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Evaluating the trustworthiness of consumer-oriented health websites on diabetes

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Abstract

Objective: The patients involvement in disease management can decrease economic burden on diabetic patients and society. Quality health information may help patients to involve in their health management. Thus, individuals need to find the additional information from other information resources such as health websites. Nevertheless, health websites vary in quality and reliability. Therefore, it is of great importance to identify trustable health websites on diabetes. Thus, the aim of the present study was to evaluate the reliability of health websites concerning diabetes.

Materials and methods: The keyword ‘’diabetes mellitus ‘’ was entered as a search term into the three most used search engines Google, Yahoo and Bing. The results for first three pages reported by each search engine were selected. After excluding 19 websites, 71 unique websites were eligible for examination. The reliability of websites was evaluated manually using the HONcode of conduct tool by both researchers. Furthermore, HONcode toolbar function was used to recognize officially verified websites.

Results: Only 19 out of 71 websites were officially verified by HONcode foundation. None of the other retrieved websites achieved all 8 principles. Most of the retrieved websites were commercial (67.6%) and the minimum number of the them belongs to university websites (1.4%). The highest and lowest compliance with the HON principles belonged to justifiability (99%), and attribution (51%).

Conclusion: Diabetic patients need high quality information from trustworthy websites to decide better about their health. Thus, physicians should have knowledge about the variable quality of health websites and guide their patients to reliable online resources.

Keywords: Diabetes mellitus, Patient Portals, Health Communication, Patient Education, HONcode

Background:

The economic burden of diabetes on healthcare systems is increasing worldwide and thus there is more need to decrease this burden(Zhang et al., 2010). Patient involvement in decision-making and disease management can decrease this burden on diabetic patients and society(Valizadeh-Haghi & Fatehi, 2015; Weymann, Härter, & Dirmaier, 2014).Good quality health information plays an important role in motivating patients to become more involved in managing their healthcare(Coulter et al., 2006). Thus, individuals need to find the supplementary information from other information resources(Klein et al., 2010).

An investigation which assessed information resources showed that after consultation with doctors, online health information is the most trusted source of health information for patients(Coulter et al., 2006). The online information has impact on patients` health behavior, health management, treatment choices and also deciding which health professional to consult(Wagner, Baker, Bundorf, & Singer, 2004). Furthermore, online information is relatively inexpensive and easy to find as well as available at any time. About 75% of Internet users consider the Internet as one of the sources of medical and health information(Klein et al., 2010) and often the first one they consult to search for basic information about a disease and its related treatment(Fang-Fang, Chia-Hua, Kung-Jeng, & Wei-Li, 2011).

Healthcare providers can provide health information to patients through websites in order to support patients` care management, such as disease management(Tao, LeRouge, Deckard, & De Leo, 2012). The ease of information publication and distribution in the Internet is one of the advantages of the internet. However, there are some disadvantages of online information. One of the main criticisms of the Internet is possibility of dissemination of inaccurate medical information from unqualified resources(Jadad & Gagliardi, 1998; Jadad, Haynes, Hunt, & Browman, 2000;

Wathen & Burkell, 2002; Winker et al., 2000) because even unqualified people could establish websites that include information about diseases or conditions and make them available to other people through the Internet(Eysenbach, 2005).

Due to increasing consumer usage and trust of online health information(Anderson, McKemmish, & Manaszewicz, 2003; Clark, 2002), inaccurate or unsuitable information can lead to risky results such as wrong treatments or medical care delays. Therefore, it is of great importance that users should be able to identify quality health information(Coulter et al., 2006). In this regard, a number of organizations have developed quality-rating tools to help healthcare consumers to assess the quality and reliability of health information websites as well as to help providers establish websites with the standards required to ensure quality. These quality-evaluating tools include DISCERN(Charnock, 1998), the Health on the Net Foundation code of conduct(Boyer, 2013), JAMA benchmarks(Silberg, Lundberg, & Musacchio, 1997), and Utilization Review Accreditation Commission(URAC)("Health Web Site Accreditation," 2018).These tools typically state the way the information should be presented on trustworthy health websites.

Accessing diabetes information on the Internet is very useful as it provides the latest medical information. In addition, surveys have reported that more than half of users of health information websites are looking for information about specific diseases and diabetes mellitus is a common search term entered by users(Kim & Ladenson, 2002). Thus, the aim of the present study was to evaluate the reliability of health websites concerning diabetes.

