1	6.0 4.0-8.0	0.76
<b>Reliability</b>	1.6 (1.2)	2.0 1.0-3.0	1.8 (1.0)	2.0 1.0-3.0	0.54

Mann-Whitney test

Table 7 shows the relationship between the duration of the videos and their visualization, interaction, number of visits, quality, utility and reliability. Longer videos have higher viewing rate and interaction rate, more likes, but lower quality. The duration of the videos has no influence on the interaction with users.

Table 8. Influence of videos quality on their visibility and popularity

	EQG 1,2,3 (n=16)		EQG 4 e 5 (n=22)		p value
	Mean (SD)	Median P25-P75	Mean (SD)	Median P25-P75	
<b>Views</b>	122,123 (426,114)	557 220-11,405	31,961 (53,785)	2,383 548-38,836	0.24
<b>Viewing rate</b>	6,896 (22,570)	190 34-2,509	1,902 (3,055)	190 34-2,509	0.62
<b>Likes</b>	229 (744)	3.0 1.0-26.0	95 (162)	12 2.8-153.0	0.31
<b>Interaction index</b>	0.65 (1.1)	0.2 0.2-0.6	0.52 (0.65)	0.3 0.2-0.5	0.72

Mann-Whitney test



Table 9. Influence of usefulness on videos visibility and popularity.

	Slightly to moderately useful n=27		Very useful n=11		p value
	Mean (SD)	Median P25-P75	Mean (SD)	Median P25-P75	
<b>Views</b>	77,329 (328,418)	1,263 336-17,769	52,749 (70,863)	2,071 592-130,643	0.39
<b>Viewing rate</b>	4,148 (17,334)	78 37-1,088	3.654 (5,036)	182 27.0-8,511	0.47
<b>Likes</b>	143.9 (571.2)	5 1-35	169.9 (231.6)	8 3-401	0.19
<b>Interaction index</b>	0.5 (0.7)	0.2 0.1-0.6	0.8 (1.2)	0.3 0.3-0.4	0.33

Mann-Whitney test

Table10. Influence of videos reliability on their visibility and popularity

	DISCERN 0-1 (n=15)		DISCERN 2-4 (n=23)		p value
	Mean (SD)	Median P25-P75	Mean (SD)	Median P25-P75	
<b>Views</b>	123,356 (442,064)	834 236-3,680	35,077 (54,509)	6,525 405-75,000	0.33
<b>Viewing rate</b>	7,045 (23,362)	78 37-284	2,022 (3,000)	647 27-3,923	0.60
<b>Likes</b>	235 (770)	5.0 1.0-20.0	97 (159)	14 2.0-153	0.18
<b>Interaction index</b>	0.6 (0.7)	0.3 0.1-0.6	0.6 (0.5)	0.3 0.2-0.5	0.64

Mann-Whitney test

According to Tables 8 and 9, the Global Quality Scale (GQS) it is not associated with 'views', 'likes', interaction index and viewing rate, since the videos with the lowest scores of GQS are those that have more interaction, viewing rate and likes. In contrast, usefulness positively influenced the visibility and popularity of the videos (Table 9). Finally, Table 10 showed that visibility and popularity were not influenced by the reliability of videos.

## Discussion

Oral cancer is ranked in position 10 among its incidence, and is considered a relevant problem of global health (6). Despite the progress in science and technological advance, the prognosis remains poor, representing an important concern for the patients and for health workers (7).

Each year, about 600 000 cases of oral cancer are diagnosed (14) and the majority of them have known causes like tobacco smoking and chewing, alcohol consumption, sun exposure among others, known as risk factors and all of them avoidable. A poor prognosis and survival rate of this illness is associated to delays in diagnosis and treatment (2).

Nowadays, new generations seek for information on virtual platforms and on the Internet. YouTube™ has become the most successful and popular platform of video sharing service (1). As a result of development of information technology and digital tools such as computers, tablets, mobile devices, social networking websites massive dissemination of information is observed worldwide.

So far, few studies have evaluated the information contained in virtual videos on oral health topics as different diseases such as Sjogren's syndrome (3), surgical treatments such as orthognathic surgery (8), dental implants (9) and oral cancer (2). Only one article was found in the bibliography assessing the content of information regarding oral cancer in YouTube™, which focused on English-language videos (2). Hence, there is a need for production of more reliable videos on oral cancer.

