YouTube as a source of information for New Delhi Metallo-β-lactamase-1 superbug gene

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OBJECTIVE: Internet has become an easy source for healthcare information. In recent years, websites like YouTube have become increasingly popular as a source of information. It is necessary to keep in check the information disseminated from these open-access sites to prevent the spread of false information. This study analyzed how information related to the superbug New Delhi Metallo-β-lactamase 1 (NDM1) was portrayed in video clips available on YouTube.

METHODS: YouTube (www.youtube.com) was searched on June 22, 2011, using the search terms keywords NDM1, New Delhi beta-metallolactamase, NDM, New Delhi superbug, New Delhi metallolactamase to identify clips related to NDM-1. Videos were classified as useful, misleading and news update. Data analyses were conducted for the duration of videos, number of viewers, and positive and negative rating.

RESULTS: A total of 47 videos were included in this analysis. Twenty-nine videos were classified as news update, 9 videos as useful, and 9 videos as misleading videos. There was no statistically significant difference in the 3 groups regarding duration of videos, number of viewers, and positive and negative rating.

CONCLUSIONS: The results demonstrate that there is a wide variety of information on YouTube regarding NDM-1. The viewers are exposed to the useful videos as much as to misleading videos. As a result, public health professionals should be more vigilant in recognizing videos containing misleading information and physicians should counsel and educate patients against inappropriate use of online videos for medical purposes.

KEYWORDS: Drug resistance; youtube; antibiotic.

■ INTRODUCTION

Recently, a novel "superbug" was reported with resistance to carbapenems[1]. It was seen as a warning, signaling the potential emergence of multiple multi-drug resistant organisms in the future. It led to travel advisory notices by the UK Health Protection Agency[2]. In the United States of America, the Centers for Disease Control and Prevention (CDC) have advised clinicians to ascertain history of travel to India or Pakistan in the last 6 months among patients where carbapenem-resistant *Enterobacteriaceae* are identified[3]. With the ongoing fear and apprehension among people regarding the emergence of this potential threat, dissemination of correct information is important in order to alleviate these apprehensions and encourage the people to be compliant with the preventive guidelines and practice specific behaviors for preventing the spread of the "superbug."

The Internet has become an easily available source of healthcare information[4]. In fact, 50 million Americans obtain health-related information on the Internet monthly, and sites such as WebMD boast nearly 20 million visitors each month[5]. Freely available video broadcast sites such as YouTube are popular sources of information, with more than 100 million viewers every day[6]. According to a website usage tracking company[7], YouTube (www.youtube.com) is the third most popular website in the United States, behind the Internet search engines Google.com and Yahoo.com. Considering its popularity and easy accessibility, YouTube should be regarded as an important platform for sharing relevant healthcare information. However, there is a risk of dissemination of misleading information. As with many Internet sites, the content on YouTube is not peer reviewed; therefore, registered users can post essentially any content they choose. YouTube has been evaluated in the past as a source of information on Human Papilloma Virus (HPV) vaccination, tobacco use, breastfeeding, prostate cancer, epilepsy and kidney stones[5,7-11]. However, there have been

no published studies available regarding the content of New Delhi beta-metallolactamase-1 (NDM1) information available on YouTube. Given the surge in both on-line consumers of healthcare information and the massive amount of content available on YouTube, we analyzed the quality of information of video clips available on YouTube portraying information related to NDM1.

