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Analysis of breast cancer videos on YouTube

Análisis de vídeos sobre cáncer de mama en YouTube

Análise de vídeo sobre câncer de mama no YouTube

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ABSTRACT
This paper studies the characteristics and reliability of 76 YouTube videos about breast cancer, relating them to their repercussion and value for users. The analysis is based on a template that includes quantitative and qualitative elements. The results show a great diversity of formats and promoters, as opposed to a greater uniformity regarding the type of content and tone. Although neutral-tone informative videos predominate, the data reflects users' preference for more subjective and less reliable videos.

Keywords: YouTube; videos; breast cancer; repercussion; reliability.

RESUMEN
El artículo estudia las características y fiabilidad de 76 vídeos de YouTube sobre cáncer de mama, relacionándolas con su repercusión y valor para los usuarios. El análisis se basa en una plantilla que incluye elementos cuantitativos y cualitativos. Los resultados muestran una gran diversidad de formatos y promotores, frente a una mayor uniformidad en cuanto al tipo de contenido y el tono. Aunque predominan los vídeos informativos de tono neutral, los datos reflejan la preferencia de los usuarios por vídeos más subjetivos y menos fiables.

Palabras clave: *YouTube; vídeos; cáncer de mama; repercusión; fiabilidad.*

RESUMO
O artigo estuda as características e a confiabilidade de 76 vídeos do YouTube sobre câncer de mama, relacionando-os à sua repercussão e valor para os usuários. A análise é baseada em um modelo que inclui elementos quantitativos e qualitativos. Os resultados mostram uma grande diversidade de formatos e promotores, em oposição a uma maior uniformidade em termos de tipo de conteúdo e tom. Embora os vídeos noticiosos de tons neutros predominem, os dados refletem a preferência dos usuários por vídeos mais subjetivos e menos confiáveis.

Palavras-chave: YouTube; vídeos; câncer de mama; repercussão; confiabilidade.

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INTRODUCTION

Breast cancer accounts for 11.6% of the cases of cancer diagnosed in the world (Bray et al., 2018). Thus, among women, breast cancer is the second most common and most frequent cancer, with a considerable difference from the rest (Bray et al., 2018). Because of the high incidence of the disease and the possibilities of reducing its impact through primary prevention and early detection, the visibility of breast cancer has been a fundamental objective of numerous associations and public entities for years. In fact, breast cancer receives high media coverage compared to other types of cancer (Jensen, Moriarty, Hurley, & Stryker, 2010).

As with other diseases, people interested in the disease or affected by it tend to seek information through the means at their disposal, including the Internet (Hallyburton & Evarts, 2014; Li, Orrange, Kravitz, & Bell, 2014; Li, Theng, & Foo, 2016). This paper aims to analyze, specifically, YouTube videos on breast cancer and assess their usefulness for women who have been diagnosed with the disease or who suspect they may have it, as well as for people around them, assuming that these are the groups that conduct a greater search for information on this subject. It will also try to assess the impact of these videos and their reliability, checking whether the tendency seen in other areas also occurs in this: i.e., that user-generated videos are more popular than professional ones (Welbourne & Grant, 2016).

THEORETICAL FRAMEWORK

In the case of breast cancer, there are three groups that can be considered active audiences within the framework of the situational theory of publics proposed by Grunig (synthesized in Grunig & Hunt, 1984), i.e., as a group affected by a certain subject, that recognizes its existence and wishes to do something about it: 1) women who suspect, due to the presence of certain symptoms, that they may suffer from the disease; 2) women who have been diagnosed with breast cancer, and 3) people around women diagnosed or who suspect they may suffer from the disease. These are groups with a high level of involvement and with a certain recognition of the problem; these two factors, according to Grunig's theory, increase the chances that individuals develop both passive communication behaviors (processing the information they receive on the subject they are interested in) and active information search behaviors. Thus, these people will not only process all the information that is offered to them from different sources (medical or not) to answer their questions or complement their knowledge about the disease, its symptoms, phases or treatments, but also will actively search for information aimed at trying to eliminate their uncertainties and obtaining different points of view.

With a worldwide penetration of 53% (We are social & Hootsuite, 2018), Internet is one of the sources where these interested audiences can seek a greater amount of information quickly, economically and easily. In fact, Hallyburton and Evarts (2014) state that both men and women use the Internet more than any other source when they are looking for health information. Li, Theng and Foo (2016) pose that the three aspects on which they online search for health information focus are the search for information on specific diseases, medical treatments and healthy behaviors. They also indicate that young women with a high level of education are, in general terms, the ones that most seek information about health on the Internet, while highlighting that individuals with a poor state of health are more likely to look for information online about this issue. Li, Orrange, Kravitz and Bell (2014) also state that 80% of patients in an online community go to the Internet for information after a medical appointment, mainly out of curiosity.

This search for information is likely to be a response to what Lee and Hawkins (2010) call unmet needs. The authors use this concept to explain why women with breast cancer turn to the Internet to search for information, showing that the more unmet needs they have, the more likely they are to seek information online about their disease. Likewise, they relate the use of the Internet to search for health information with the theory of uses and gratifications, and stress that newly diagnosed cancer patients want to obtain information about treatments, side effects and the possibilities of cure, while who are in a post-treatment phase need information on how to prevent cancer and the hereditary factor.

