HUMAN VACCINES & IMMUNOTHERAPEUTICS
2020, VOL. 16, NO. 10, 2513–2517
https://doi.org/10.1080/21645515.2020.1726683

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SHORT REPORT

Characteristics of YouTube videos about the meningococcal B vaccine (4CMenB)

Ignacio Hernández-García [a], Silvio Ragozzino[b], and Teresa Giménez-Júlvez[c]

[a]Department of Preventive Medicine, Lozano Blesa University Clinical Hospital of Zaragoza, Zaragoza, Spain; [b]Division of Infectious Diseases and Hospital Epidemiology, University Hospital of Basel, Basel, Switzerland; [c]Department of Preventive Medicine, Miguel Servet University Hospital of Zaragoza, Zaragoza, Spain

ABSTRACT

YouTube has become a large source of health information, and it has the capacity to influence users: for instance, regarding their vaccination habits. The aim of our study was to analyze the characteristics of the videos published on YouTube about the meningococcal B vaccine (4CMenB, Bexsero®). A search was made on YouTube using the keyword "Bexsero." The association between the authorship of videos (health professionals or others) and the rest of the variables (tone of the message and vaccination recommendations, among others) was evaluated using the Chi-square test. In total, 77 videos were analyzed; 74% supported the use of the vaccine, and the most frequently mentioned vaccination recommendations were in epidemic outbreaks (28.6%) and in children (18.2%). Depending on the type of authorship, significant differences were observed regarding the tone of the message and the frequency with which the videos discussed effectiveness, dosage, adverse effects, and vaccination recommendations. There is a difficulty in obtaining information on vaccination recommendations. Recommendations are very diverse since there is a great heterogeneity in the official recommendations for the use of this vaccine, depending on the country the information is from.

ARTICLE HISTORY
Received 19 November 2019
Revised 10 January 2020
Accepted 1 February 2020

KEYWORDS
Serogroup B meningococcal vaccine; YouTube; information; evaluation; Bexsero

Introduction

YouTube is one of the most visited websites worldwide. In recent years, it has become a large source of health information, and it has the capacity to influence users: for instance, regarding their vaccination habits.[1,2] However, the information shown there often lacks scientific rigor, given the fact that anyone may upload their content. This factor is a cause of great concern to scientific societies, governments, and users.[3]

Multiple studies have analyzed the characteristics of YouTube videos that provide information about vaccines.[4-9] However, an assessment of YouTube videos containing information in English about the meningococcal B vaccine (4CMenB, Bexsero®) has not yet been published. For this reason, this research was carried out in order to determine the characteristics of YouTube videos showing information in English about this vaccine.

Materials and methods

A cross-sectional research within YouTube search engine during February 2018 using the "Bexsero" keyword was performed. Three exclusion criteria were applied (video not viewable, language other than English, and video does not include information about the meningococcal B vaccine (4CMenB, Bexsero®)). The following variables were obtained: date and country of publication, length, number of views, likes, dislikes and comments, authorship, type of publication, and tone of the message ("positive": vaccination is clearly recommended; "negative": arguments are put forward against vaccination; "ambiguous": information is given for and against the vaccine; "neutral": no information is given for or against the vaccine).[2]

We also recorded whether the videos provided information regarding benefits, effectiveness, adverse effects and cost of vaccination, route of administration and dosage, and any alert that the general public may contract a preventable disease with immunization and vaccination recommendations.

The association between the type of author of the video (health professionals and others) and the rest of the variables was assessed. A Chi-squared or Fisher's exact test was performed, and the association was quantified with odds ratio (OR) and 95% confidence intervals (95% CI). For the variables of the video length, number of views, likes, dislikes, and comments, median values were compared with the Mann–Whitney U test. This analysis was also done to study the association with the tone of the message.

The level of statistical significance for the comparison of hypotheses was established at $p < 0.05$.

Results

The number of videos obtained was 752; 77 of them met all the selection criteria. The oldest video was published on October 21, 2011. In total, 51.9% of the videos (40/77) were published before August 2015, and 81.8% (63/77) were produced in the USA and the United Kingdom (Table 1). The median length (range) was 152 seconds (21–11,857), and the number of views, likes, dislikes, and comments were,

CONTACT Ignacio Hernández-García ignaciohernandez79@yahoo.es Department of Preventive Medicine, Lozano Blesa University Hospital of Zaragoza, Calle San Juan Bosco 15, Zaragoza 50009, Spain

Table 1. Country of publication, authorship, type of publication, and tone of the message in the videos.

