Do Internet Searches Prior to a Doctor Visit Improve Quality and Reduce Costs?

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Abstract

A confidential survey on the impact Internet searches had prior to a doctor visit was completed by 131 randomly selected patients and 85 clinical providers. Survey results suggest that patients do not believe that the Internet replaces the need for a doctor diagnosis, nor does it improve the quality of the visit or reduce the cost of care. However, the survey did find that patients believe that the Internet is a great source of information and can better prepare patients for a doctor visit and even replace the need for a doctor visit from time to time. The survey found that providers strongly disagreed with the statement that the Internet replaces the need for a diagnosis by the doctor. It was also reported that clinical providers believe that the Internet was a great source of information and had a more positive impact on the quality of doctor visit than did the patients. Patients and providers agreed that the Internet does not reduce costs, and that the doctor provides a better diagnosis than those found on the Internet. These findings illustrate the reliance of patients on health information found on the Internet and highlights the importance of healthcare providers evaluating the quality of information found on the Internet.

Keywords: Internet search, doctor visit, quality, costs and health information.

Introduction

No other communication technology has had a more profound impact on the world than the Internet. In 1993, the Internet communicated one percent of the information flowing through two-way telecommunication networks, but this increased to more than 97% by 2007 (Hilbert & Lopez, 2011). In 2013, the United States Census reported 83.8% of all U.S. households had a computer and 74.4% reporting had high-speed internet (File & Ryan, 2014). Just four years later, cellphones are now smartphones with full computer capabilities -- including high-speed internet.

Before the Internet, information flowed from the doctor to the patient, but now, patients can directly search the Internet for answers. Internet use by patients as a source of information on

health and disease is expanding rapidly with obvious effects on the doctor-patient relationship (Figueiredo de Oliveira, 2014). In the past, the patient's role in his or her care was more passive. With the Internet, though, the pendulum has swung the other way as patients are now taking a more active role in their care. According to Patel (2016), access to health information on the Internet is offering new tools and efficiencies that support an integrated healthcare system's aim to ensure improved outcomes, reduced costs, and better patient care.

Although many of the benefits of health information technology seem obvious, it has been unclear whether this is due to an improvement in the quality of care provided or because of a decrease in costs (Chaudhry, 2016). Studies and systematic reviews have focused on evaluating the impact the Internet has on the quality, efficiency, and costs of healthcare as well as health information technologies. The Internet has many advantages, such as being a source of information, including easy access to massive amounts of information, having the convenience of updating information, and providing interactive platforms to allow for further understanding of information (Murray, Lo & Pollack, 2016).

However, disadvantages also exist such as misinterpreting or misreading presented information. Compromised health behaviors and health outcomes have resulted in inappropriate requests for clinical interventions (Murray, Lo & Pollack, 2016). Kotentko (2013) wrote "[t]oday, anyone with a computer and a connection can get online and find a variety of results, ranging from simple sore throat to the more serious, like bronchitis and asthma. But just because we can doesn't mean we should. In a world where almost everyone is online and can easily find and provide medical solace, is it really, truly a good idea to consider social media and the web a reliable source of healthcare."

Buck (2012) wrote that "[f]or most, Googling "diaper rash" is more convenient than loading the baby in the minivan and heading to the doctor's office. But what happens when you read on a website that your baby's sore buns might be caused by a yeast infection, and thus, would require topical antifungal cream? As a first-time parent, do you panic? Do you search for pictures of diaper rash and compare the next hundred Google images to your infant's bottom? In the past, a mother may have referred to one of many baby books or official medical pamphlets for advice. Now the Internet provides access to scholarly journals, videos of surgeries, testimonials and online health communities, effectively putting medical information that can be valuable or inaccurate in the hands of non-experts, which can either empower or and endanger today's connected patient."

Literature Review

Kotenko (2013), surveying over a thousand patients and over a hundred healthcare executives on the accuracy of the information, found that the most trusted resources online are those posted by doctors (60%), followed by nurses (56%) and then hospitals (55%). Dr. Dina Strachan, a New York-based medical and cosmetic dermatologist, believes online information can be empowering and reassuring for some patients, but can also overwhelm and possibly mislead others. Some people simply don't have the ability to assess the value of information from a blog, vetted medical site or a doctor's assessment (Buck, 2012).