The information resources available on the Internet are many, from specialized websites to different content generation platforms and social networks. In this study, we will focus on YouTube, which with 1.5 billion users in the world is the second social network in active users, behind Facebook (We are social & Hootsuite, 2018). Although there is abundant literature focused on the use of Facebook for communication about health and breast cancer (Abramson, Keefe, & Chou, 2015;

Fernández-Gómez & Díaz-Campo, 2016; Corbacho, Dafonte, & Míguez, 2018), according to Madathil, Rivera-Rodriguez, Greenstein and Gramopadhye (2015), YouTube is increasingly being used as a means to disseminate health information; the fact that its format is audiovisual can be an incentive for active audiences who want to seek information about the ailments that concern them in a way easy to consume and that does not require the effort of reading long texts on a website.

Several recent studies try to assess the effectiveness of YouTube videos and the quality of their content in relation to different diseases. In the specific case of cancer, there are various studies that analyze YouTube videos related to prostate cancer (Basch, Menafro, Mongiovi, Hillyer, & Basch, 2017), mouth cancer (Hassona, Taimeh, Marahleh, & Scully, 2016), skin cancer (Ruppert et al., 2016; Basch, Basch, Hillyer, & Reeves, 2015; Myrick & Oliver, 2014), cervical cancer (Adhikari, Sharma, Arjyal, & Uprety, 2016) and gynecological (Cooper, Gelb, & Chu, 2016), among others.

Most of these studies positively assess the possibilities of YouTube as a tool to provide information on the different types of cancer. However, several detect lack of content, an excess of videos created by non-qualified people or the users' preference for videos that are not especially useful.

Thus, Basch et al. (2017), in their study on prostate cancer videos, detect a higher percentage of user-generated videos than videos created by medical or government professionals, although the latter are the ones that offer more information. In the same vein, Hassona et al. (2016) conclude that, in the case of mouth cancer, videos of health professionals and professional organizations are more useful than those of users; however, while a significant correlation between the usefulness of the videos and their viewing rate or interaction cannot be established, the most useful videos are those that have the least views.

The lack of videos promoted by reputable organizations is also one of the conclusions reached by Adhikari et al. (2016) in their study on cervical cancer; in it, they detect abundance of videos that describe personal stories or that address the risk factors of the disease and the importance of early detection, but few that deal specifically with concrete aspects of the disease and its development.

According to the study by Basch, Basch, et al. (2015), among the videos on skin cancer, there is also an abundance that addresses early detection, although videos of users with descriptions of home treatments, of unproven effectiveness, also have a high presence. Therefore, the authors insist that research is required to identify the features of the videos that are most likely to be watched in order to develop credible products that help users make informed decisions about cancer prevention and control.

In the case of breast cancer, there are studies related to YouTube videos on specific aspects such as mammograms (Basch, Hillyer, MacDonald, Reeves, & Basch, 2015) or breast reconstruction (Tan, Kok, Ganesh, & Thomas, 2014). Basch, Hillyer, et al. (2015) suggest that, although the videos created by professionals contain more general information about mammograms, the ones generated by consumers have more comments and stress that future research should focus on analyzing the accuracy of the information offered. On the other hand, Tan et al. (2014) highlight that, although YouTube videos do not offer exhaustive information about breast reconstruction, they are a useful resource for patient education.

However, studies on the more general videos related to breast cancer that may be useful for the interested user are scarce and this is where this research focuses.

METHODOLOGY

The objectives of this study are to analyze YouTube videos about breast cancer, assessing their reliability, their usefulness for women who have been diagnosed with the disease or who suspect they may have it and for people around them, and their impact depending on their characteristics. To do this, the following research questions are posed:

- RQ1. What are the characteristics of the videos that can be found on YouTube by people interested in finding information about breast cancer?
- RQ2. What aspects of the disease do these videos address?
- RQ3. Is the information they offer reliable and useful?
- RQ4. Is there a relationship between their characteristics, reliability and usefulness and their impact?

For this study, we conducted a selection of YouTube videos on breast cancer, imitating the search behavior of

any habitual user. Thus, we selected the following search terms (in English): breast cancer, as the most frequent general search term when looking for information about the disease; breast cancer detection, which could be used by individuals interested in finding out about early detection mechanisms; breast cancer symptoms, as a search term that can be used by people who believe they might have the disease and want to assess or rule out their symptoms; breast cancer treatment, which could be used by people who have been diagnosed with the disease.

In April 2017, we conducted a search for each of these terms and selected the twenty videos that appear on the first YouTube results page, in the order in which the platform presents them (by relevance), since they are the ones that users more likely consult when they perform a search. Of the 80 resulting videos in total, for the four terms searched, we eliminated duplications. Then, we conducted a second search process in which the same four criteria were used; in this case, the results were sorted by number of visualizations, in order to add to the sample the most viewed videos on the subject, which probably also occupied positions of relevance in the network at some point. Once the duplications were eliminated, the database was reviewed and cleaned, eliminating results that corresponded to channels (and not videos), videos in languages impossible to process for researchers (Arabic and Hindi, keeping only the videos in English) and videos that, despite appearing in the search, were not related to the subject under investigation. Thus, the sample was reduced to a total of 76 videos.