	Frequency, *n* (%)
Country of publication	
The USA	32 (41.6)
The United Kingdom	31 (40.3)
Australia	6 (7.8)
Canada	3 (3.9)
Ireland	1 (1.3)
Hungary	1 (1.3)
Unknown	3 (3.8)
Type of authorship	
Television channels	22 (28.6)
Health-care professionals	15 (19.5)
Pharmaceutical industry	12 (15.6)
Private users	8 (10.4)
Universities	7 (9.1)
Non-Governmental Organization	6 (7.7)
Other	7 (9.1)
Type of publication	
News	27 (35.1)
Interviews	18 (23.4)
Material created by the user	12 (15.6)
Conferences	12 (15.6)
Advertisements	6 (7.8)
Documentaries	2 (2.5)
Tone of the message	
Positive	57 (74.0)
Neutral	15 (19.5)
Ambiguous	3 (3.9)
Negative	2 (2.6)

respectively, 294 (13–6,563), 1 (0–29), 0 (0–8), and 0 (0–19). Most of the videos (63.7%) were produced by television channels, health-care professionals, or the pharmaceutical industry (Table 1). With regard to the type of publication, 74.1% of the videos were news pieces, interviews, or exclusive YouTube material created by users. In total, 74.0% of the videos showed positive messages with regard to the use of the vaccine (Table 1).

The most common themes were an alert that people may contract a preventable disease with immunization (80.5%), benefits (68.8%), and recommendation in cases of epidemic outbreaks (28.6%). Less frequent themes were related to vaccination recommendations in cases of treatment with eculizumab (1.3%) or properdin deficiency (1.3%) (Table 2).

The univariate analysis according to the type of author revealed statistically significant differences regarding the length (median length of the videos by health-care professionals: 219 seconds (range: 80–11,857); median length of the other videos: 139.5 seconds (range: 21–3,309)) (p = 0.028), tone (p = 0.008), and frequency with which different themes related to the vaccine were discussed (effectiveness (OR = 5.29), adverse effects (OR = 7.71) and description of the dosage (OR = 6.73)) (Table 3).

With regard to the frequency with which information was provided about vaccination recommendations, differences were observed depending on the type of author. This was the case with recommendations on vaccination for asplenic patients (p = 0.036) and in cases of terminal complement pathway deficiencies (p = 0.006) (Table 3).

The analysis according to tone revealed statistically significant differences regarding the number of likes (median (range) in videos with a positive tone: 2 (0–29); median (range) in other videos: 0 (0–16)) (p = 0.030).

Table 2. Topics related to the meningococcal B vaccine discussed in the videos.

Topic	Discussed, *n* (%)	Not discussed, *n* (%)
Alert that a disease may be contracted that is preventable with immunization	62 (80.5)	15 (19.5)
Benefits of the vaccine	53 (68.8)	24 (31.2)
Recommendation in cases of epidemic outbreak	22 (28.6)	55 (71.4)
Cost of the vaccine	20 (26.0)	57 (74.0)
Effectiveness of the vaccine	19 (24.7)	58 (75.3)
Description of the dosage	17 (22.1)	60 (77.9)
Adverse effects of the vaccine	16 (20.8)	61 (79.2)
Recommendation in children	14 (18.2)	63 (81.8)
Route of administration of the vaccine	12 (15.6)	65 (84.4)
Recommendation in teenagers	9 (11.7)	68 (88.3)
Shortage of the vaccine	5 (6.5)	72 (93.5)
Recommendation in young adults	4 (5.2)	73 (94.8)
Recommendation in cases of asplenic patients	3 (3.9)	74 (96.1)
Recommendation in cases of terminal complement pathway deficiencies	3 (3.9)	74 (96.1)
Recommendation for laboratory staff	3 (3.9)	74 (96.1)
Recommendation in cases of properdin deficiency	1 (1.3)	76 (98.7)
Recommendation in cases of treatment with eculizumab	1 (1.3)	76 (98.7)
Recommendation in cases of previous IMD[a]	0 (0)	77 (100)

[a]IMD: invasive meningococcal disease.

Discussion

This is the first study that assesses the characteristics of YouTube videos with information in English on the meningococcal B vaccine (4CMenB, Bexsero®). More than 70% of the videos show a favorable view regarding the use of the vaccine. Health professionals always support its use.

