Original Article:

Credibility of health websites on infectious diseases: Are there any fully trustable website to read on Ebola?

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ABSTRACT

When a new disease develops, people are looking for information about that disease where the internet is considered as one of the sources of health information. Beside empowering individuals to identify and select valid information, reliable and up-to-date websites should also be introduced for them. Therefore, the present study aimed to evaluate and identify the high quality websites on Ebola virus and disease. To do this study, the term "Ebola" was searched for in Google, Yahoo, and Bing search engines using the Google Chrome browser. Three pages were obtained from the search in these three selected search engines and were examined, with the exclusion of duplicate websites, non-English websites, the results related to news, images, ads, and inaccessible websites; finally, 43 websites out of the 90 retrieved websites were selected for evaluation. The research tools included the HONcode toolbar and an eight-item checklist was developed by the researchers based on the HONcode of conducts. The result showed that out of 43 websites evaluated, only 6 websites (14%) were trustable and the 86% were not approved after evaluation based on the HONcode criteria. Only 37% of evaluated websites have been considered complementarity criterion. Justifiability was the most considered criterion and 95% of evaluated websites had paid to distribute information fairly enough. Online information about Ebola is available on many websites and this information affects people's health decisions and behaviors. Physicians and other health professionals can help patients and other community members to find their needed information on infectious diseases (e.g. on Ebola) from the most reputable and valid international websites.

Keywords: Patient Portals; Health Communication; Patient Education; HONcode; Ebola Virus Disease; website evaluation

INTRODUCTION

Ebola Virus Disease (EVD), previously known as Ebola hemorrhagic fever, is a rare and deadly disease caused by infection with one of the Ebola virus species [1-3]. The virus is transmitted to people through contact with the blood or body fluids of an infected animal and spreads in the human population through human-to-human transmission [1-3]. Ebola disease can develop in humans or mammals such as monkeys, gorillas and chimpanzees [2].

It has a high mortality rate and often causes death between 50- 90% of the infected people [1]. The Ebola virus was found in several African countries and was first discovered in 1976 near the Ebola River in the Democratic Republic of Congo, and since then this disease has spread sporadically in Africa [2]. Ebola emerged from the West Africa in late December 2013, resulting in a huge outbreak in areas such as Guinea, Liberia, Sierra Leone and Nigeria [4]. The prevalence of this disease in West

Africa in 2014-2016 was the largest and the most complex outbreak of Ebola since the discovery of this virus [1]. The main source of Ebola disease is unknown; however, based on the evidence and the nature of the similar viruses, researchers believe that this is an animal virus and fruit bats are more likely to be the main source of it. Four viruses from five Ebola viruses have been observed in native African animals [2]. Ebola is caused by infection with a virus called Ebolavirus from the Filoviridae family [2]. Symptoms of the Ebola disease include fever, severe headache, muscle pain, weakness, fatigue, diarrhea, vomiting, abdominal (stomach) pain and unexplained hemorrhage (bleeding or bruising); these symptoms may appear between 2 to 21 days after the exposure to the Ebola virus, but the average time for this is between 8 to 10 days [5]. People are affected by the disease through the direct contact (with the skin or mucous membranes such as the eyes, nose, mouth) and other factors such as contact with the blood or body fluids (including urine, saliva, sweat, feces, vomit, breast milk, and semen) of the infected person or objects like needles and syringes contaminated with body fluids of an Ebola patient, or the body of a person who has died from Ebola, as well as the transmission from the infected fruit bats or mammals [2]. Early diagnosis of EVD is of great importance for controlling the infection, and health care providers should be aware of and evaluate any of the patients with suspected cases. Social participation is the key to success in controlling the Ebola outbreak. This control requires the use of an intervention package, including case management, infection prevention and control measures, surveillance, good laboratory services, safe burial, and social mobilization [1]. The recovery from this disease depends on the good clinical cares and the patients' immune response [5]; there is currently no standard treatment for this disease, and so far no vaccine has been developed to prevent it [4]. When a new disease develops, people are looking for information about that disease and Internet is considered as one of the sources of health information. As no one has the responsibility of controlling the internet resources, and anyone with any degree of

expertise can publish medical information with any degree of credibility and authenticity in the web environment, a wide range of resources, of varying quality, and by writers with varying degrees of credibility is available on the net. Hence, beside empowering individuals to identify and select valid information, reliable and up-to-date websites should also be introduced for them. One of the organizations that introduces reputable and reliable websites in the field of medical sciences is the HON (Health On the Net) foundation; this organization allows websites that have met the 8 HONcode criteria to use the logo of this institution on their pages, which indicates the validity of these sites. The present study aimed to identify and introduce valid websites on Ebola virus and disease.

