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Opportunities and Challenges of Consumer Health Information on the Internet: is Cyberchondria an Emerging Challenge?

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Abstract

Introduction: With the advent of the Internet, retrieval and searching of information resources have changed compared to the past. These changes have made the Internet network easy enough for users to access specialized and non-specialized knowledge, and consequently, expose users to many challenges and opportunities. Accordingly, this study investigates and categorize these challenges and opportunities.

Methods: To conduct this narrative review, at the first step, the articles addressed health-related information available on the Internet from reputable journals and databases were selected. Then, the selected articles were examined to answer the research questions, and the information obtained was categorized. Finally, the challenges and opportunities arising from this information were identified.

Results: Health-related information on the Internet can help empower individuals to make medical decisions, as well as control and manage their disease. Alternatively, using the Internet to obtain health-related information can cause harm, such as health anxiety and cyberchondria.

Conclusion: Despite the many challenges, online health information plays a vital role in people's self-care. Public health-related organizations should provide the essential platforms for better use of online health information and thus better self-care of people in the community by recognizing the opportunities and challenges of this type of information.

Keywords: Online health information; Health information-seeking behavior; Health anxiety; Cyberchondria; Patient-physician relationship; Electronic health literacy

Introduction

The advent of the Internet has changed the search and retrieval of information resources compared to the past (Beaunoyer, Arsenault, Lomanowska, & Guitton, 2017). In addition, the form of information resources and the way people access resources have changed. Information resources have evolved from traditional resources such as books and printed journals to dynamic and user-centered resources that contain images and videos available online on websites, forums, online groups, and social networks (Chou, Hunt, Beckjord, Moser, & Hesse, 2009; Song et al., 2016; Tennant et al., 2015). These changes have faced users with many challenges and opportunities in using information resources. One of the crucial areas in which the spread of the Internet has been effective is the health and medical area, to the extent that online health information has quickly become an essential and popular resource for people (Kim, 2010).

Health-related information on the Internet is often available for free or at a low cost (da Mota, Ferreira, da Costa Neto, Falbo, & de Barros Lorena, 2018). For many people, the Internet is their first step in finding information about symptoms, diseases, and health information (Starcevic, 2017). This type of information is significantly influential in decisions related to people's health. Thus, in addition to traditional ways of receiving medical information, such as seeing a doctor and consulting with specialists, people search for health information on the web (K. Lee, Hoti, Hughes, & Emmerton, 2015). However, searching through this category of information is a complex and dynamic process that can lead to potential errors (Kordovski, Babicz, Ulrich, & Woods, 2020). In other words, due to its sensitive nature, online medical information should contain accurate, adequate, and understandable content and be appropriate to the information needs of different people.

Additionally, this information's quality must be controlled and managed; otherwise, it will cause the dissemination of disproportionate information (Beaunoyer et al., 2017; Brossard, 2013). A study of the capacities available on the Internet and online medical information shows that there are many opportunities in the platform of the health information area for health professionals to improve the quality of content, which in turn, leads to better use of information by users, and help the public health system (O'mathúna, 2018). However, it should be noted that increasing Internet access and use of its content may cause fear and increase anxiety (Mcelroy & Shevlin, 2014). In this regard, this study investigates the challenges and opportunities arising from the use of health-related information on websites.

Methods

The keywords online health information and eHealth information were searched in databases, including PubMed, Scopus, Web of Science, and Google Scholar, to conduct the present narrative review research. These were selected from the retrieved articles that examined online health information and identified their challenges and opportunities. It should be noted that there is no specific time limit on search formulas. However, the most recent and authoritative articles

for the present study were retrieved and selected. Also, in terms of language, only English language articles were selected. Finally, the selected articles were examined to answer the research questions, and the needed information to conduct the research was extracted.

Results

In line with the research objectives, the articles' findings are categorized into challenges and opportunities which are presented in in Table 1 and Table 2 respectively.