In the present study, we assessed the content of YouTube™ videos about oral cancer in Spanish language. Regarding the origin of these videos, most of them were made by government agencies and news channels while others were produced by independent users. These data correspond more to what Hegarty et al (8) observed in his study, in which most of the videos was published by patients, whereas professional information sources went unnoticed. However, these results differ from the study published by Hassona about videos on YouTube™ of oral cancer, although a significant number of the videos analysed were published by TV channels and news agencies, most of them were originated by health professionals and university channels or professional organizations (2). Previous studies (10) showed that the videos produced by university channels and professional organizations were

those that presented better quality, usefulness and reliability. However, the present findings did not confirm the previous data of the literature.

The analysis of the performance of the videos showed that most of them did not have a satisfactory utility and quality. This corroborates previous studies carried out by Ashraf *et al.* on dental implants (9), Delli *et al.* on Sjogren's Syndrome (3) and studies on other disease a systemic level such as that carried out by Abedin *et al.*, on diabetes (11) and Steinberg *et al.*, on prostate cancer (12).

This study, in accordance with the aforementioned studies, there are very few videos considered with good utility and quality and almost none as excellent. The results show that the reliability of the videos is relatively low since the scale used had scores ranging from 0 to 5. The assumption that videos produced by university channels would obtain better scores in terms of quality and reliability was not supported by our data. This may be due to the absence of references to the source of the bibliography in the videos or the lack of information based on scientific evidence, which was also demonstrated in the works of Hassona *et al.* (2), Delli *et al.* (3) and Ashraf *et al.* (9).

The length of the videos correlated with the content; no significant association existed between the content and number of views or rating by YouTube™ viewers(12). Delli, *et al.* (3) showed that the most usefulness videos had a length of approximately 7 minutes. However, in this study the results show that the time of duration of the videos has no influence on its popularity.

According to the statistical analysis, there was no significant association among the variables of popularity such as interaction index, views, 'likes', 'dislikes', viewing rate with the parameters of usefulness, quality and reliability. The relation of the GQS with the number of views, interaction index and viewing rate doesn't shows significant association, similar as what it is shown in the work by Hassona *et al* (2), but in contradiction of what it could be appreciated in the work of Delli *et al.* (3).

Videos have become powerful tools of information in social networks, people need to learn to discern between trustworthy and misleading information and health authorities and professionals should be involved in the control and production of health information content in virtual platforms, and share their research findings on social network in addition to Scientifics journals. This is why Shabbir Syed-Abdul *et al*

(13) on their publications suggest that health institutions and individual researchers should produce informative videos and also report misleading videos.

Some limitations of this study should be considered. Firstly, it should be kept in mind that YouTube™ is a dynamic network and the videos uploaded on the platform are feasible to be modified, uploaded or downloaded at any time, that is why the results may vary with respect to the search date, the incorporation of new videos from the date the search was made, and the time that has elapsed until now. Another question to be considered is that the subjective opinion about the content of the videos can be any person who accesses these videos, not being able to discern in this work, whether the opinions regarding "likes", "dislikes" and interaction were from health professionals, patients, students, among others.

Given the characteristics of oral cancer, these videos could be used as an excellent tool to raise awareness among the population about the prevention, control of risk factors and the importance of the early diagnosis. This platform of information has potential to spread knowledge on health topics reaching population in general, particularly young adults and teenagers.

## **Conclusions**

Although many videos in relation to oral cancer may be found on YouTube™, most of them have an unreliable content, low quality and little usefulness. Few videos are produced by health professionals or university channels and almost none presented bibliographic sources or had scientific support.

## References

1. Cheng X, Dale C, Liu J. Statistics and social network of YouTube™ videos. *IEEE Int Work Qual Serv IWQoS*. 2008;229-38.
2. Hassona Y, Taimeh D, Marahleh A, Scully C. YouTube™ as a source of information on mouth (oral) cancer. *Oral Dis*. 2016;22(3):196-201.
3. Delli K, Livas C, Vissink A, Spijkervet FKL. Is YouTube™ useful as a source of information for Sjogren´s syndrome? *Oral Dis*. 2016;22(3):196-201.
4. Bernard A, et al. A systematic review of patient inflammatory bowel disease information resources on the World Wide Web. *AM J Gastroenterol*, v.102, p.2070, 2007.
5. Singh AG, Singh S, Singh PP. YouTube™ for information on rheumatoid arthritis – a wakeup call? *J Rheumatol*, v.39, no.5, p.899-903, 2012.
6. Rivera C. Essentials of oral cancer. *Int J Clin Exp Pathol* 2015; 8(9):11884-11894.
7. Feller LL, Khammissa R, Kramer BB, Lemmer JJ. Oral Squamous cell carcinoma in relation to field precancerisation: pathobiology. *Cancer Cell International* 2013, 13:31.
8. Hegarty E, Campbell C, Grammatopoulos E, DiBiase AT, Sherriff M, Cobourne MT. YouTube™ as an information resource for orthognathic surgery. *J Orthod [Internet]*. Taylor & Francis; 2017;44(2):90-6.