According to Figueiredo de Oliveira (2014), 85.3% of physicians reported that their patients accessed the Internet and that 92% used that information in a following visit. Overall, 56.9% of the physicians thought that the Internet helped the doctor–patient relationship, 27.6% thought it interfered with the relationship, and 15.5% believed that the Internet had a negative impact on the relationship.

Hartzband and Groopman (2010) support the fact that both patients and physicians can now access a wealth of medical information on the Internet within seconds and that expert evidence-based analyses are readily available. Primary care physicians also have easy access to many guidelines whose reach was previously limited to specialists. However, when in the hands of patients, this surplus of medical information can prove hazardous. Falsehoods abound on the Internet and inaccurate sites often link to other false information that reinforces those misconceptions and rumors. Sunstein (2009) stated that "[f]alsehoods are easily and rapidly propagated on the Internet: once you land on a site that asserts a false rumor as truth, hyperlinks direct you to further sites that reinforce the falsehood."

Dr. Aditi Nerurkar, a primary care physician at Harvard Medical School and Beth Israel Deaconess Medical Center, was quoted by Buck (2012) as saying "while I love their sense of curiosity and ownership of their health, their online searches can – and often do – go awry". Most signs and symptoms are not exclusive to one disease so many patients using the Internet as a way to diagnose themselves often become worried about the dangerous diseases they learned about on the Internet. Hospitals may inadvertently contribute to website-inspired worry since many of them have web portals that allow patients to view their laboratory, radiology and pathology results on-line (Hartzband & Groopman, 2010). This technology is efficient since it reduces the need for calling and mailing information to the patients. However, receiving clinical data without context increases on-line searches.

Tang and Ng (2006) tested the accuracy of Google searches by entering symptoms and signs from 26 published case records and found that the searches revealed the correct diagnosis in only 15 of the cases. Hartzband and Groopman (2010) pointed out that search results can vary depending how the name is entered. For example, "Dr. followed by a name gives a plethora of rating sites, whereas a search using MD at the end yields scholarly publications." Such variation can skew the decision of the patient trying to choose a physician for consult.

Fox and Duggan (2013) reported that 35% of U.S. adults have gone online to determine what medical condition they or someone else might have. Forty-one percent of those that went on-line said that a medical professional confirmed their diagnosis, and 18% reported that either the clinician did not agree or he or she offered a second opinion. The study also reported that 35% did not visit a clinician to get a professional opinion after searching the Internet. Women were more likely than men to search the Internet to figure out a possible diagnosis as were younger people, white adults, those from households earning $75,000 or more, and those with a college degree or advanced degrees.

According to Fox (2011), 80% of Internet users (93 million Americans) have searched for a health-related topic online, which is up from 62% of Internet users who said they went online to research health topics in 2001. People most often went online to look up information about a specific disease or medical problem (63%), a particular medical treatment or procedure (47%), diet, nutrition and vitamins (44%), and exercise or fitness information (36%). Other popular health topics include: prescription or over-the-counter drugs (34%), alternative treatments (28%), health insurance (25%), depression, anxiety or stress (21%), and a particular doctor or hospital (21%). Only 22% of Americans over 65 have Internet access and of those, 70% have searched for health topics. But, in general, senior citizens are much less likely to have searched for health topics, with the exception of Medicare. The study also found that a consumer who uses the Internet as a resource for health education "stands a better chance of getting better treatment." The challenge remains to close the gap between those with Internet health access and those without. There is also a need in helping people find relevant information once they are online.

According to Buck (2012), the fear and anxiety that online medical searches cause now has its own diagnosis. Cyberchondria is the fear and preoccupation with medical concerns that are brought on by self-diagnosis and health research done online. Many people try to find their symptoms and ailments based on Internet searches and worry that they may have contracted some rare and horrific diseases which can cause more harm than good. Seventy-two percent of Internet users say that they have searched online for health information and advice, and 70% of U.S. adults still got information or care from a doctor or health care professional. Medical websites are run off of databases that match key words to their log of ailments and symptoms and don't really narrow down the possibilities. Therefore, using them could cause one to over-diagnose or to even under-diagnose, which can be just as dangerous. Apart from inducing anxiety, cyberchondria poses certain risks. It can be costly if people demand expensive medical tests such as MRIs and CT scans, which also put them at risk for other conditions. Cyberchondriacs may also be more inclined to buy into false treatments online since many websites that claim to be offering facts are selling things.

