Wired and Worried: Understanding Users’ Emotions while Web Searching for Health Information

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Abstract

To-date, most of the research concerning online health information search has focused on how users search the Web and how they evaluate health information. Despite the concerns raised on the impact of online health information on users’ emotions, there is little research done in this field. In this paper, a critical analysis of the previous studies on Web searching for health information is done and it is found that emotions in Web searching for health information is scantly addressed area. As an exploratory study, an interview is conducted on frequent health information seekers and “emotions during searching” emerged as one of the major themes. The gap in the literature and the results from the exploratory study shows that there is a need for further research to delve deeper into understanding users' emotions during Web searching for health information.

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1. Introduction

Internet makes it much easier for general public to seek health information themselves. However, in spite of many advantages of online health information, there are many problems (e.g. poor quality of information, information overload, users’ lack of health information literacy etc.) associated with it. A few studies have also addressed the consequences of online health information by addressing its impact on users’ negative emotions[1][6]. As Web searching (series of users’ actions between logging on and logging off a Web search system such as search engines[7]) has become the predominant form of health information access worldwide, it is important to gain a deeper
understanding of users’ search process. Thus, the objective of this paper is to conduct a review of past studies in Web searching for health information and to identify the research gaps if any.

2. Past studies in web searching for health information

In response to the problems associated with online health information and their significant impact on users’ healthcare decisions, efforts have been made to understand users’ search process during searching online for health information. Studies on understanding how users search the Internet for health information have enhanced the knowledge of users’ search strategy and some of the pitfalls they usually encounter. Qualitative studies conducted by Eysenbach & Kohler[8] to observe users’ online health information searching techniques found that majority of the search queries entered contained a single keyword and participants rarely went beyond the first page of search results. It was also found that participants did not check the quality criteria while retrieving health information. An observational study conducted by Hansen et al.[9] on adolescents found that search engines were the main source of access and the participants accessed the first few results. It was observed that participants did not consider the source of the content when searching. In a similar study by Hargittai et al.[10], over 25% of participants mentioned that they chose a website because the search engine had returned that site as the first result.

Along with how users search for online health information, it is also important to understand how they evaluate the credibility and relevance of the information obtained. In a study by Peterson et al.[11] on consumer experiences in searching for and evaluating health information online, researchers have found that the study participants quickly rejected the sites that were slow to load and that had pop-up advertisements. Sillence et al.[12] have found that their study respondents evaluated health websites based on design features (such as layout of the website, navigational aids provided) and content factors (such as credibility and relevance of the information). Given the huge choice of health websites available, it appears that people are not prepared to put up with poorly designed interfaces[13]. Studies by Harris et al.[14] and Rains & Karmikel[15] have also showed that the presence of design features on health websites is positively associated with perceptions of website credibility. In an observational study conducted by Buhi et al.[16] on understanding how college students search and evaluate online sexual health information found that students’ perception of website credibility was dependent mainly on the domain names of the sources.

Further, in a study on identifying users’ relevance judgments of health information, Crystal & Greenberg[17] have found that users were evidently looking for cues that could connect a document from general search engine to their particular problem of interest. While evaluating a typical document retrieved from Web search engine, users considered the title of the page, the description below it, date, URL and format of the document as relevant. Observational studies and interviews were conducted on college students to examine their health information search and appraisal behaviours[18]. The results indicated that familiarity with health websites and confidence in search strategies were major factors affecting their search and evaluation behaviours. It was also observed that participants judged the quality of websites by the design features. Such websites selected by the participants as credible were evaluated by health experts. Contrary to participants’ evaluation of quality, health experts judged the websites to contain unbalanced, superficial, and unsubstantiated information. Although these studies have highlighted the importance of design features in evaluating the quality of health websites listed, most of the quality frameworks developed such as HONCode[19] and E-Health code of ethics[20] for evaluating online health information ignore the design features for assessing the quality of the content. As Mokhtar et al.[21] concludes in their review of research, people rely most heavily on design elements judging information quality even though it is not listed in the critical evaluation skills recommended for judging quality.

Few studies in online health information search have identified distinctive challenges in searching such as difficulty in searching due to unfamiliar terminology[22] and difficulty in determining the quality of health information[23]. In an observational study, Toms & Latter[24] observed users searching for health-related topics using Google search engine. Results indicated significant problems in query formulation and in making efficient selection from results lists. In a study on young adults searching online for sexual health information[25], it was found that many of the participants struggled to find the required information.

Some of the studies in Web searching for health information have investigated the impact of online health
information on users’ healthcare decisions. Lau & Coiera\cite{26} have shown that users experience cognitive biases\footnote{Cognitive bias is a pattern of deviation in judgement that occurs in particular situations leading to inaccurate judgement\cite{28}.} while searching for health information and such biases may have a negative impact on post-search decisions. In another study on how checking out health symptoms online affects healthcare decisions, Kwan et al.\cite{27} have found that the order in which the symptoms are listed and the length of the list affect perceived risk of disease. Their study suggests that lay people may not be able to accurately judge their medical risks based on the information found online.