Table 1. Emerging challenges of online health information

Challenges			
Increasing Cyberchondria level	Disseminating poor quality and inaccurate information in the health area	Increasing health anxiety	Decreasing patients' satisfaction with the consultation with the physician
(Bati, Mandiracioglu, Govsa, & Çam, 2018; Farooq, Laato, & Najmul Islam, 2020; Fergus & Spada, 2017; Horvitz, 2014; Khazaal et al., 2021; Mcelroy & Shevlin, 2014; Muse, McManus, Leung, Meghreblian, & Williams, 2012; Singh & Brown, 2014; Starcevic, 2017; Starcevic, Baggio, Berle, & Khazaal, 2019; Starcevic, Schimmenti, Billieux, & Berle, 2020; Starcevic & Berle, 2013; Tyrer, Cooper, Tyrer, Wang, & Bassett, 2019; Vismara et al., 2020; White & Horvitz, 2009a)	(Ansari, Hamzehei, & Valizadeh-Haghi, 2020; Berland et al., 2001; Bernstam et al., 2008; Diviani, van den Putte, Giani, & van Weert, 2015; Eysenbach, Powell, Kuss, & Sa, 2002; Hamzehei, Ansari, Rahmatizadeh, & Valizadeh-Haghi, 2018; Korp, 2006; C. J. Lee, 2008; S. Rahmatizadeh & Valizadeh-Haghi, 2018; Shahabedin Rahmatizadeh, Valizadeh-Haghi, Kalavani, & Fakhimi, 2019; Rice, 2006; Stvilia, Mon, & Yi, 2009; Valizadeh-Haghi, Khazaal, & Rahmatizadeh, 2021; Valizadeh-Haghi & Rahmatizadeh, 2018)	(Blackburn et al., 2019; Fergus, Kleinsasser, & Ebarb, 2020; McMullan, Berle, Arnáez, & Starcevic, 2019; Singh & Brown, 2014, 2016; Tanis, Hartmann, & Poel, 2016; Tyrer et al., 2019)	(Bianco, Zucco, Nobile, Pileggi, & Pavia, 2013; da Mota et al., 2018; Murray et al., 2003; Tanis et al., 2016)

Table 2. Opportunities of online health information

Opportunities	
Empowering people to use medical care and make appropriate decisions	Informing people about diseases and epidemics
(Bol, Van Weert, De Haes, Loos, & Smets, 2015; Bujnowska-Fedak & Węgierek, 2020; Buyl et al., 2020; Chen, Li, Liang, & Tsai, n.d.; Coglianese et al., 2020; Hall, Bernhardt, & Dodd, 2015; Hall, Bernhardt, Dodd, & Vollrath, 2015; Huberty, Dinkel, Beets, & Coleman, 2013; Kavosi, Vahedian, Montazeralfaraj, Tafti, & Bahrami, 2020; Özkan, Mellema, Nazzal, Lee, & Ring, 2016; Sherman, Patterson, Tomar, & Wigfall, 2020; Yu et al., 2020)	(Jamal et al., 2015; Özkan et al., 2016; Sherman et al., 2020; Zhao, Fan, Basnyat, & Hu, 2020)

Discussion

The current study examines the articles, opportunities, and challenges online health information has created for health information professionals, patients, and users. The findings revealed that despite the usefulness of online health information, there are few challenges which the users may encounter in case of reading those information.

Challenges

- Cyberchondria

One of the significant challenges of online health information is cyberchondria (Bati, Mandiracioglu, Govsa, & Çam, 2018; Farooq, Laato, & Najmul Islam, 2020; Fergus & Spada, 2017; Horvitz, 2014; Khazaal et al., 2021; Mcelroy & Shevlin, 2014; Muse, McManus, Leung, Meghreblian, & Williams, 2012; Singh & Brown, 2014; Starcevic, 2017; Starcevic, Baggio, Berle, & Khazaal, 2019; Starcevic, Schimmenti, Billieux, & Berle, 2020; Starcevic & Berle, 2013; Tyrer, Cooper, Tyrer, Wang, & Bassett, 2019; Vismara et al., 2020; White & Horvitz, 2009a). Cyberchondria means increased anxiety and concern about one's health due to searching for symptoms and diseases, and medical information on the Internet (Bati et al., 2018; Mcelroy & Shevlin, 2014; Muse et al., 2012; Starcevic, 2017). This compulsion is the result of searching for health information on the web and includes five dimensions, each of which is related to online health information. The first dimension, "compulsion," refers to the extent to which information anxiety resulting from online medical information retrieval prevents a person from engaging in online and offline activities and wastes a person's time. The "distress" dimension indicates the level of extreme anxiety and worry resulting from searching for medical

information online. "Excessiveness" is the third dimension, and represents a series of searches resulting from the concern and anxiety of compulsive search of medical information, which continues due to the lack of recognition of the reliability of the information available on the Internet. "Reassurance," as the fourth dimension, expresses the level of anxiety and worry that forces a person to see a doctor to ensure the validity of information obtained from the Internet. The last dimension is "Mistrust of Medical Professional," which indicates how searching for medical information online can lead to distrust even of specialist physician advice (Bessiere, Pressman, Kiesler, & Kraut, 2010; Gray, Klein, Noyce, Sesselberg, & Cantrill, 2005; Mcelroy & Shevlin, 2014; O'BRIEN & FRANK, 1959; White & Horvitz, 2009b). The destructive effects of cyberchondria include wasting users' time and money, adverse psychological and emotional effects, trusting in unprincipled and unscientific treatments, increasing unnecessary referrals to doctors, lack of trust in physician counseling, lowering the quality of counseling sessions, and wasting much unnecessary money for unnecessary tests and generally a heavy psychological and economic burden on public health (Mcelroy & Shevlin, 2014).