METHOD

Based on the statistics presented by Alexa Website, Google, Yahoo, and Bing are the three most widely used search engines in the world [6]. Therefore, for the purpose of this study, the term "Ebola" was searched for in these three search engines using the Google Chrome browser. Given that 90% of search engine users study one or more results from the first three pages of search results [7], three pages were obtained from the search in these three selected search engines (with the exclusion of duplicate websites, non-English websites, the results related to news, images, ads, and inaccessible sites) and were examined; finally, 43 websites out of the 90 retrieved websites were selected for evaluation. The search and data collection was carried out in April 2017. The research tool included the HONcode of conducts toolbar. This tool includes eight principles, namely authority, complementarity, privacy, attribution, justifiability, transparency, financial disclosure, and advertising policy [8] that has been used in various studies to evaluate the quality of health websites [9-12]. For the purpose of evaluation, all websites were reviewed using the HONcode Toolbar to identify the websites approved by HON.

FINDINGS

HONcode of conducts has eight criteria, presented in Table1.

Table 1. HONcode principles[*]

HONcode principles	Description
Authoritative	Indicate the qualifications of the authors
Complementarity	Information should support, not replace, the doctor-patient relationship
Privacy	Respect the privacy and confidentiality of site users
Attribution	Cite the source(s) and dates of published medical information
Justifiability	Site must back up claims relating to benefits and performance
Transparency	Accessible presentation, accurate email contact
Financial disclosure	Identify funding sources
Advertising policy	Clearly distinguish advertising from editorial content

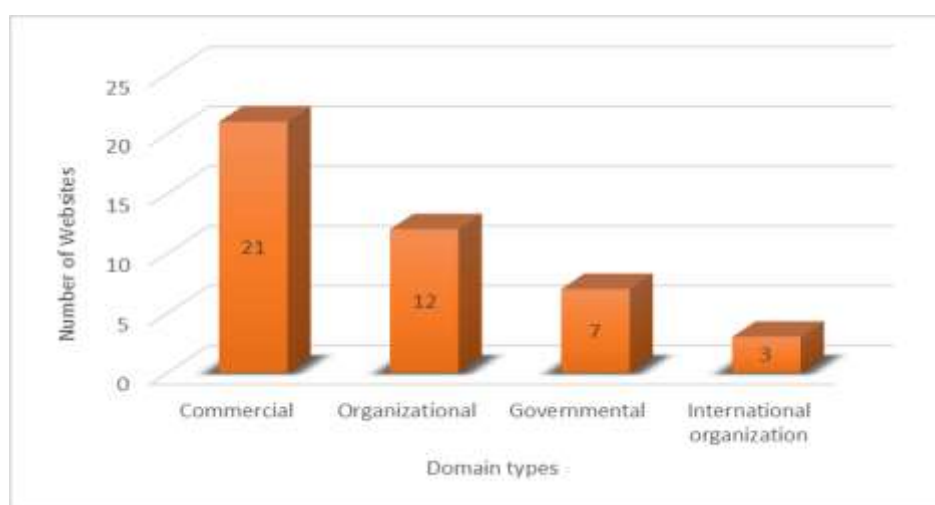[*]The table information is adopted from the HON website [8]

Figure 1. Distribution of websites by Domain

Figure 1 shows the distribution of websites by domain. As shown, many of the retrieved websites (49%) were commercial. Out of 43 websites evaluated, only six (14%) websites had been officially approved and had the HONcode logo. In the following, information about six valid websites are presented:

WHO

In the healthcare subjects, the World Health Organization (WHO) website has provided comprehensive information on the Ebola virus and disease. The information in this section can greatly influence people's decision to prevent the virus (Figure 2). There are various documents about this disease on the WHO website. This information includes the history of the disease, the way of prevention and outbreak of the disease in different countries presented based on the time. In addition, links to other reliable sources of information on Ebola virus and disease are available on this site. Information presented in the WHO website is available in a variety of languages, including English, French, Arabic, Chinese, Russian and Spanish, which has made this website usable to most people. The information provided on this site can be used both by the ordinary people of the society and by health care providers. In 2014, the World Health Organization declared Ebola to be an international emergency.