Methods:

Most people find online information by using general-purpose search engines rather than accredited health websites or portals(Bernstam et al., 2008). Therefore, we used three most used

search engines Google, Yahoo and Bing(Silberg et al., 1997; Srivastava, Garg, & Mishra, 2014; Whitten, Nazione, & Lauckner, 2013) to identify web pages that users are likely to encounter when searching for online health information. A list of search terms commonly used by patients suffering from diabetes was obtained from published literature, and finally we selected the keyword ‘’diabetes mellitus‘’ as it was the most used(Kim & Ladenson, 2002). All searches were performed using the Google Chrome browser in April 21st, 2017 and the keyword “diabetes mellitus” was entered as a search term into the selected search engines. The results for first three pages reported by each search engine were selected because 90% of search engine users click on a result within the first three pages of search results(Xiang & Gretzel, 2010). A total of 90 websites were assessed, 30 for each of the three selected search engines. All URLs were analyzed, and Websites were excluded if they were repeated, were journal articles, had Non-accessible links, were not in English and/or had no information on “diabetes mellitus”. The search flow diagram is shown in Figure 1.

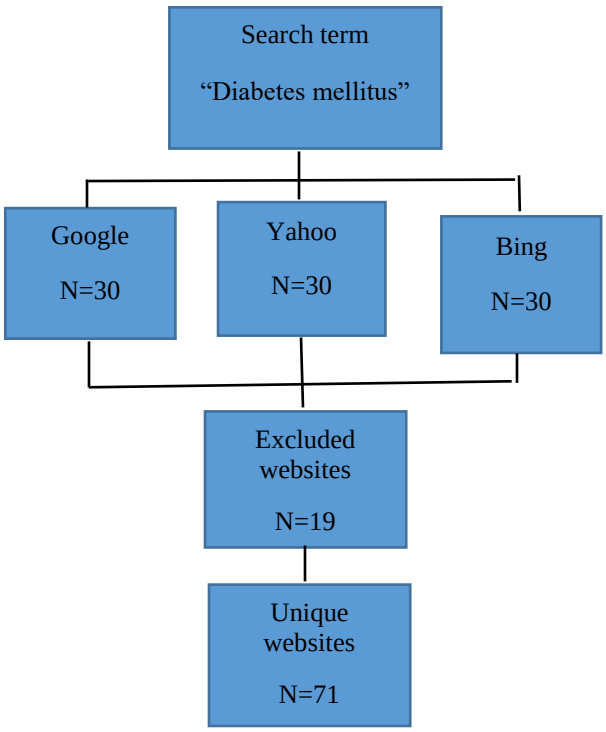


Figure 1. Internet search flow diagram

After excluding 19 websites, 71 unique websites were eligible for examination.

Affiliations were determined based on the information provided by the website and divided into four categories: Commercial, Governmental, Non-Governmental Organizations (NGO), and University websites. The reliability of websites was evaluated using the HONcode of conduct quality rating tool, which is a reliable instrument to assess health websites (Bedell, Agrawal, & Petersen, 2004; Hirasawa et al., 2012; Khazaal, Chatton, Cochand, & Zullino, 2008; López-Jornet & Camacho-Alonso, 2010; Morel, Chatton, Cochand, Zullino, & Khazaal, 2008; Schmidt & Ernst, 2004). HONcode of conducts, which was developed by the Health On The Net Foundation in 1995, is one of the most popular quality rating tools(Luo & Najdawi, 2004). It is "a de facto standard adopted worldwide by health web publishers''(Gaudinat, Grabar, & Boyer, 2007). The HON foundation, which is the leading voluntary accreditation network on the web,(Eysenbach, 2005) has generated the Code of Conduct to help people to recognize the trustworthiness of online health information the find and read. HONcode of conduct principles include authority, complementary, privacy, attribution, justifiability, transparency, financial disclosure, and advertising policy(Table1). This quality assessment tool has been used frequently for studies that assessed health information websites(Bedell et al., 2004; Hirasawa et al., 2012; Khazaal, Chatton, Zullino, & Khan, 2012; Morel et al., 2008) and thus is considered a valid tool for this purpose. Researchers visited the selected websites to find it out if the website complies with the HON principles or not. Manual evaluation was done by both researchers. In case of disagreement this was debated, and researchers came into an agreement. Furthermore, the researchers used HONcode toolbar function (downloaded from official website of the HON Foundation) to recognize officially verified websites. SPSS statistical software package version 16 was used to analyze the data.