■ METHODS

YouTube (www.youtube.com) was searched on June 22, 2011 to locate video clips related to NDM1. We conducted this search by typing the keywords NDM1, New Delhi beta-metallolactamase, NDM, New Delhi superbug, New Delhi metallolactamase into the YouTube search toolbar to locate video clips related to NDM1. The online link of each video clip was saved for records. Video clips that met any of the exclusion criteria were then eliminated from the final sample. Video clips that were not in the English language were excluded. Additionally, all the videos were then watched by 2 independent viewers and all the duplicate videos excluded from the study; in case of duplicity, the earliest posted video was considered for the study and the rest excluded. The remaining videos were included in the study and were viewed, assessed and analyzed for their content by two researchers who categorized them into 3 groups, namely useful, misleading, or news updates as follows:

- Useful—those videos that contained scientifically correct information about any aspect of the NDM1 superbug/gene (e.g., mode of development of resistance, its spread, videos guiding how to prevent development of resistance by appropriate use of antibiotics and measures to be taken to prevent spread of resistance).
- Misleading—those that contained scientifically unproven information (e.g., referring to NDM1 as a controversial issue, government propaganda targeting medical tourism in India, videos providing incorrect information on generation of resistance and its spread among bacteria).
- News update—those that were uploaded by news agencies with information about the current status of the NDM1, new cases reported, related mortality and morbidity, but devoid of information regarding prevention, treatment, or measures to combat the disease.

Total viewership, number of days since upload, and duration of videos were also noted. Data entry and analysis were done using SPSS software, version 17.0. An independent t-test and ANOVA test was done to compare the means of continuous variables. A p-value < 0.05 was considered significant.

■ RESULTS

A total of 82 videos were screened. Out of those, 35 videos (42.68%) were excluded from study. 27 videos (80% of exclusions, 33% of total) were not in the English language and 8 videos (23% of exclusions, 10% of total) were repeated. Thus 47 videos (57.32%) were analyzed for the purpose of this study. The total viewing time of these videos was 196 minutes and 8 seconds (11768 seconds). The average view time per video was 4 min 10 sec (250 seconds) ± 3 min 26 sec (206 seconds).

Out of the 47 videos analyzed, 29 videos (62%) were news updates and included in group I, 9 videos (19%) were useful and included in group II, and 9 videos (19%) were misleading and included in group III. The total watch time of the videos in groups I, II and III were 108.66 min (55%), 45.1 min (23%) and 42.36 min (22%) and the mean duration was 3.7 ± 3.1 min, 5.0 ± 3.8 min and 4.7 ± 4.3 min respectively. There was no statistically significant difference between three video classes with respect to duration of video ($p > 0.05$). The various parameters related to 3 groups are listed in Table 1.

The total viewership of the videos in group I, group II and group III were 49,341 (70%), 11,759 (17%) and 9,354 (13%) and average viewership per video was 1701, 1307 and 1039 respectively. There was no statistically significant difference with respect to viewership in these groups ($p > 0.05$).

The cumulative total number of days that the videos were available online for viewing in group I, group II and group III were 6467 days, 2712 days and 2473 days, with average number of 223 days, 301 days and 274 days per video respectively. There was also no statistically significant difference with respect to number of days the videos were available online for viewership in these groups ($p > 0.05$).

The average viewership per day in group I, group II and group III were 7.6, 4.3 and 3.8 respectively. The average positive rating the videos received was 2.7, 3.7 and 0.8 in group I, group II and group III respectively. The average negative rating the videos received was 0.3, 0.7 and 0.1 in group I, group II and group III respectively. There was no statistical significance in the groups regarding the positive or negative rating ($p > 0.05$).

Table 1 - Showing characteristics of 3 groups

	News update (Group I)	Useful videos (Group II)	Misleading videos (Group III)	ANOVA p-value
Number of videos (%)	29 (61.7%)	9 (19.15%)	9 (19.15%)	
Total duration (min)	108.66 (55.4%)	45.1 (22.99%)	42.36 (21.59%)	0.55
Mean duration (min) ± SD	3.73 ± 3.05	5.0 ± 3.85	4.71 ± 4.32	
Total viewership	49341 (70.03%)	11759 (16.69%)	9354 (13.28%)	0.82
Avg. viewership per video	1701	1306.56	1039.33	
Total number of days	6467	2712	2473	0.12
Number of days per video	223	301.33	274.78	
Total positive rating	79	33	7	0.19
Average positive rating	2.72	3.66	0.77	
Total negative rating	10	6	1	0.08
Average negative rating	0.34	0.66	0.11	

■ DISCUSSION

When we last accessed, YouTube had a total of 47 English language videos with a total view time of 196 minutes and 8 seconds related to NDM1, of which 61.7% were news updates and 19.15% was useful information. No differences were found in average viewership/day of news update, useful videos and misleading videos. Similar trends have been observed in the past during evaluations of the role of YouTube as a source of information about HPV vaccination and immunization[8,9].

