Analysis of YouTube as a source of information for West Nile Virus Infection

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Abstract:

Introduction

A major outbreak of West Nile Virus was seen last year in different parts of United States. Adequate dissemination of correct information about the same would have helped in decreasing the disease spread and associated panic in the general population. In this study, we looked into the use of YouTube as a source of information on West Nile Virus infection.

Objective

This study aims to identify and evaluate YouTube as source of information on West Nile Virus infection.

Methods

YouTube was searched on November 25\textsuperscript{th}, 2012, using the keywords West Nile Virus epidemic, West Nile Virus infection, West Nile Virus prevention for videos uploaded in the past six months containing relevant information about the disease. The videos were classified as useful, misleading, or as news updates based on the kind of information contained. Total viewership, number of days since upload, total duration of videos, and source of upload were noted.

Results

A total of 106 videos with information on West Nile Virus infection were included in the study. 79.24\% had useful information about the disease. Among the useful videos, 51/84 (60.71\%) had information on disease prevention and 29/84 (34.52\%) contained information on news and research updates. Majority of these videos were uploaded by individuals (54.6\%) and news agencies (41.8 \%). Healthcare agencies contributed only 3.4 \% of the total videos. Even though
the useful videos represented 72% of total duration of all videos, there was significantly higher total viewership and viewership per day for non useful videos (p<0.05).

**Conclusions**

YouTube can be a significant source of information dissemination on public health issues like West Nile virus infection and should be targeted by health care agencies for the same. Major drawback of this medium is lack of verification by authorized health care professionals before these videos are made available for viewing by the community. Hence a strict caution should be exercised in obtaining the information from unauthorized videos posted on YouTube.
Introduction:

The West-Nile Virus (WNV) outbreak of 2012 with 4531 cases and 183 fatalities in United States of America (USA) is one of the worst outbreaks of the decade. It was second only to the epidemic in 2003 which saw more than 9000 cases and 265 fatalities in USA. During 2012, WNV epidemic had spread to several countries of Europe including Israel, Greece and Italy. [1, 2] As of July 30, 2013, a total of 53 cases of WNV disease have been reported to CDC, including 3 deaths. Nearly 40% of the cases were classified as neuroinvasive disease (such as meningitis or encephalitis) and 60% were classified as non-neuroinvasive disease. [3] Resurgence of this arboviral disease emphasizes the importance of outbreak prevention measures, awareness and preparedness of the general public.

Dissemination of correct information is important to encourage people to be compliant with preventive guidelines and practice specific behaviours for preventing disease spread. Effective measures to tackle WNV infection include identifying diseased state, providing supportive measures, preventing long term complications associated with the illness and educating public about the disease. Awareness about the clinical symptomatology can lead to early presentation to the hospital subsequently leading to decrease in mortality and its complications. [4,5]

Internet has become one of the most powerful sources of healthcare information. Approximate viewership of 100 million per day is a marker of immense popularity and easy accessibility of YouTube among the masses. [6,7] Information regarding multitude of medical conditions through the means of videos is easily provided to the general public. But the potential risk of posting misleading information and lack of verification could adversely influence the perception of masses. This emphasizes the importance of analysis and verification of the information
available on YouTube. In the past YouTube has been evaluated as a source of information on vaccination [8,9], tobacco use [10], breast feeding [11], H1N1 [12], kidney stones [13], basic life support, cardiopulmonary resuscitation [14], Tourette’s syndrome[15] and Epley’s maneuver [16].

Use of YouTube as a source of information for WNV epidemic has never been evaluated in the past. In this study we have analyzed the use of YouTube by health organizations, independent users and news agencies to disseminate information during the WNV outbreak from the month of June through November 2012.