An analysis template was applied to each video; it included, first, the general broadcast data of each video (year of publication and duration in minutes and seconds) and the impact factor (visits, Likes, Dislikes and Comments) (RQ1 and RQ4).

The videos were also classified according to the type of broadcaster or source (RQ1), using the classifications proposed by Basch, Hillyer, et al. (2015), which identify four types of sources (individuals, state or medical sources, news sources and advertisement), and of Adhikari et al. (2016), which differentiate between individual sources, health-related people or health centers, academic institutions, new channels or miscellaneous. Finally, we decided to codify the results for this variable in six categories: individuals –whether YouTubers with a large number of followers or private individuals–; medical or specialized sources, including medical channels, medical centers, medical specialists, universities and research centers; health NGOs; specific health and/or wellness channels that cannot be considered specialized medical sources; channels with diverse contents (news, education, entertainment, general...), and miscellaneous (celebrities, companies, programs...).

According to the format or type of publication (RQ1), we used the classification of Tuells et al. (2015), which categorizes videos into news, advertisements, documentaries, interviews, conferences and exclusive user-generated YouTube content (prepared by the subscriber). We chose this classification but decided to change the name of documentary by reportage, more adjusted to the purposes of the study according to Nichols' classification (1997), and we added the tutorial category due to its frequent use on YouTube.

On the other hand, we also tried to assess the type of predominant content, the information offered (RQ2) and the tone of each video. To categorize the videos in this stage of the content analysis, we used inductive coding (Andréu, 2002) because –due to the variety of the material and its specificity– no sources were found with classifications that fit the analyzed content and allowed a deductive coding. After a first individual coding by each of the three researchers, which generated three sets of different categories for each of the variables, we conducted a discussion that consensually resulted in a final categorization for each of them. Regarding the type of content, we distinguished between informative (where content intended to report a phenomenon is predominant), testimonial (the narration of one or more testimonials is predominant), advertising (persuasive content predominates for the purpose of selling a product or service, or look for adherence to a cause, etc.) or others (for example, music content). Regarding the information offered, we identified several non-exclusive categories on aspects that could be of interest to active users seeking information about the disease: what it is, figures, risks, symptoms, prevention, early detection, treatments and care. Regarding the predominant tone, it was classified as neutral, emotional, humorous or alarmist; we added the category of non-applicable for cases such as music videos.

Based on the analysis of Adhikari et al. (2016), the videos were also classified according to the reliability of the information they offer (RQ3), qualifying those who provide information considered scientifically correct on any aspect of the disease as reliable, and those that offer some data or information that can be confusing or misleading for the user as unreliable; we added the indifferent category to classify those videos that, due to

Broadcast and impact	Source	Type of information	Predominant content	Format	Tone	Reliability	Useful for the user
Year	Individual	What is it	Informative	News	Neutral	Yes	No
Duration	Specialized source	Figures	Advertising	Add	Emotive	No	A little
Visits	Health NGO	Risks	Testimonial	Reportage	Humoristic	Indifferent	Very
Likes	Health channel	Symptoms	Others	Interview	Alarmist		
Dislikes	Diverse contents channel	Prevention		Conference	Non-applicable		
Comments	Miscellaneous	Early detection		Tutorial			
		Treatment		Youtube			
		Care					

Table 1. Variables and analysis categories

Source: Own elaboration.

their characteristics, do not offer information, strictly speaking (for example, the testimonial videos of users who limit themselves to tell their experience), despite being related to the breast cancer theme.

This variable was complemented with another: identification of videos useful for users (RQ3). The starting point was the videos' usefulness proposed by Hassona el al. (2016) and, based on it, we proposed our own categorization, considering that a video can offer reliable information but of little value to the user (for being excessively complex or excessively simple, for example) or may not offer specific information on the disease but have another type of value (e.g., the narration of a personal experience that does not provide objective information but can provide emotional support). Thus, the videos were divided into useless, a little useful and very useful, considering that those videos that are a little useful or very useful can be of value for the user.

The three researchers performed the coding independently between January and April 2018. The agreement level was almost complete and the few classification differences in the categorical variables were resolved consensually. Visits, likes, dislikes and comments data were updated on May 30, 2018.

The analysis was conducted using Excel and R. We detailed the range and found the mean, standard deviation and median of the duration of the videos, visits, Likes, Dislikes and Comments; in the case of duration, we grouped it into six sections for better analysis. We made frequency distributions for the rest of the variables depending on the type of promoter, accepting the data with $p<0.05$ as statistically significant. In addition, we created statistical tables of the medians of the impact variables (given the high deviation from the mean) in relation to other categorical variables.

RESULTS

GENERAL BROADCAST AND IMPACT DATA

More than three quarters of the videos returned by YouTube according to the search parameters are from 2014 onwards, with a peak of videos in 2016. There are no videos recorded before 2008. The length of the videos ranges between 30 seconds and about an hour and a half, with an average duration of eight and a half minutes and a standard deviation (DS) of almost fifteen minutes; the median is three and a half minutes. The division of the videos into six sections indicates that almost 80% of the videos are below ten minutes (table 2).