Table1. HONcode principles*

HONcode principles	Description
1. Authoritative	Indicates the qualifications of the authors
2. Complementarity	Information should support, not replace, the doctor-patient relationship
3. Privacy	Respects the confidentiality of website users
4. Attribution	Cites the source(s) and dates of published health information
5. Justifiability	Website must endorse claims relating to benefits and performance
6. Transparency	Accessible presentation, accurate email address
7. Financial disclosure	Identifies funding sources
8. Advertising policy	Clearly distinguishes marketing from editorial content

*The table information is adapted from the HONcode website

Results:

The descriptive statistics was used to describe characteristics of the retrieved websites, and the selected websites were classified by category, which are shown in Table 2. Regarding the HONcode principles, only 17 websites achieved all eight principles, which are the same websites that officially have been verified by HON and displayed the HON seal on their pages. In other words, none of the other retrieved websites met all the eight principles (Table 2).

Most of the retrieved websites were commercial (67.6%) and most of them belong to Bing search results. The minimum number of the retrieved websites belongs to university websites (1.4%) that was retrieved by Google´s search engine (Figure 2).

Table 2. Characteristics of retrieved websites

	Number of Retrieved websites	No of unique websites	Organization	Commercial	Governmental	University	HON verified
Google	30	26	6 (23.1%)	16 (61.5%)	3 (11.5%)	1(3.8%)	4
Yahoo	30	23	5 (21.7%)	14 (61%)	4 (17.4%)	0	7
Bing	30	22	3 (13.6%)	18 (82%)	1 (4.5%)	0	6
Total	90	71	14(19.7%)	48(67.6%)	8(11.3%)	1(1.4%)	17

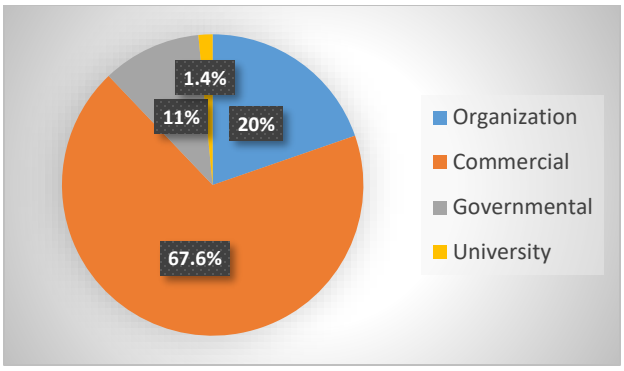


Figure 2. Distribution of evaluated websites

Compliance of retrieved websites and each search engine results with HONcode quality criteria is expressed in Table 3.

Table 3. Compliance of retrieved websites with HONcode Quality Criteria

Quality criterion	No. of websites (n=71)	Google (n=26)	Yahoo (n=23)	Bing (n=22)
Authority	53(75%)	25(96%)	17(74%)	11(50%)
Complementarity	56(79%)	16(62%)	21(91%)	19(86%)
Privacy	63(89%)	25(96%)	22(96%)	16(73%)
Attribution	36(51%)	11(42%)	14(61%)	11(50%)
Justifiability	70(99%)	26(100%)	23(100%)	21(95%)
Transparency	65(92%)	26(100%)	21(91%)	18(82%)
Financial disclosure	38(53%)	13(50%)	15(65%)	10(45%)
Advertising policy	58(82%)	21(81%)	23(100%)	14(64%)

According to Table 3, the highest compliance with the HON principles belongs to justifiability (99%), and the lowest belongs to attribution (51%).