The small number of videos that met the inclusion criteria in our study reveals the difficulty of obtaining information about this issue on YouTube. More specifically, the USA and the United Kingdom were the countries in which most of the selected videos were uploaded; however, Ireland, where that vaccine was introduced into the publicly funded national routine immunization program in 2016,[10] only provided one video.

The number of views was lower than that recorded in other studies[7,8] (with up to 6,229,835 views[7]), although it should be borne in mind that most of the videos corresponded to news that had previously been broadcast on television channels and therefore potentially seen by many more people than those who had accessed their version on YouTube®. The fact that the most common type of authorship for the videos was television channels (28.6%) is similar in other studies, such as the one we previously performed[9] by assessing the available YouTube videos in Spanish on the meningococcal B vaccine (4CMenB, Bexsero®) (45.2%). As in that study, the median numbers of likes, dislikes, and comments of the videos were small (0.5, 0, and 0, respectively),[9] and this suggests that videos about this vaccine generate little impact on users.

With regard to the tone of the message, the results from our study were more positive than other analyses of the information available on YouTube about the use of vaccines in European countries,[2,9] in which a positive tone has been described regarding the use of vaccines as a preventive measure in 50%[2] and 58.1%[9] of the videos, respectively.

The most common themes were an alert that a preventable disease may be contracted and the benefits of the vaccine. In

Table 3. Authorship and topics discussed regarding the meningococcal B vaccine and tone of the message.

	Benefits			
Type of authorship, % (n)	Discussed (n = 53)	Not discussed (n = 24)	OR (95%CI)	p
Healthcare professionals	24.5 (13)	8.3 (2)	3.58 (0.74-17.30)	0.126
Other	75.5 (40)	91.7 (22)	1	
	Effectiveness			
Type of authorship, % (n)	Discussed (n =19)	Not discussed (n = 58)	OR (95%CI)	p
Healthcare professionals	42.1 (8)	12.1 (7)	5.29 (1.59-17.69)	0.008
Other	57.9 (11)	87.9 (51)	1	
	Adverse effects			
Type of authorship, % (n)	Discussed (n = 16)	Not discussed (n =61)	OR (95%CI)	p
Healthcare professionals	50.0 (8)	11.5 (7)	7.71 (2.19-27.12)	0.002
Other	50.0 (8)	88.5 (54)	1	
	Cost			
Type of authorship, % (n)	Discussed (n = 20)	Not discussed (n = 57)	OR (95%CI)	p
Healthcare professionals	15.0 (3)	21.1 (12)	0.66 (0.17-2.64)	0.747
Other	85.0 (17)	78.9 (45)	1	
	Route of administration			
Type of authorship, % (n)	Discussed (n = 12)	Not discussed (n = 65)	OR (95%CI)	p
Healthcare professionals	16.7 (2)	20.0 (13)	0.80 (0.16-4.11)	1.000
Other	83.3 (10)	80.0 (52)	1	
	Description of the dosage			
Type of authorship, % (n)	Discussed (n = 17)	Not discussed (n = 60)	OR (95%CI)	p
Healthcare professionals	47.1 (8)	11.7 (7)	6.73 (1.96-23.17)	0.003
Other	52.9 (9)	88.3 (53)	1	
	Alert that a preventable disease may be contracted			
Type of authorship, % (n)	Discussed (n = 62)	Not discussed (n = 15)	OR (95%CI)	p
Healthcare professionals	22.6 (14)	6.7 (1)	4.08 (0.49-33.83)	0.277
Other	77.4 (48)	93.3 (14)	1	
OR (95%CI): Odds Ratio (95% confidence interval)				
	Recommendation in cases of epidemic outbreak			
Type of authorship, % (n)	Discussed (n = 22)	Not discussed (n = 55)	OR (95%CI)	p
Healthcare professionals	18.2 (4)	20.0 (11)	0.89 (0.25-3.16)	1.000
Other	81.8 (18)	80.0 (44)	1	
	Recommendation in cases of properdin deficiency			
Type of authorship, % (n)	Discussed (n = 1)	Not discussed (n = 76)	OR (95%CI)	p
Healthcare professionals	100 (1)	18.4 (14)	-	0.195
Other	0 (0)	81.6 (62)		
	Recommendation in cases of treatment with eculizumab			
Type of authorship, % (n)	Discussed (n = 1)	Not discussed (n = 76)	OR (95%CI)	p
Healthcare professionals	100 (1)	18.4 (14)	-	0.195
Other	0 (0)	81.6 (62)		
	Recommendation in cases of asplenic patients			
Type of authorship, % (n)	Discussed (n = 2)	Not discussed (n = 75)	OR (95%CI)	p
Healthcare professionals	100 (2)	17.3 (13)	-	0.036
Other	0 (0)	82.7 (62)		
	Recommendation in cases of terminal complement pathway deficiencies			
Type of authorship, % (n)	Discussed (n = 3)	Not discussed (n = 74)	OR (95%CI)	p
Healthcare professionals	100 (3)	16.2 (12)	-	0.006
Other	0 (0)	83.8 (62)		
	Recommendation for laboratory staff			
Type of authorship, % (n)	Discussed (n = 3)	Not discussed (n = 74)	OR (95%CI)	p
Healthcare professionals	66.7 (2)	17.6 (13)	9.39 (0.79-111.39)	0.095
Other	33.3 (1)	82.4(61)	1	
OR (95%CI): Odds Ratio (95% confidence interval)				
	Recommendation in children			
Type of authorship, % (n)	Discussed (n = 14)	Not discussed (n = 63)	OR (95%CI)	p
Healthcare professionals	14.3 (2)	20.6 (13)	0.64 (0.13-3.23)	0.725
Other	85.7 (12)	79.4 (50)	1	