As for the impact data, the median number of views is 66,760, although a video exceeds eleven million. In the case of Likes the same thing happens; most of the videos have a very small number of Likes (median of 194), although some exceed 30,000. The Dislike and Comments data are much lower, as usual in this type

		n	%
Year	2008	1	1.32
	2009	0	0
	2010	3	3.95
	2011	3	3.95
	2012	3	3.95
	2013	8	10.53
	2014	14	18.42
	2015	11	14.47
	2016	23	30.26
	2017	10	13.16
Duration	<0:02:00	14	18.42
	0:02:00 - 0:03:59	27	35.53
	0:04:00 - 0:09:59	19	25
	0:10:00 - 0:19:59	11	14.47
	0:20:00 - 0:59:59	3	3.95
	1:00:00 o >	2	2.63

Table 2. Broadcast characteristics of 76 relevant YouTube videos on breast cancer

Source: Own elaboration.

	Views	Likes	Dislikes	Comments
Range	626 - 11,095,021	0 - 30,000	0 - 4,600	0- 3,655
Mean	866,324	2,972	232	279
(SD)	-2,031,113	-6,640	-676	-635
Median	66,760	194	27	28

TTable 3. Impact data of 76 relevant YouTube videos on breast cancer

Source: Own elaboration.

of platforms. The general ratio between Likes and Dislikes is 6.5 to 1 (table 3).

CHARACTERISTICS OF THE VIDEOS DEPENDING ON THE TYPE OF PROMOTER

Among the promoter sources of the videos there is a lot of diversity; the specific health or wellness channels and the individuals/YouTubers are those that provide the greatest number of videos, followed by the channels of specialized promoters and the channels of diverse content. Regarding the format, 47.4% of the videos could be classified as reportages; this is the format preferred by many of the promoters, although it is not the case of YouTubers, which fundamentally generate their own content that cannot be included in other formats, nor of the health NGOs, which diversify their formats (table 4).

In general terms, the aspect on which the videos offer more information is early detection, present in 42.11% of the videos. Prevention and care during and after the illness are the aspects least informed. 18.42% of the videos do not offer information about

any of the contents mentioned in the classification. In the case of information on symptoms, prevention and early detection, the relationship with the type of promoter giving this information is statistically significant ($p<0.05$) and we can observe how specialized promoters insist especially on aspects related to early detection, while health or wellness channels focus more on symptoms. Most of the videos (63.2%) have a fundamentally informative content, while 23.7% are testimonial; YouTubers are the only type of promoter that opt primarily for testimonial content (table 4).

Most of the videos (71.05%) have a neutral tone and only in 17.11% of the cases there is emotionality as an element of attraction. About 8% of videos address the problem from a humorous perspective. YouTubers are the ones who choose emotionality the most, while specialized sources, health NGOs and health and wellness channels avoid it, although the latter type of promoter is the only one in which we found alarmist messages (table 4).

Just over half of the videos offer reliable information, but 26% provide confusing or biased information. Most of the unreliable information is in the YouTubers' videos, but also in those of health or wellness channels. In contrast, almost all videos of specialized promoters and health NGOs offer reliable information. In general, three quarters of the videos can be considered useful, to a greater or lesser extent, for users. The highest percentage of useful videos belongs to specialized promoters, although their presence in the sample is lower than that of other promoters such as health or wellness channels and YouTubers (table 4).

RELATIONSHIP BETWEEN THE CHARACTERISTICS OF THE VIDEOS AND THEIR IMPACT

The videos broadcasted by health and wellness channels reach a higher average of views than the rest, while the videos of health NGOs are the ones with the worst results in terms of viewing. The videos most liked and commented are, instead, those that come from diverse promoters (table 5).

As for the duration, the views and reactions concentrate in the longer videos, although in this case that category includes only two videos, so the result is probably very biased. If these videos are excluded, those that obtain a higher median of views and reactions are those that last between 4 and 10 minutes (table 5).

Regarding the format, the adds or campaigns are those that reach, with much difference, both a greater number of views and reactions, followed by the news and the tutorials. On the other hand, the distribution by type of content indicates that the videos in which the information, the advertising content or the testimonies (e.g., mainly musical content) do not predominate are the most watched and the ones that generate the most reactions, while the informative are those that obtain worse results (table 5).

As for tone, the humoristic videos have more visualizations, although they also have a greater number of negative reactions. The Likes are, again, for videos in which no tone has been identified (mainly musical) and the comments, for the alarmist videos. Neutral tone videos generate fewer visualizations and reactions than the rest (table 5).

The videos classified by the researchers as unreliable and those that the encoders consider useless for the users are more viewed and generate more reactions (both positive and negative) than the reliable ones and those considered very or a little useful (table 5).

CONCLUSIONS AND DISCUSSION

The results of this study reaffirm, in general terms, the contributions of other research conducted in relation to YouTube videos on different types of cancer.

Regarding the characteristics of the videos on breast cancer that an interested person can find on YouTube (RQ1), a standard search fundamentally gives as a result videos of the last five years and up to ten minutes long, although we can also find products that exceed sixty minutes. It can be concluded that the user will find an important diversity in terms of formats and promoters, with many videos from sources somehow related to health (whether specialized, NGOs or health channels), but also with abundant videos of YouTubers and diverse content channels. Just over 18% of the videos correspond specifically to specialized broadcasters, which are the ones that can offer the highest quality information, which is consistent with the conclusions obtained by Adhikari et al. (2016) for cervical cancer or Basch et al. (2017) for prostate cancer.