**Objective:**
This study aims to identify and evaluate YouTube as a source of information on West Nile Virus infection.

**Methods:**
YouTube was searched on November 25, 2012, using the keywords West Nile Virus epidemic, West Nile Virus infection, West Nile Virus prevention for videos uploaded in the past six months containing information about the disease. Duplicated videos were not included in the study. The videos were analyzed by two independent resident physicians and classified as useful, misleading or as news updates based on the information provided. *Useful videos* were defined as those containing scientifically relevant information about symptoms, prevention of disease, measures taken to combat the disease or either one of these. *Misleading/non-useful videos* were those which contained scientifically unproven information. *Updates* were videos uploaded by health agencies, news agencies or independent users quoting Center of Disease Control (CDC) website with information about the current status of the disease in terms of mortality.
and extent of spread only, devoid of other useful information regarding primary or secondary prevention of the disease or its complications.

The degree of agreement between the two researchers was determined by kappa co-efficient of agreement. Videos were also categorized into three groups according to their source: National agencies (like CDC), news agencies and independent users. Total viewership, number of days since upload and total duration of videos were analyzed. Assessment of the videos for providing information regarding disease prevention and symptomatic manifestation of infection was also conducted.

Data entry and analysis were done using SPSS, version 19.0, software. An independent t-test was applied to compare the means of continuous variables. A p-value of <0.05 was considered significant.

**Results**

A total of 106 videos pertaining to WNV epidemic were evaluated by two independent physicians. Kappa coefficient of agreement between the physicians was 0.95. Total of 79.24% (84) videos were found to be useful. It was determined that CDC and other national agencies had a contribution of 3.4 % (3) videos, news agencies contributed 41.8% (36) videos, while the majority of the videos were contributed by individuals 54.6 % (67).

Out of the total videos that were found to be useful ,23.8 % (25) videos provided updates on the disease trend and current prevalence in the community. A total of 58% (49) of the useful videos had information regarding disease prevention whereas 33.7% (28) had information regarding symptomatology of the disease. Misleading information was posted by 20.76% (22) videos. All such videos were contributed by individuals.
On further analysis of the section of videos that was found to be useful, it was determined that these videos had a mean viewership of 228 per day and a mean duration since upload of 106 days (S.D. = 34.58). There was a positive correlation between viewership per day and length of the videos \( (r=0.48, \ p< 0.0001) \) and viewership per day and duration since upload \( (r=0.3, \ p< 0.0001) \).

Mean Viewership per day for useful videos was 2.20 (S.D. = 5.78) whereas that for non useful videos was 6.28 (S.D. = 15.89). The viewership for non useful videos was significantly higher than useful videos. There was a gradual increase in the number of useful videos posted till the month of August and a decline thereafter. On the other hand the number of updates peaked in the initial months (June-July 2012) of the epidemic. Detailed characteristics of various categories of YouTube videos is provided in table 1 and graphic depiction of types of videos based on uploading agency is provided in graph 1.

**Discussion:**

On the day of analysis (November 25, 2012) 79.24% of the videos were found to be useful. The mean duration of the useful videos since upload was 106 minutes. The videos posted by national health care agencies contributed to a meagre 3.4% as compared to the videos posted by individuals and news agencies, which were 54.6% and 41.8% respectively. Given the enormous impact on health care because of WNV epidemic in the year 2012 there should be increased number of videos posted by national health care agencies. The absence of videos posted by national health care agencies as sponsored links further adversely impacted the availability and accessibility of correct, useful and comprehensive information to the general public.
There was significantly higher viewership of the non-useful videos (p<0.05). Some of these videos portrayed misleading information. One such video suggested that outbreak of west WNV infection was a government conspiracy to perform inspection of backyards on private property. Another video labelled the epidemic as trial of biological weapons. A video uploaded by an individual explained the epidemic to be a sign of alien warfare. Some suggested that this was biblical prophecy being fulfilled or outbreak of infection was secondary to the shift of North Pole. Non useful videos also presented misleading information about the aerial pesticide spraying, portrayed it as a means of chemical warfare raged by the government against the citizens. This further emphasizes the importance of verification and authentication of such videos by the health care professionals.