- Disseminating low quality and inaccurate information in the health topics

Studies examining the quality of health websites show that the quality of health information is low (Berland et al., 2001; Bernstam et al., 2008; Eysenbach et al., 2002; Stvilia et al., 2009; Valizadeh-Haghi et al., 2021). Contrary to traditional resources – usually had direct contact with researchers in this field – the information available on the Internet is being disseminated and re-disseminated by various people, leading to rumors and misinformation in the health area (Diviani et al., 2015). In this regard, studies show that viewing inadequate medical information on the Internet can increase anxiety (Singh & Brown, 2016), fear (Baumgartner, Hartmann, & Ph, 2011), and the risk of developing diseases and anxiety disorders (Norr, Capron, & Schmidt, 2014).

Alternatively, medical information can be confusing and ambiguous or have low readability, which ultimately reduces individuals' perception of information, especially in people with low health literacy (C. J. Lee, 2008; Rice, 2006). However, a 2012 study found that 72% of US Internet users use medical information on the Internet; most of them (77%) search in public search engines, and only 13% of them use specialized sites in the field of health such as WebMD ("Health Online 2013 | Pew Research Center," n.d.). While, the search results in public search engines are unreliable, and the quality and reliability of this information are often questioned. As a result, most websites lack evidence-based content, and there is almost no quality control over this information (Hamzehei et al., 2018; Korp, 2006; C. J. Lee, 2008). However, websites and online discussion forums that lack of accurate and reliable information can mislead people into interpreting symptoms and information, leading to excessive worries and false self-diagnosis (Muse et al., 2012; Tanis et al., 2016).

- Health anxiety

Studies indicate that searching for health information on the Internet can increase health anxiety (Blackburn et al., 2019; Fergus et al., 2020; McMullan et al., 2019; Singh & Brown, 2014, 2016; Tanis et al., 2016; Tyrer et al., 2019). Health anxiety usually occurs when there are changes in individuals' bodies, and they experience symptoms associated with infectious diseases (such as fever, cough, muscle aches) and feel sick (Asmundson, Abramowitz, Richter, & Whedon, 2010). Excessive health anxiety can lead to overconfident behaviors such as frequent visits to the physician and searching for health information on the Internet. These behaviors are done repeatedly to reassure health status and receive more health services and then repeated to gain confidence and deny the disease. Although these behaviors may initially temporarily reduce anxiety, eventually, they are reinforced by repeated searches, and this vicious cycle continues (Tyrer, 2018).

However, health anxiety has various degrees and can be found in every age and society. Numerous systematic studies show that between 1985 and 2017, health anxiety has increased among students in Western countries. According to these studies, the emergence and prevalence of the Internet in communities and the comfortable and uncontrolled access of individuals to unverified medical information have greatly influenced this relative increase (Kosic, Lindholm, Järholm, Hedman-lagerlöf, & Axelsson, 2020).

- Decreasing patients' satisfaction with the consultation with the physician

Today, patients are increasingly searching the Internet for medical information before a consultation with a physician and discuss the accuracy of the Internet's information while consulting a physician (Hu, Bell, Kravitz, & Orrange, 2012; Moreland, French, & Cumming, 2015). The severity of this varies with age, gender, education level, living status, health status, and Internet use (Hu et al., 2012; J. Li, Theng, & Foo, 2016; N. Li, Orrange, Kravitz, & Bell, 2014; Moreland et al., 2015; Oh & Cho, 2015). With the advancement of the Internet and the widespread use of health information resources, physicians will increasingly encounter patients who have searched the Internet for medical information prior to a medical consultation (Wong & Cheung, 2019). This can be helpful at times (Chiu, 2011; Schrank, Sibitz, Unger, & Amering, 2010), but studies suggest that the overuse of the Internet and other media as medical information sources has caused problems for the physician-patient relationship (Bianco et al., 2013; da Mota et al., 2018; Murray et al., 2003; Tanis et al., 2016). Health search results on the Internet are usually directly related to an increase in physician visits (Baumgartner et al., 2011; Muse et al., 2012; Singh & Brown, 2014), which indicates that most health information on the Internet is inadequate. However, it should be noted that paying attention to education, search strategies, and promoting eHealth literacy can better understand and retrieve health information from the Internet. People can make better use of this essential and irreplaceable resource (Norman & Skinner, 2006; Wong & Cheung, 2019).