Scullard, Peacock and Davies (2010) sought advice for five common pediatric questions and analyzed the first 100 search results for each inquiry. Of the 500 total sites analyzed, 39% contained correct information, 11% were incorrect and 49% failed to answer the question. Among the sites that supplied an answer, 78% gave the correct information, but consistency varied by type of medical query. It was also found that none of the sponsored websites that researchers encountered provided accurate medical information.

Murray (2006) randomly surveyed 2,000 physicians and reported that 85% of respondents experienced a patient bringing Internet information to a visit. It was found that accurate, relevant information benefited, while inaccurate or irrelevant information worsened the quality of care, health outcomes and the physician-patient relationship. A physician feeling that the patient was challenging their authority was the most consistent predictor of a perceived deterioration in the physician-patient relationship.

According to the 2012 Pew Research Center's Internet & American Life Project Survey, 80% of American adult Internet users search for health related topics (Fox, 2012). Many physicians

perceive that health information found on the Internet as problematic and feel it generates patient misinformation and can cause detrimental self-diagnosis (Ahmad 2006). However, other studies have shown that patients who use the Internet are often more compliant, have better medical results, and arrive at their appointments asking specific and informed questions (Garcia 2011).

Methodology

In order to answer the stated research question, patients and clinical providers were randomly selected and then directed towards an online survey. The patients completed an eleven-question five-point Likert scaled survey, while the clinical providers completed a seven-question five-point Likert scaled survey – Highly Disagree (1), Disagree (2), Sometimes (3), Agree (4) and Highly Agree (5). The patients and clinical providers selected to complete the survey were randomly selected from a primary and specialty care clinics in Southern California.

Table 1: Patient Survey

Patient Survey	HD	D	S	A	HA
1. I use the internet to research a symptom I may have.					
2. I research the internet for health options instead of visiting a doctor.					
3. I believe the internet replaces the need for a physician diagnosis.					
4. I feel prepared when I visit the doctor's office after researching a symptom first.					
5. I rely on the internet for my symptoms.					
6. I believe that the internet has improved my healthcare.					
7. I believe the internet has reduced my healthcare costs.					
8. I believe the internet is a great source for medical information.					
9. I believe a doctor has a better diagnosis than the internet.					
10. I believe a doctor is more reliable than the internet.					
11. I research my symptoms before visiting a doctor.					

Table 2: Clinical Provider Survey

Clinical Provider Survey	HD	D	S	A	HA
1. The interent replaces the need for a physician diagnosis.					
2. When patients research their symptoms first, they are more prepared for their doctor visit.					
3. Patients rely on the internet for their symptoms.					
4. The internet has improved healthcare.					
5. The internet has reduced healthcare costs.					
6. The internet is a great source for medical information.					
7. A physician's diagnosis is more trusting than the internet.					

Results

There were 131 patients and 85 clinical providers randomly selected that completed the confidential survey over a period of three weeks. The surveys were collected and placed in tables. Pivot charts were used for analysis and evaluation. The results are in ascending order.

Table 3 - Patient Survey Results

Please select the option that you agree with most.	F	M	A	Response
10. I believe a doctor is more reliable than the internet.	4.4	4.1	4.3	Agree
9. I believe a doctor has a better diagnosis than the internet.	4.2	4.1	4.2	Agree
8. I believe the internet is a great source for medical information.	3.4	3.6	3.5	Agree
1. I use the internet to research a symptom I may have.	3.4	3.5	3.5	Agree
11. I research my symptoms before visiting a doctor.	3.1	3.2	3.1	Sometimes
4. I feel prepared when I visit the doctor's office after researching a symptom first.	2.9	2.9	2.9	Sometimes
2. I research the internet for health options instead of visiting a doctor.	2.5	2.7	2.6	Sometimes
6. I believe that the internet has improved my healthcare.	2.3	2.5	2.3	Disagree
5. I rely on the internet for my symptoms.	2.0	2.2	2.1	Disagree
7. I believe the internet has reduced my healthcare costs.	1.9	2.3	2.0	Disagree
3. I believe the internet replaces the need for a physician diagnosis.	1.4	1.7	1.5	Disagree

The patient survey results suggest that patients do not believe that the Internet replaces the need for a doctor diagnosis, nor does it improve the quality of the visit or reduce doctor visit costs. However, patients reported that the Internet is a great source of information and can better prepare patients for a doctor visit or even replace the need for a doctor visit from time to time.