Studies have been conducted in the past on several of topics of public interest. An analysis on Human Papilloma Virus vaccination coverage found that three quarter of the video clips (74.9%) revealed positive information on HPV vaccine. [8] Whereas a paper on immunization revealed that as compared to useful videos, misleading videos were more likely to be viewed and received a higher mean star rating.[9] Pandey et al in their paper on H1N1 influenza pandemic showed that difference in viewership of useful and misleading videos was not statistically significant. [12]

Magnitude of 2012 outbreak was hypothesized to be secondary to the presence of migratory birds combined with increased mosquito population and favourable weather conditions. [17] Unusually mild winter, early spring and hot summer in many parts of the United States was considered to foster mosquito breeding. [17]
Various personal preventive strategies which were emphasized in the posted videos included eliminating stagnant water sources in the community; staying indoors during dusk and dawn; wearing long pants, long sleeves, use of well-fitting screens on doors and windows and DEET (N,N-Diethyl-meta-toluamide) insect repellent outdoors.

Due to the absence of specific antiviral medications and suitable human vaccines against WNV, preventive measures are of utmost importance in preventing fatalities associated with the WNV infection. Hence preventive strategies need to be emphasized well in advance before a major outbreak occurs in the coming years. These measures should include posting of authentic and verified measures on YouTube by national health care agencies.

**Limitations:**

The study evaluated the videos posted only over a six month period. This evaluated the use of YouTube as a source of information only for the outbreak of 2012. Videos posted during the previous outbreaks were not evaluated. Our study was limited to direct search of YouTube and did not analyse the YouTube videos accessed using other websites or posted links. Assessment of viewership could have been affected by accounting for the repeated viewing from the same Internet Protocol address counted as multiple viewers. Only English language videos were analysed in this study, while information could have been available in multiple other languages as well.

**Conclusions:**

YouTube contains a significant amount of useful information on WNV infection. However, there is a scarcity of useful videos uploaded by health agencies like CDC or Red Cross. Major
drawback of this medium is lack of verification by authorized health care professionals before
these videos are made available for viewing by the community. Hence a strict caution should be
exercised in obtaining the information from unauthorized videos posted on YouTube.
References:


Table 1. Detailed characteristics of various categories of YouTube videos with relevant information about WNV 2012 epidemic in USA.

<table>
<thead>
<tr>
<th></th>
<th>Useful videos (correct information and updates)</th>
<th>Non-useful Videos (Misleading videos)</th>
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<tbody>
<tr>
<td>Number of videos (%)</td>
<td>84 (79.24%)</td>
<td>22 (20.76%)</td>
</tr>
<tr>
<td>Total duration (minutes [%])</td>
<td>206.54004(72.41%)</td>
<td>78.680008(27.58%)</td>
</tr>
<tr>
<td>Mean duration (minutes+/SD)</td>
<td>2.4588 (SD 1.767)</td>
<td>3.5763 (SD 4.186)</td>
</tr>
<tr>
<td>Total # of days (+/-SD) on YouTube</td>
<td>106 (SD34.581)</td>
<td>102.73 (SD 35.581)</td>
</tr>
<tr>
<td>Total viewership (n [%])</td>
<td>19116(58.89%)</td>
<td>13345(41.11%)</td>
</tr>
<tr>
<td>Viewership/day (mean)</td>
<td>2.2026</td>
<td>6.2766</td>
</tr>
<tr>
<td>Source</td>
<td>- CDC and other national agencies (3.4%),</td>
<td>- CDC and other national agencies,---0</td>
</tr>
<tr>
<td></td>
<td>- Individuals (54.6%)</td>
<td>Individuals 20 (18%)</td>
</tr>
<tr>
<td></td>
<td>- News agencies (41.8%)</td>
<td>-News agencies--0</td>
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