On the other hand, there is much more uniformity in terms of content type and tone, with predominance of informative videos that use a neutral tone, from which a greater capacity for the transmission of rigorous information can be assumed a priori, as well as their usefulness for a person affected or interested in the disease; the emotional aspects reduce their presence to less than a fifth of the videos and humor, a resource that could be tricky, is used occasionally.

% VIDEOS BY TYPE OF PROMOTER[a]							
	F1	F2	F3	F4	F5	F6	Total
Total	17.11	21.05	18.42	21.05	9.21	13.16	**100**
% Videos by format ***							
Add	2.63	0	0	1.32	2.63	2.63	**9.21**
Conference	3.95	0	0	0	0	2.63	**6.58**
Interview	0	1.32	0	1.32	3.95	3.95	**10.5**
News	2.63	0	0	0	0	0	**2.63**
Reportage	6.58	15.79	15.79	5.26	1.32	2.63	**47.4**
Tutorial	1.32	3.95	1.32	3.95	0	1.32	**11.84**
User-generated YouTube content	0	0	1.32	9.21	1.32	0	**11.84**
% Videos by information offered							
What is it/ types/ phases	5.26	9.21	5.26	0	1.32	2.63	**23.68**
Figures	5.26	5.26	6.58	0	1.32	3.95	**22.37**
Risks	2.63	5.26	2.63	1.32	1.32	0	**13.16**
Symptoms*	2.63	13.16	3.95	3.95	2.63	1.32	**27.63**
Prevention*	0	5.26	0	0	1.32	0	**6.58**
Early detection**	11.84	5.26	13.16	2.63	3.95	5.26	**42.11**
Treatment	0	7.89	5.26	6.58	1.32	6.58	**27.63**
Care	0	2.63	0	1.32	1.32	1.32	**6.58**
% Videos by predominant content type*							
Informative	9.21	18.4	17.11	5.26	2.63	10.5	**63.2**
Advertisement	2.63	0	0	2.63	2.63	1.32	**9.21**
Testimonial	3.95	2.63	1.32	11.84	2.63	1.32	**23.7**
Others	1.32	0	0	1.32	1.32	0	**3.95**
% Videos by tone*							
Alarmist	0	2.63	0	0	0	0	**2.63**
Emotive	3.95	1.32	0	7.89	3.95	1.32	**17.11**
Humoristic	2.63	0	1.32	1.32	1.32	1.32	**7.89**
Neutral	10.5	17.11	17.11	11.84	2.63	10.5	**71.05**
Non-applicable	0	0	0	0	1.32	0	**1.32**
% Videos by reliability***							
Reliable	9.21	10.53	17.11	3.95	0	11.84	**52.63**
Indifferent	5.26	3.95	1.32	9.21	5.26	1.32	**21.05**
Non reliable	2.63	6.58	0	7.89	3.95	0	**26.32**
% Videos by usefulness**							
Very useful	3.95	7.89	14.47	2.63	1.32	7.89	**38.16**
A little useful	7.89	11.84	2.63	10.53	1.32	2.63	**36.84**
Useless	5.26	1.32	1.32	7.89	6.58	2.63	**25**

Table 4. Characteristics of the videos according to the type of promoter

a F1 = Diverse content channels. F2 = Health or wellness channels. F3 = Specialized promoters.

F4 = Individuals/ YouTubers. F5 = Miscellaneous. F6 = Health NGO.

** p<0.05 ** p <0.01 *** p<0.001*

Source: Own elaboration.

		Views	Likes	Dislikes	Comments
Type of promoter	Diverse content channel	95,840	167	42	88
	Health channel	**137,290**	424	**56**	34
	Specialized	54,606	165	17	26
	Individual	121,700	295	39	86
	Miscellaneous	117,033	**953**	24	**120**
	Health NGO	11,022	46	4	3
Duration	<0:02:00	5,046	113	27	16
	0:02:00 0:03:59	64,072	179	21	10
	0:04:00 0:09:59	106,315	670	43	88
	0:10:00 0:19:59	29,973	103	15	14
	0:20:00 0:59:59	52,552	315	13	28
	1:00:00 o >	**1,010,984**	**3,418**	**95**	**336**
Format	Add	**6,526,470**	**7,700**	**564**	**752**
	Conference	8,500	28	2	6
	Interview	23,120	178	5	12
	News	858,599	6,530	155	639
	Reportage	59,664	201	25	26
	Tutorial	247,633	284	68	28
	YouTube	106,315	1,100	35	161
Content	Informative	51,585	105	13	14
	Advertisement	1,164,115	6,700	122	349
	Testimonial	111,674	618	34	104
	Others	**1,442,581**	**20,000**	**272**	**642**
Tone	Alarmist	2,037,317	7,350	807	**852**
	Emotive	105,351	1,026	32	194
	Humoristic	**7,045,986**	8,050	**1,215**	775
	Neutral	52,543	108	14	14
	Non-applicable	1,442,581	**20,000**	197	642
Reliability	Reliable	51,585	84	13	9
	Indifferent	127,059	618	33	104
	Unreliable	**296,970**	**1,400**	**95**	**162**
Usefulness for users	Very useful	55,257	108	21	25
	A little useful	52,779	171	18	15
	Useless	**952,475**	**2,500**	**146**	**452**

Table 5. Median of the impact variables according to the characteristics of the videos

Source: Own elaboration.