Table 4 – Clinical Provider Survey Results

Please select the option that you agree with most.	F	M	A	Response
7. A physician's diagnosis is more trusting than the internet.	4.5	4.4	4.4	Agree
6. The internet is a great source for medical information.	3.5	3.7	3.6	Agree
3. Patients rely on the internet for their symptoms.	3.2	3.4	3.3	Sometimes
4. The internet has improved healthcare.	3.0	3.1	3.1	Sometimes
2. When patients research their symptoms first, they are more prepared for their doctor visit.	2.9	3.0	3.0	Sometimes
5. The internet has reduced healthcare costs.	2.2	2.1	2.2	Disagree
1. The internet replaces the need for a physician diagnosis.	1.5	1.4	1.4	Strongly Disagree

The clinical provider survey found that providers strongly disagreed with the statement that the Internet replaces the need for a diagnosis by the doctor. However, survey results suggested that

providers believed the Internet improved the quality of doctor visits more than the patients. The study also found that clinical providers felt that the Internet was a great source of information, but still maintained that the doctor provides a better diagnosis than information obtained from the Internet. Both patients and clinical providers agreed that the Internet doesn't reduce costs and that the doctor's diagnosis is better than the Internet.

Conclusions

Information, both accurate or not, is just a click away on the Internet. The side effects of Internet use are not all bad, but they are also not all good. The Internet is redefining the roles of doctor and patient in more positive than negative ways. Internet self-diagnosis can be beneficial and even effective when practiced responsibly. Clinical providers should recognize that patients are going to continue using the Internet as a source of medical information and be prepared to assist patients in evaluating the quality of information found on the Internet.

References

Black, A. D., Car. J., Pagliari, C., Anandan, C., Cresswell K, (2011). The Impact of eHealth on the Quality and Safety of Health Care: A Systematic Overview. *PLoS Med 8*(1): e1000387. doi:10.1371/journal.pmed.1000387

Buck, S. (2012). What Doctors Think About Your Online Health Searches, Mashable. Retrieved from http://mashable.com/2012/06/15/online-medical-searches/#_UyB0u42gSqS

Chaudhry, B. (2016). Systematic Review: Impact of Health Information Technology on Quality, Efficiency and Costs of Medical Care. *Annals of Internal Medicine*, Oct.-Nov. 2016.

Figueiredo de Oliveira, J. (2014). The effect of the internet on the patient-doctor relationship in a hospital in the city of São Paulo, *Journal of Information Systems Technology, 11*(2), May/August.

File, T. & Ryan, C. (2014). *Computer and Internet Use in the United States: 2013, American Community Survey Reports*, United States Census Bureau.

Fox, S. (2011). The Social Life of Health Information, 2011 Pew Center Research Study. Retrieved from http://www.pewinternet.org/2011/05/12/the-social-life-of-health-information-2011/

Fox, S., & Duggan, M. (2013). Health Online 2013, Pew Study. Retrieved from http://www.pewinternet.org/2013/01/15/health-online-2013/

Hartzband, P., & Groopman, J. (2010). Understanding the Web – Patients, Doctors and the Internet. *New England Journal of Medicine, 362*(12), 10063 – 1066.

Hilbert, M.,& Lopez, P. (2011). The World's Technological Capacity to Store, Communicate, and Compute Information. *Science*, *332*(6025), 60–65.

Kotenko, J. (2013). The doctor will see you now: How the Internet and social media are changing healthcare, Digitial Trends, April 18. Retrieved from https://www.digitaltrends.com/social-media/the-internet-and-healthcare/

Murray, E., Lo, B., & Pollack, L. (2016). The Impact of Health Information on the Internet on Health Care and the Physician-Patient Relationship: National U.S. Survey among 1,050 U.S. Physicians. *Journal of Medical Internet Research*, Oct. 2016.

Patel, K. (2016). Six Benefits of IoT for Hospital and Healthcare. *In Health*, July 18.

Scullard, P.,Peacock, C., & Davies, P. (2010). Googling children's health: reliability of medical advice on the internet. Archives of disease in childhood, adc.bmj.com

Sunstein, C. R. (2009). *On Rumor, how falsehoods spread, why we believe them, what can be done*. New York, Farrar, Straus & Giroux.

Tang, H., & Ng, J. H. K. (2006). Googling for a diagnosis - use of Google as a diagnostic aid: Internet based study, *BMJ*, *333*, 1143-1145.