Noticeably, the content on YouTube is not peer reviewed, unlike many other information based websites such as, for instance, Wikipedia, where the contents are scrutinized and refereed. Authors are not required to disclose the source of their video or how current the information is. Thus, the potential for biased and/or incorrect information to appear and thus spread via YouTube is high[5]. Blind authorship, and lack of consistent peer review before such videos are posted online with open access, can pose serious dilemmas such as misinformation, misdiagnosis, and seeking of unnecessary treatment for benign conditions, along with patient anxiety[12]. Thus it is imperative that physicians posting content on the Internet inform viewers of the references for their claims and how current that information is; likewise, practicing physicians should counsel and educate patients against inappropriate use of online videos for medical purposes.

Our study has a few limitations. (i) the scoring criteria were subjective; (ii) non−English language video clips were excluded; (iii) this study presents only a snapshot of information available on YouTube and content may have shifted over time; (iv) this study was limited to a direct YouTube search and was not able to account for YouTube videos viewed at other sites that embed or link videos and videos that might be available at other health information websites but not on YouTube.

Considering the ever-growing popularity of YouTube, this mode of communication can be used more effectively by health care professionals as a platform for dissemination of important useful information. If used optimally, it has the potential to be an important educational tool that could play a significant role in informing and guiding people and thus reduce morbidity and mortality in the long run. We believe that videos by trusted health organizations should be posted frequently to prevent against misleading information and to make the general public aware of common health hazards. Further studies may be done to gain more insight into the public perceptions about information contained in the videos on YouTube, how people distinguish between reliable and unreliable sources of information and how it may change the behavior of people regarding common ailments.

■ RESUMO

OBJETIVO: A Internet tornou-se uma fonte de fácil acesso para informações relativas à saúde. Nos últimos anos, sites como o YouTube tornaram-se cada vez mais populares como fonte de informação. No entanto, é necessário manter sob controle as informações divulgadas a partir destes sites de livre acesso para evitar a propagação de informações falsas. Este estudo analisou o modo pelo qual a informação relacionada com a superbactéria New Delhi metalo-β-lactamase 1 foi retratada em vídeos disponíveis no YouTube.

MÉTODOS: YouTube (www.youtube.com) foi pesquisada em 22 de junho de 2012, utilizando os termos de busca palavras-chave NDM1, Nova Deli beta-metallolactamase, NDM, Nova Deli superbactéria, Nova Deli metallolacta-mase para identificar clipes relacionados a NDM-1. Vídeos foram classificados como úteis, enganosos e de atualização de notícias. A análise dos dados foi realizada por meio da avaliação de duração dos vídeos, do número de espectadores, e de um avaliação positiva ou negativa.

RESULTADOS: Um total de 47 vídeos foram incluídos nesta análise. Vinte e nove foram classificados como atualização de notícias, nove como úteis, e nove como vídeos enganadores. Não houve diferença estatisticamente significativa nos três grupos em relação à duração dos vídeos, o número de espectadores, e avaliação positiva e negativa.

CONCLUSÕES: Os resultados demonstram que existe uma grande variedade de informações sobre o YouTube sobre NDM-1. Os espectadores são expostos a vídeos úteis, tanto quanto a vídeos enganadores. Como resultado, os profissionais de saúde pública devem ser mais vigilantes em reconhecer vídeos com informação enganosa e os médicos devem aconselhar e educar os pacientes contra o uso inadequado de vídeos on-line para fins médicos.

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