(*Continued*)

Table 3. (Continued).

	Recommendation in young adults			
Type of authorship, % (n)	Discussed (n = 4)	Not discussed (n = 73)	OR (95%CI)	p
Healthcare professionals	25.0 (1)	19.2 (14)	1.41 (0.14-14.54)	1.000
Other	75.0 (3)	80.8 (59)	1	
	Recommendation in teenagers			
Type of authorship, % (n)	Discussed (n = 9)	Not discussed (n = 68)	OR (95%CI)	p
Healthcare professionals	33.3 (3)	17.6 (12)	2.33 (0.51-10.67)	0.366
Other	66.7 (6)	82.4 (56)	1	
	Tone of the message			
Type of authorship, % (n)	Positive (n = 57)	Others (n = 20)	OR (95%CI)	p
Healthcare professionals	26.3 (15)	0 (0)	-	0.008
Other	73.7 (42)	100 (20)		

OR (95% CI): odds ratio (95% confidence interval).

this regard, we may point out the heterogeneity of the main issues observed by other authors.[5,7,9]

On the other hand, vaccination recommendations appeared in few cases (1.3–28.6% of the videos), and they were very diverse. This reflects the great heterogeneity that exists in the official recommendations for the use of this vaccine, depending on the country,[10-13] which may generate confusion among YouTube users about which recommendation to take. In a context in which Internet and YouTube are sources of information that may have an influence on the decisions of its users,[2,14,15] an example of the result of having confused information is the situation in Spain, in which, between January and September 2016, 1,700,000 doses of this vaccine (17% of all the units distributed worldwide in that period) were administered to over 390,000 people (mainly children). Spain is the country with the largest consumption of this vaccine, in spite of the fact that less than 1% of those who received it belonged to the risk groups established by the Ministry of Health and that the epidemiological status of the disease did not justify its systematic use.[16]

In our study, statistically significant differences were observed between different types of authors regarding the tone of the message, as in other studies that analyzed vaccines in general[2] and Human Papilloma Virus vaccine in particular.[5] On the other hand, we did observe significant differences regarding the fact that videos uploaded by health professionals discussed topics related to the medical practice (such as dosage) more often, whereas other types of users tended to focus more on other aspects, such as price.

A significant relationship between the positive tone and the number of likes was found. This is at odds with the results of the Ekram,[8] Covolo,[2] and Donzeli[6] studies, although the small number of likes detected in our study limits the validity of making such comparisons.

The methodology applied in this study is similar to other authors.[2,5,7,9] Its limitations include an intrinsic feature of the Internet: information is changing constantly, whereas our study, as with those carried out by the abovementioned authors,[2,5,7,9] only analyzed the information at a specific moment. The small size of the sample, which is similar to what can be found in the literature (62[9]–87[7] videos), may have led to results that were not fully precise.

There is a difficulty in obtaining information on vaccination recommendations. Moreover, recommendations are very diverse since there is a great heterogeneity in the official recommendations for the use of this vaccine depending on the country the information is from.

Disclosure of potential conflicts of interest

The authors have no competing interests to declare.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

ORCID

Ignacio Hernández-García http://orcid.org/0000-0003-1334-6783

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