9. Ashraf A, Ahmad AH, Mohammed-Noor A, Mahmoud N, Hassona Y. Quality of YouTube™ videos on dental implants. *Med Oral Patol Oral Cir Bucal*. 2018 Jul 1; 23 (4):e463-8.
10. Samuel N, Alotaibi NM, Lozano AM. YouTube™ as a Source of Information on Neurosurgery. *World Neurosurg*. 2017 Sep; 105:394-398.
11. Abedin T, Ahmed S, Al Mamun M, Ahmed SW, Newaz S, Rumana N, et al. You Tube as a source of useful information on diabetes foot care. *Diabetes Res Clin Pract [Internet]*. Elsevier Ireland Ltd; 2015; 110(1):e1-4.
12. Steinberg P. et al. YouTube™ as Source of Prostate Cancer Information. *J Urology*, v.75, no.3, p.619-22, 2010.
13. Syed – Abdul, S. et al. Misleading health-related information promoted through video-based social media: anorexia on YouTube™. *J Med Internet Res.*, v.15, no.2, e30, 2013.
14. Porcheri C, Thomas C, Mitsiadis T. Multifactorial Contribution of Notch Signaling in Head and Neck Squamous Cell Carcinoma. *Int. J. Mol. Sci*. 2019, 20, 1520.
15. Desai T, Shariff A, Dhingra V, Minhas D, Eure M, Kats M (2013). Is content really king? An objective analysis of the public's response to medical videos on YouTube. *PLoS One* 8: e82469.

#### **4 CONSIDERAÇÕES FINAIS**

Neste trabalho, procuramos avaliar o conteúdo de informações sobre o câncer bucal disponível na plataforma do YouTube™. Apesar de algumas limitações inerentes ao estudo, pode-se avaliar que existem poucos vídeos produzidos por profissionais de saúde de boa qualidade e baseados em evidências científicas. Dado que esta plataforma se tornou massiva e muito acessível, é importante que na área médica comece a ser usada como uma ferramenta, não apenas conscientizar a população sobre doenças e tratamentos, mas também como uma nova modalidade de ensino e aprendizagem para as futuras gerações.

## 5 REFERÊNCIAS

ABEDIN, T. et al. YouTube as a source of useful information on diabetes foot care. **Diabetes Research and Clinical Practice**, v. 110, n. 1, p. e1–e4, 2015.

CHENG, X.; DALE, C.; LIU, J. Statistics and social network of YouTube videos. **IEEE International Workshop on Quality of Service, IWQoS**, p. 229–238, 2008.

DAILY, K. M.; NAN, X.; BRIONES, R. Analysis of HPV Vaccine Information on Influential Blog Sites: A Snapshot Amid the 2011 Republican Presidential Primary Debates. **Atlantic Journal of Communication**, v. 23, n. 3, p. 159–177, 2015.

DELLI K, LIVAS C, VISSINK A, SPIJKERVET FKL. Is YouTube™ useful as a source of information for Sjogren´s syndrome? **Oral Diseases**, v. 22, n. 3, p.196-201, 2016.

HASSONA, Y. et al. YouTube as a source of information on mouth (oral) cancer. **Oral Diseases**, v. 22, n. 3, p. 202–208, 2016.

MADATHIL, K. C. et al. Healthcare information on YouTube: A systematic review. **Health Informatics Journal**, v. 21, n. 3, p. 173–194, 2015.

MUKHOPADHYAY, S.; KRUGER, E.; TENNANT, M. YouTube: a new way of supplementing traditional methods in dental education. **Journal of dental education**, v. 78, n. 11, p. 1568–71, 2014.

STEINBERG, P. L. et al. YouTube as Source of Prostate Cancer Information. **Urology**, v. 75, n. 3, p. 619–622, 2010.

SYED-ABDUL, S. et al. Misleading health-related information promoted through video-based social media: Anorexia on youtube. **Journal of Medical Internet Research**, v. 15, n. 2, p. e30, 2013.