Regarding the format, the percentage of videos in several of the identified categories is quite similar to that obtained by Tuells et al. (2015) in the case of the human papillomavirus (12.35% of ads, 12.35% of interviews, 12.35% of YouTube content or 10% of conferences). There would be a noticeable difference in the percentage of news (43.52% in the study by Tuells et al. versus 2.63% in this case) and reportages (9.41% vs. 47.4%), although the sum of both categories, also adding the 11.84% of tutorial videos detected and that the study by Tuells et al. (2015) does not difference, would be quite similar (52.93% vs. 61.87). Considering the thematic and scope difference (in the study by Tuells et al. the search is done with terms in Spanish), it seems that the frequency distribution of formats is more or less general, at least for videos of health topics, which endorses the validity of the sample.

As for the aspects on which the videos offer information (RQ2), we can conclude that early detection mechanisms are a priority issue, closely related to information on the disease's symptoms. General cancer figures and treatment information also have an important presence. Users will have more difficulties if they intend to locate information on possible preventive measures against breast cancer and on the care that a person affected by the disease requires.

On the other hand, a quarter of the videos that people interested in breast cancer will locate on YouTube do not offer reliable information and do not provide, in objective terms, any useful element to users (RQ3).

Regarding the relationship between the characteristics of the videos and their impact (RQ4), it is striking that videos between four and ten minutes generate more views and reactions than shorter videos, since what is usual on YouTube is to find short videos, lasting less than 4 minutes, because they manage to retain viewers to a greater extent than those of long duration (Vidyard, 2017). In this regard, we can conjecture that users prefer videos with a certain length (greater than the one considered optimal on YouTube) because very short videos can hardly describe adequately the aspects on which people need to inform themselves or narrate experiences they want to know.

Considering reactions, in line with the trend pointed out by Welbourne and Grant (2016), the videos broadcasted by specialized promoters (and, therefore, more reliable a priori) are watched less and generate few reactions, while the videos generated by YouTubers have more views and more impact. These results are consistent with those obtained by Basch, Hillyer, et al. (2015) for mammography videos, who detect a much lower percentage of comments for professional videos than for those created by users, or by Hassona et al. (2016), who detect that the most reliable videos about mouth cancer are those that have a worse position in terms of views.

The preference for videos generated by YouTubers over those of specialized broadcasters, along with the low impact of informative videos (despite their abundance) against testimonials, or of videos considered reliable and useful by researchers against those who are not, makes us doubt that the purpose for which users look for videos about diseases on YouTube is to obtain detailed and objective information about the ailment. Rather, the impact patterns –with greater success of humorous, emotional or alarmist videos versus neutral ones– point to a search for materials of diverse nature in which the disease is approached from a less objective and more emotional point of view.

Therefore, it could be conjectured that, although the broadcasters specialized in health issues seem to strive to offer rigorous videos, with reliable and quality information, the user prioritizes the search for support and accompaniment over the resolution of doubts about the disease.

This study is limited to the specific case of a disease, breast cancer, with English language searches, as it is the fundamental language on the Internet. The replication of this study in Spanish or other languages could be useful to check if the characteristic patterns of the videos are repeated in a different linguistic (and, therefore, social and cultural) context and if the conclusions obtained regarding the relationship between these characteristics and the impact of the videos are universal in the case of breast cancer. Also, it would be of interest to check these same aspects in videos about other types of cancer and other ailments, to determine general trends related to the use of YouTube in the field of health.