Figure 2. WHO: Ebola virus disease

CDC

The Centers for Disease Control and Prevention (CDC) Website is a very important source of information on Ebola viral disease for ordinary people as well as health professionals. The information presented on this website is up-to-date and accurate, and every new aspect of the disease that is discovered is immediately reflected on the site (Figure 3). The CDC publishes comprehensive public health information that includes disease introduction, pre-travel alert, prevention, geographically-infected areas, concerns about the sensitive groups of the community, symptoms, spread and control of the disease. The CDC website is the most authoritative source of online public health information in the United States.

Figure 3. CDC: Ebola (Ebola virus disease)

Mayo Foundation for Medical Education and Research

The Mayo Clinic mission is to inspire hope and contribute to people's health and well-being through providing the best cares with regard to the conditions of each patient using the integrated clinical activities, education and research with its special focus on providing services to all people, including patients, their families and medical colleagues, with dignity and respect. Maintaining honesty in line with the highest standards of professionalism, ethics and personal responsibility has increased the trust of patients to this center. The Mayo Clinic's perspective is to provide accurate and detailed information for the care and treatment of patients as well as their family members. Teamwork and innovation are of great importance in this center; that is to say, creative ideas and unique talents of each employee will strengthen this organization and attempt to provide the best results and the highest quality

of service through the dedicated efforts of each team member. In this center, referrals have access to information in the areas related to the "patient cares and health information", "health centers and organizations," "research information", "medical professionals" and "healthcare providers and producers" such as the Ebola disease. In Mayo Clinic, some information has been provided on the Ebola virus (Figure 4), the way of infection, the time and the way emergence of signs and symptoms such as fever, severe headache, muscle aches and pains, weakness; and in its intense case, the symptoms include nausea, diarrhea, redness of the eyes, chest pain, cough, sore throat, stomachache, severe weight loss, bruising and bleeding, risk factors, side effects, and the ways of prevention of this fatal disease to inform the website's visitors about the EVD in which it is recommended to the infected people or those who are at the risk of the disease to study about it.

Figure 4. MAYO CLINIC: Ebola virus and Marburg virus

WebMD

The mission of WebMD is to identify the needs of the visitors and find the best ways to respond to them appropriately and accurately. WebMD has created an organization that promises to provide health information to users in the internet environment. This website provides valid health and medical information, health support communities, and accurate sources of information on health issues that are important to patients and their fellows. Producers and

content providers in WebMD are experts who are looking for the appropriate ways to combine and provide health information to the visitors. This corporation provides health news for the general public, up-to-date information and content presented through medical references, medical pictures, graphics and animations, health and medical association and centers, the website users' experience, interactive tools, and other pharmaceutical and medical information. It should be mentioned that the WebMD verifies the records of all medical professionals

presented on the website. In WebMD, some valuable information has been provided to the visitors of this website about the Ebola virus infection (Figure 5), its transmission, signs and symptoms, how to diagnose and identify the virus in the body of patients, and how to prevent the disease. In this website, Ebola has been introduced as a rare and yet deadly virus that causes fever, body aches, diarrhea, and sometimes internal and external bleeding. The information provided in this center regarding Ebola or any other illnesses is in the form of a text, a video or movies, and are freely accessible to users.

Figure 5. WebMD: Ebola virus infection

eMedTV

eMedTV is a trusted health information website that helps more than 5 million people every month to receive their needed health information. All the information provided on this website is the correct and accurate materials presented by the teams of experts and medical specialists. eMedTV has delivered more than 100 health channels featuring 4,000 health topics and a wealth of articles and videos. Each of the listed channels provides useful and up-to-date information on a health problem or a disease.