Opportunities

- Empowering people to use medical care and make appropriate decisions

Findings from the present study showed that health information on the Internet had created many opportunities for the health community, users, and health professionals. Besides, the search for information about health and medicine on the Internet and in the virtual world, in general, is increasingly expanding, such as information about diseases and viruses and their symptoms, treatment methods, information about medication regimens, traditional medicine, nutrition, and exercise and complementary medicine (Kim, 2010). Today, health information available on the Internet covers a wide range of medical information and is provided almost for free and high availability. One of the advantages of health information through the Internet is empowering people to use health and medical care (Bol et al., 2015; Buyl et al., 2020; Coglianesi et al., 2020; Hall, Bernhardt, & Dodd, 2015; Hall, Bernhardt, Dodd, et al., 2015; Özkan et al., 2016) and making appropriate medical and health decisions to increase the level of health of themselves and others (Bol et al., 2015; Bujnowska-Fedak & Węgierek, 2020; Chen et al., n.d.; Hall, Bernhardt, & Dodd, 2015; Huberty et al., 2013; Kavosi et al., 2020; Özkan et al., 2016; Sherman et al., 2020; Yu et al., 2020). Users of health information on the Internet often prefer a self-reliant approach, and non-users of health information prefer a physician-based approach. For this reason, there is a significant difference between health information users and non-users of the Internet in the proper use of health and medical care and consequently can lead them to make appropriate decisions in the health area (Hall, Bernhardt, & Dodd, 2015). The high level of access to this type of information, if used correctly, can cause the dynamism and updating of people's health information and affect their decisions (Kavosi et al., 2020). Besides, a group of users believes that the possibility of exchanging opinions on the Internet helps users make appropriate decisions (Kavosi et al., 2020). However, having a clear strategy regarding health information on the Internet and proper education leads to the more appropriate use of this type of information (Chen et al., n.d.; Özkan et al., 2016).

- Informing people about diseases and epidemics

Health information on the Internet helps people with diseases and certain conditions and makes it easier for them to manage and control the disease. For example, in a study by Fabiana Coglianesi et al.(2020), they found that searching for health information on the Internet by pregnant women with obstetric complication diagnosis improved control and management of the condition and reduced their anxiety (Coglianesi et al., 2020). In other societies, however, the outcome may be different. Also, in another example, Amr Jamal and colleagues in a study concluded that people with diabetes who search health information on the Internet, in aspects such as testing their blood glucose regularly, taking proper action for hyperglycemia and adopting non-pharmacological management perform better than non-users of health information on the Internet (Jamal et al., 2015). In addition to physical illness, the impact of searching for health information on the Internet on the management and control of mental illness such as schizophrenia has been confirmed (Schränk, Sibitz, Unger, & Amering, 2010). Alternatively, in epidemics and pandemics, the use of online health information spreads the necessary instructions for any prevention and counseling to people around the world as soon as possible. For example,

during the COVID-19 pandemic, the Internet was used as the essential source of health information among the Chinese. Accordingly, individuals used online health information to address issues such as access to treatment, quarantine management, and new symptoms and notifications about the disease (Zhao et al., 2020).

However, when using a set of information, people must have a variety of information literacy to use it; otherwise, they will be threatened with various mental, physical, and economic damage. In this regard, having an appropriate level of eHealth literacy helps people to properly use health information on the Internet (Norman & Skinner, 2006; Shiferaw, Tilahun, Endehabtu, Gullslett, & Mengiste, 2020; Soleimaninejad, Valizadeh-Haghi, & Rahmatizadeh, 2019; Valizadeh-haghi & Rahmatizadeh, 2018; Wong & Cheung, 2019). This literacy is defined as a set of skills and knowledge essential for the interaction and use of technology-based health tools and resources (Chan & Kaufman, 2011). However, it remains to be seen whether higher eHealth literacy can reduce and prevent cyberchondria disorder.

Conclusion

The study findings revealed that searching for online health information is associated with challenges and opportunities. Hence, this almost free and accessible information can empower people to manage their health and control their disease, as well as help them make appropriate decisions in the health and medicine area. In addition, during pandemics and epidemics, such as the COVID-19 pandemic and quarantine, it increases individuals' awareness and treatment methods. However, searching for online health information on the Internet can lead to rumors, as well as scattered and ambiguous information and cause mental disorders such as health anxiety and cyberchondria, which in addition to mental damage, lead a person to misdiagnosis, and consequently physical injuries to the person. With these explanations, trustees, policymakers, and owners of medical websites and databases can identify the opportunities and challenges of this critical resource, improve the community health system as much as possible, and finally, make the most of the high potential of this information.

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