Discussion

Internet usage has rapidly raised and become more common in the past few years. It has a growth of 566.4% from 2000 until 2012(Alam, Mohd, Nik, & Ahmad, 2014). The qualification of health-related websites is not easy to do because it would be an enormous and costly task requiring expert staff in varying fields to monitor too many of health-related websites(Pérez-López, 2004). Furthermore, diabetes management is becoming an important issue as the occurrence of diabetes is high and increasing as well as it has considerable impact on health care costs in many countries. On the other hand, empowerment of diabetic patients and access to quality online information is needed for the control of diabetes and its problems(Kannampilly, Pavlić-Renar, & Metelko, 2002). Nevertheless, the results from current study demonstrate the overall quality of retrieved websites was poor as only 17 websites achieved all eight HONcode principles. In the present study, the sample of first 90 websites (30 for each search engine) is reflective of the websites that a user of online health information would search and find. The low rate of compliance with HONcode of conducts demonstrate that while searching for diabetes related health information, people will encounter with unreliable health websites which could affect their healthcare decision making.

The results of the present study is in line with the results of study on diabetes websites, which was done on 2014(Valizadeh-Haghi & Fatehi, 2015). Furthermore, the current study results is in line with other research studies in which assess the quality of health websites in different subjects(Hirasawa et al., 2012; López-Jornet & Camacho-Alonso, 2010). Moreover, Eysenbach and his colleagues (2002) did a systematic review of 79 studies assessing the quality of health information for consumers on the Internet. Their study showed that 55 of them indicated that online health information is of poor quality(Eysenbach, Powell, Kuss, & Sa, 2002).

As the use of internet increases, access to high quality information may be helpful to empower patients. Regarding that only 47% of adults will share online health information with their physicians, this indicates how important is for doctors to understand the quality of online information and how to guide patients to reliable and quality websites(Fast, Deibert, Hruby, & Glassberg, 2013). Therefore, with increasing use of the Internet, it will become more important for physicians to identify patients who use the Internet and to understand how they use it as a source of medical information(Diaz et al., 2002).

At present study, the lowest score belonged to the "Attribution" criteria, which may greatly influence informed decision-making. The attribution principle says that all medical content should have a specific date of creation and a last revision date. In the current research only 51% of the health websites on diabetes, complied with this criterion, while when reading health information, the date of publication is important. Since the emerge of new medical findings affects the previous obtained results gained from old findings and makes it necessary to use current information. Therefore, the out of date medical information could not be valid enough to help patients to benefit from health information websites. For example, a website that has not been updated or an article that has been published several years ago may not include current information on new treatment options.

One of the HONcode important criteria is "authority". The authority principle states that all medical information available on the health websites should be attributed to an author and his or her area of specialization must be mentioned. This will prove the trustworthiness of the source, and credibility is generally enhanced if medically educated professionals offer it. Nevertheless, in the current study, only 75% of the evaluated websites had considered the authority criteria.

Many of the retrieved websites (67.6%) in the present research was commercial websites. Previous studies have found that commercial websites are less credible and of lower quality than noncommercial websites(Obiyo, Ellimoottil, Adams, Hannick, & Gupta, 2016). It shows that while searching for diabetes information, users will encounter websites that are less trustworthy and of lower quality than noncommercial websites. The findings are concerning because many people use the internet to learn about health problems such as diabetes and the low-quality information could threaten their health seriously.

There are some limitations associated with this study. We did search our keyword on three search engines on April 2017. Thus, it cannot be representative of search results from other search engines at other times. Furthermore, there are some other tools also to measure the trustworthiness and quality of health websites. However, we cannot rely on only one tool to judge the reliability of retrieved diabetes information websites. The progressive continuous change of internet beside different search engines provide the range of choice for internet users. Moreover, expiry of old websites and the born of new ones, internet limitations, insufficient knowledge of web users, and geographic search location would affect the result of any search considering both the researchers and health websites consumers.

Conclusions:

Diabetic patients need high quality and updated information to decide better about their health situation since having knowledge allows patient to make more informed health decisions. Nevertheless, diabetic patients must consider that information on retrieved websites could be harmful. Thus, considering the lack of international online health information quality control, physicians should have knowledge about the variable quality of health websites and the literacy level and amount of internet usage of their patients. With this in mind, they can guide their patients

to reliable health websites(Obiyo et al., 2016)which in turn help patients to understand their illness and would bring about their satisfaction. Furthermore, it is good to make the patients familiar with some of quality evaluating tools such as HONcode to help them choosing the right and trustworthy websites to use and involving more effectively in their decision-making. Finally, working toward agreement in defining and measuring the quality of online health information needs more effort.

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