In the eMedTV website, some information has been given regarding the Ebola virus (Figure 6), the signs and symptoms of the disease, its images, outbreak, and treatments as well as some researches focusing more on the identification of the rapid diagnostic methods and identifying the high-risk areas for the disease. Topics such as the specific conditions of Ebola disease, diagnostic tests and procedures, effective medications, signs and supportive methods, articles and videos related to Ebola have been presented and discussed in this website.
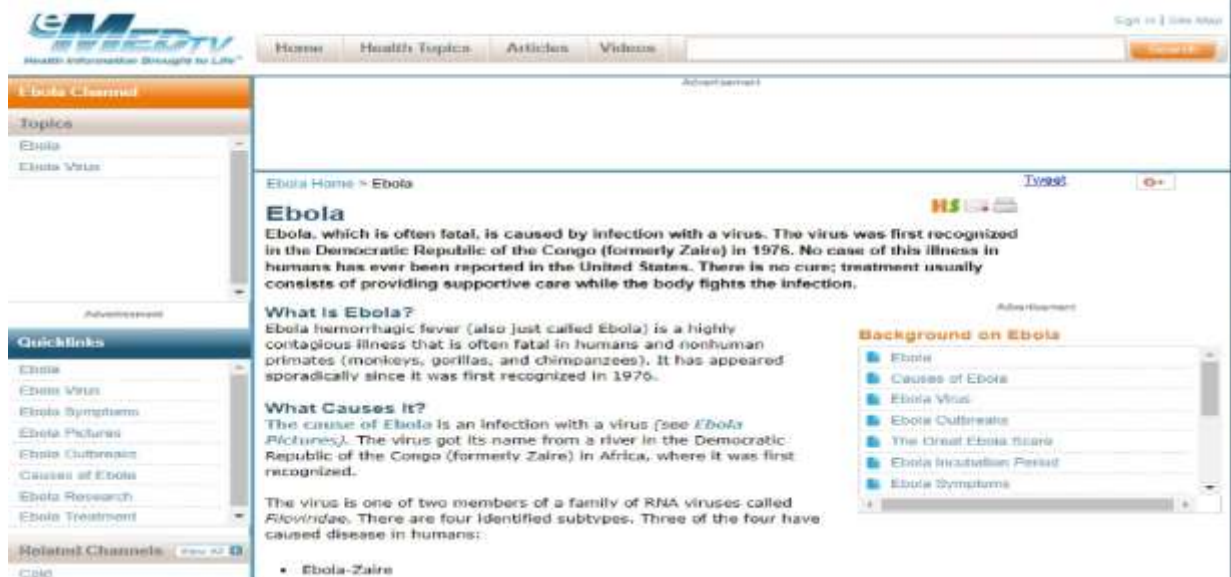
Figure 6. eMedTV: Ebola

MedicineNet

MedicineNet is an online, healthcare media publishing company which provides "Health News of the Week", "the most popular collections including the information on the health of injuries, teeth, diabetes, children's health, etc.", "signs and symptoms of the common diseases, "a system for checking the symptoms and signs of a disease, and providing healthy solutions". This company has many expert personnel in the fields of medicine, healthcare, and internet and business technologies; a network of physicians who seek to provide accurate information and the signs and symptoms of various illnesses for online users in a fair way. MedicineNet provides comprehensive information relating to the Ebola hemorrhagic fever, the infection, the time and manner of the emergence of signs and symptoms, the risk factors, high-risk areas to catch the disease, outbreak of the disease, history of the disease, the spread of virus infection, and the ways of prevention of the disease to inform the website's visitors about EVD (Figure 7). At the end of each page, there are ways to access additional and more detailed information that is recommended for the patients or people at the risk of catching Ebola disease. One of the characteristics of the information provided in this collection is the precise and detailed categorization of each disease.

Figure 7. MedicineNet: Ebola Hemorrhagic Fever (Ebola Virus Disease)

DISCUSSION

Search engines are the first and foremost means of initiating information search by users on the internet which play an important role in the process of providing information for the non-professional individuals. In this study, a common search engine was used to search the term "Ebola" to identify the websites that would be available to a usual user as a result of the search. The results showed that 86% of the websites were found from the search results of the three widely used search engines, that is, Google, Yahoo and Bing were not credible; only six websites were officially approved by HON foundation and were credible. Other studies that have been conducted on the evaluation of health websites on various subjects also indicated the undesirable validity of these websites [13-15]. This suggests a high probability of getting access to invalid and inadequate online health information by the ordinary people, whose rapid acceptance may seriously threaten their health; this is because some studies have shown that in most cases people trust online information, and only half of them consult with their physicians about the internet-based contents [16-18]. Therefore, patients should be advised to pay more attention to the accuracy of online health information resources and visit the reputable and credible websites. It is expected that health professionals who are aware of the special importance of this issue direct their clients to the trustworthy websites. On the other hand, international organizations and institutions have a positive and important role in providing the authentic and reliable health information and influence the policies of different countries in the face of health crisis. The trust of individuals in international organizations as the providers of high-quality and credible information has made them effective in all societies. In this research, only 7% of websites which were retrieved through public search engines were owned by international organizations. Due to the emergence of Ebola, it seems that online information on this disease is most commonly found on news websites or academic journals that are not suitable for lay people in order to access reliable and quality information. Therefore, physicians and other health care providers are recommended to identify these organizations and encourage their clients to use the health information provided on the websites of these organizations.

CONCLUSION

Awareness of the latest advances in the EVD is of great importance to both community members and physicians. Online information about Ebola is available on many websites and this information affects people's health decisions and behaviors. Physicians and other health professionals can help patients and other community members to find their needed information from the most reputable and valid international websites.

CONFLICT OF INTEREST

None declared

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