ANNEX: LINKS TO THE SAMPLE VIDEOS

DATE	VIDEO	LINK
07/11/2008	My First Chemo Treatment for Breast Cancer	https://www.youtube.com/watch?v=_N8yb-VQq-s
08/24/2010	Breast Cancer | Staging | Nucleus Health	https://www.youtube.com/watch?v=l2lRZuEK4YQ&t=30s
09/28/2010	How to Recognize Breast Cancer Symptoms	https://www.youtube.com/watch?v=yTHyMNBkbOY&t=37s
10/25/2010	Breast Cancer | Treatment | Nucleus Health	https://www.youtube.com/watch?v=rg7bv3TpXEE
03/07/2011	Innovations In Breast Cancer Detection: 3D Mammography	https://www.youtube.com/watch?v=J4yyxYzJlGs
10/05/2011	Rethink Breast Cancer presents: Your Man Reminder	https://www.youtube.com/watch?v=VsyE2rCW71o&t=8s
11/22/2011	Tattoos Cover Breast Cancer Scars	https://www.youtube.com/watch?v=dkvlLYfqhAc
02/08/2012	My Early Breast Cancer Symptoms	https://www.youtube.com/watch?v=MTcMKA_dg1o
10/02/2012	Global neural network cloud service for breast cancer detection: Brittany Wenger at TEDxAtlanta	https://www.youtube.com/watch?v=oJFdaIfNy3Y
10/10/2012	How to Check Yourself for Breast Cancer	https://www.youtube.com/watch?v=mTG7BqM9Obk
02/12/2013	Early Breast Cancer Detection: Matt Bernardis at TEDxUniversityofNevada	https://www.youtube.com/watch?v=wcUFLjRVxK8
04/10/2013	Breast cancer - Symptoms and treatment	https://www.youtube.com/watch?v=VsviAPGfPUo&t=34s
04/27/2013	Young Breast Cancer Survivors Share Stories And Importance of Early Detection - Give 2 Educate 10	https://www.youtube.com/watch?v=p5DD8xjJwgE
04/29/2013	Breast Cancer Treatment 101: The Basics - Fourth Thursdays: Lunch & Learn Webinar	https://www.youtube.com/watch?v=_zjLJdXhnjQ
07/10/2013	Removal of chemo port after Breast Cancer Treatment	https://www.youtube.com/watch?v=nYM_dyY-Rlk
10/01/2013	Detection Inequality: Disparity Among Breast Cancer Screening Access	https://www.youtube.com/watch?v=dylKU-DtnLs
10/03/2013	She Cured Her Breast Cancer-Here's How!	https://www.youtube.com/watch?v=MSjQYQt-PRw
12/24/2013	Breast Cancer Radiation Treatment	https://www.youtube.com/watch?v=14jz2dGMzo8
01/10/2014	Hormonal therapy in breast cancer	https://www.youtube.com/watch?v=pD3aXpnkWwU
04/09/2014	11 Home Remedies For Breast Cancer	https://www.youtube.com/watch?v=zYVrZd7WhDo
04/12/2014	'I Touch Myselfie' for Breast Cancer Detection #itouchmyselfproject	https://www.youtube.com/watch?v=8UUNpr8pKmc
06/12/2014	What It's Like to Have a Mammogram | Cancer Research UK	https://www.youtube.com/watch?v=4Pw1Duz22OQ&t=16s
06/14/2014	Breast Cancer - Causes, Types, Symptoms and Treatment Options	https://www.youtube.com/watch?v=Ig1-n4X8pCY
06/16/2014	Breast Cancer Patient Dances Her Way to the Operating Room	https://www.youtube.com/watch?v=GkGCE986HTk
06/20/2014	A Year of Breast Cancer	https://www.youtube.com/watch?v=G1zTk7ZR_CQ
08/01/2014	Thermography: Breast Cancer Detection Years Before Mammography	https://www.youtube.com/watch?v=WwKEMp8hIn4
08/12/2014	What Are the Treatment Options for Stage 4 Breast Cancer?	https://www.youtube.com/watch?v=jvgHQn8DXqs
09/24/2014	NESTLÉ FITNESS® Bra Cam	https://www.youtube.com/watch?v=8Gr1OJbidw8&t=1s
09/30/2014	Living Beyond Breast Cancer: Metastatic Breast Cancer Treatment Strategies	https://www.youtube.com/watch?v=c7TrE9ttO6s
10/01/2014	DIY Crochet Pink Awareness Ribbon Scarf Prayer Shawl Wrap Blanket Stitch Breast Cancer Other	https://www.youtube.com/watch?v=IgHuYICfxdQ
10/03/2014	How To Catch Breast Cancer Early: Stanford Doctors Explain Mammography Options	https://www.youtube.com/watch?v=ql11xKFMKg4

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DATE	VIDEO	LINK
10/12/2014	Breast cancer awareness campaign that Shocked everybody	https://www.youtube.com/watch?v=8xCTZR4Imqg
01/19/2015	Breast Cancer: First Chemo A/C cycle one 12/30/14 using port	https://www.youtube.com/watch?v=S_GJBy3LQyQ
02/02/2015	How Shannon healed stage 4 breast cancer with alternative therapies	https://www.youtube.com/watch?v=v4-tgpp7kkk
04/20/2015	Breast Cancer (Breast Tissue, BRCA genes, Biopsy, Lumpectomy, Mastectomy, Mammogram, &	https://www.youtube.com/watch?v=8INjcI2GZ68
10/01/2015	Importance of Early Detection in Breast Cancer Diagnosis	https://www.youtube.com/watch?v=wybtf6FU-uU
10/07/2015	Pink Panther | Breast Cancer Awareness | Tommy Emmanuel	https://www.youtube.com/watch?v=oUoxlagDVIo
10/14/2015	Self-exam is the key to detecting breast cancer early	https://www.youtube.com/watch?v=Hhu4WszL1Bs
10/15/2015	The Truth About Cancer: A Global Quest - Episode 2	https://www.youtube.com/watch?v=VK_sX5ko8SE&t=4598s
10/22/2015	2015 Breast Cancer Screening Recommendations for Women at Average Risk	https://www.youtube.com/watch?v=TDeGl4hJqYQ&t=29s
11/21/2015	Breast Cancer - CRASH! Medical Review Series	https://www.youtube.com/watch?v=OJHbimZtT7Y
12/01/2015	New Treatment for Early-stage Breast Cancer Available at Emory Healthcare	https://www.youtube.com/watch?v=6ltyH8c6EtQ
12/15/2015	What Happens After Breast Cancer Treatment?	https://www.youtube.com/watch?v=9c2amvvzc9s
01/30/2016	Deadpool - Ladies Listen | official Breast Cancer PSA (2016) Ryan Reynolds	https://www.youtube.com/watch?v=e0T8dLAyT6I&t=42s
02/18/2016	8-Year-Old Girl is Breast Cancer Free After Having Double Mastectomy	https://www.youtube.com/watch?v=8bI16iVGrUA
02/18/2016	Best Remedies For Breast Cancer	https://www.youtube.com/watch?v=RO2rwf_cqic
02/18/2016	Signs And Symptoms Of Breast Cancer	https://www.youtube.com/watch?v=QxQdSZgDpyg
05/13/2016	Microwave Imaging for Breast Cancer Detection	https://www.youtube.com/watch?v=UE9zME9wgJc
05/23/2016	Breast Cancer - Symptom, Causes & Diagnosis (Finding Earth)	https://www.youtube.com/watch?v=NjlBejwb_xw
06/28/2016	Detection of Breast cancer / Lesion Contour using MATLAB	https://www.youtube.com/watch?v=uAS7DO4OGHo
08/19/2016	Breast Cancer - All Symptoms	https://www.youtube.com/watch?v=HB2-6JHaluQ
09/07/2016	How to Care for your Skin during Breast Cancer Radiation Therapy	https://www.youtube.com/watch?v=-di3DeHIRYY
10/01/2016	These Dogs Can Detect Breast Cancer By Sniffing	https://www.youtube.com/watch?v=jIrgtWWwqZo
10/03/2016	Mammography vs. Thermography for Detecting Breast Cancer - Dr. Veronique Desaulniers	https://www.youtube.com/watch?v=hOhZMZBfSis
10/03/2016	Symptoms of Breast Cancer	https://www.youtube.com/watch?v=ydlgEpZqpNM
10/16/2016	Radiation Treatment for Breast Cancer	https://www.youtube.com/watch?v=1_Hsz5dt2l4
10/17/2016	BRA UNHOOKING CHALLENGE	https://www.youtube.com/watch?v=YY3OPSv6XKM
10/17/2016	My Breast Cancer Story	https://www.youtube.com/watch?v=TGBGUTDnKcY
10/18/2016	Detecting Breast Cancer Through Tears	https://www.youtube.com/watch?v=FO2kaPibdoc
10/23/2016	ATTENTION! 5 Warning Signs Of BREAST CANCER That Many Women Ignore!	https://www.youtube.com/watch?v=sx84nHzlTaY&t=28s
12/04/2016	20 early warning signs that cancer is growing in your body	https://www.youtube.com/watch?v=amts1OceY5M
12/04/2016	Women Test Their Breast Cancer Risk	https://www.youtube.com/watch?v=gbHMb8g9f8I
12/06/2016	Breast Cancer Symptoms – Find Cancer Risks and Signs	https://www.youtube.com/watch?v=qmXgd6kGUOg
12/09/2016	The Future of Breast Cancer Detection is Already Here | Kevin Kelly | TEDxManhattanBeach	https://www.youtube.com/watch?v=sYcpMVgXcqA
12/10/2016	Inflammatory Breast Cancer | Symptoms and Causes	https://www.youtube.com/watch?v=DbKceu2OB-I
12/19/2016	Symptoms Of Breast Cancer	https://www.youtube.com/watch?v=CAHuWbGGvAO
01/23/2017	Early Breast Cancer Symptoms 7 Important Signs and Symptoms of Breast Cancer With Pictures	https://www.youtube.com/watch?v=2q5ulWVHzjw

Annex - Continues on next page

DATE	VIDEO	LINK
01/25/2017	How I Found Out my Cancer Came Back | Metastatic Breast Cancer	https://www.youtube.com/watch?v=3CPBc5sm67U
02/21/2017	Breast Cancer Awareness - Breast Cancer Symptoms - Cancer Fighting Foods	https://www.youtube.com/watch?v=4GmCVAeagBw
02/26/2017	5 Early Signs of Breast Cancer That Many Womens Ignore	https://www.youtube.com/watch?v=mYTZt7WWeXs
03/06/2017	Signs of breast cancer - Signs and symptoms of breast cancer in women	https://www.youtube.com/watch?v=cQOy9WZ3G5w
03/27/2017	Shannen Doherty Describes Her Treatment For Breast Cancer (Part 1) | Chelsea | Netflix	https://www.youtube.com/watch?v=A4GgFOapcTs
04/06/2017	New Breast Cancer Detection Technology	https://www.youtube.com/watch?v=1_CVMlTjr6Y
04/17/2017	How to Block Breast Cancer's Estrogen-Producing Enzymes	https://www.youtube.com/watch?v=AvSLeoUVb54
04/17/2017	Terra Jole' of "Little Women LA" Reveals Breast Cancer Test Results; EXCLUSIVE: 130 lb. Tumor	https://www.youtube.com/watch?v=jG9BbAxCDsY
04/19/2017	Exclusive: Terra Jole's Breast Cancer Test Results Revealed	https://www.youtube.com/watch?v=YEtrxZJsSjA

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