White & Horvitz\cite{6} conducted a log-based study on how people search online for health information. Their study focused on the content retrieved from Web searches and results showed that search engines have the potential to escalate medical concerns. They called this kind of unfounded escalation of concerns about common symptoms, based on the search results as “Cyberchondria”. Of several hundred Microsoft employees surveyed, 90% reported at least one occasion, where Web search for common symptoms led to searching a serious illness and 25% reported that this was a frequent occurrence. Often this leads to people assuming the worst possible outcome and in turn might take risky health behaviours such as wrong self-diagnosis.

Table 1 summarizes these past studies in Web searching for health information.

| #  | Area of research in Web searching for health information | Studies conducted | Findings |
|----|--------------------------------------------------------|-------------------|---------|
| 1  | How users search the Web to find health information    | Eysenbach & Kohler\cite{8} | - Search queries contained a single keyword  
|    |                                                        | Hansen et al.\cite{9} | - Scanned only first page of the retrieved results  
|    |                                                        | Hargittai et al.\cite{10} | - Did not check the quality criteria  
| 2  | How users evaluate online health information           | Peterson et al.\cite{11} | - Based on design features  
|    |                                                        | Sillence et al.\cite{12} | - Based on design and content features  
|    |                                                        | Sillence et al.\cite{13} | - Rejected credible websites because they lacked expected design features  
|    |                                                        | Harris et al.\cite{14} and Rains & Karmike\cite{15} | - Based on visual cues to content of health websites  
|    |                                                        | Buhi et al.\cite{16} | - Presence of design features on website credibility  
|    |                                                        | Crystal & Greenberg\cite{17} | - Perception of website credibility dependent on domain names of the sources  
|    |                                                        | Kim, Park & Bozeman\cite{18} | - Search cues – title, description below each link, URL and format of the document  
|    |                                                        |                    | - Familiarity with health websites and confidence in search strategies affected search and evaluation behaviours  
|    |                                                        |                    | - Judgment of quality by design features  
| 3  | Challenges in searching                                | Cline & Haynes\cite{22} | - Difficulty in searching due to unfamiliar terminology  
|    |                                                        | Toms & Latter\cite{24} | - Problems in query formulation and making efficient selection  
| 4  | Effect of online health information on users’ decision making | Lau & Coiera\cite{26} | - Users experience cognitive biases while searching and such biases may have negative impact on post-search decisions  
|    |                                                        | Kwan et al.\cite{27} | - Order and length of the search list affect perceived risk of disease  
| 5  | Effect of online health information on users’ emotions | White & Horvitz\cite{6} | - Web escalates health anxiety  
|    |                                                        |                    | - Order of the results has impact on this escalation  

Table 1. Summary of Past Studies in Web Searching for Health Information.
3. Exploratory Study

Based on the literature review conducted, as an exploratory study, we conducted an in-depth interview in order to get an understanding of how users search the Web for health information. Studies\textsuperscript{29,30} have reported that generally young adults actively search online for health information. Thus, we interviewed 25 young adults (aged 20 to 30) who actively seek online health information. Out of 25, 16 are male and 9 are female participants; 15 are pursuing under-graduation and 10 have finished post-graduation. The study took place in Mumbai. The interview questions were phrased as per the areas of research in Web searching for health information obtained in the literature reviewed in the previous section (Table 1). This is done in order to check whether the research done in Web searching for health information is in line with users’ actual search behaviour. The interview session for each participant was transcribed individually. Qualitative analysis of the data followed the procedure outlined by Gibbs\textsuperscript{31}, where he mentions about coming up with coding themes from the topics in the study schedule. Accordingly, from the interview schedule, four major coding themes were deductively constructed from the data.

- **Theme-1: Using search engines for searching health information:**
  All the participants claimed that they always select the health websites from search engines and that they do not have any specific health portal in mind while searching for health information.

- **Theme-2: Frequently searched health topics:**
  The second emergent theme identified was about frequently searched health topics. It was observed that participants (both male and female) mostly look into “a specific disease” and “body and beauty image (which includes exercise and fitness, reducing weight and food, diet & nutrition).” Some of the participants (three male and five female) said that they look into information on depression and anxiety.

- **Theme-3: Emotions during searching:**
  Another main theme identified was about the emotions participants felt when they searched online health information. Twelve participants said they feel “anxious” or “fear” after their search and fifteen participants said they feel “uncertain” or “confused” while searching.

- **Theme-4: Actions taken after searching for online health information:**
  The last emergent theme was about the actions taken by the participants in the past after searching online for health information. Participants were asked to narrate about their past experiences about what they did after searching for health information. Eleven participants (six male and five female) indicated that they “have searched repetitively for the problem” and “have searched for serious illness based on the Web searches for symptoms.” Many participants said that they have even “purchased medicine” based on the online health information.

4. Implications and Future Avenues

Recent research in Human Computer Interaction (HCI) has begun to understand the critical role of emotions in every computer-related activity. Highlighting the importance of studying emotions with respect to technology, Brave & Nass\textsuperscript{32} say that any interface that ignores users’ emotional state or fails to manifest the appropriate emotion can dramatically impede performance. Dufresne et al.\textsuperscript{33} says that development of information systems and services must take into account users’ emotions. The literature reviewed in the paper showed that emotion in Web searching for health information is a scantily addressed area. Also, it is one of the major themes (emotions during searching) emerged in the exploratory study conducted. This gap in the research shows that there is a need to understand emotions in Web searching for health information.

Further, the literature reviewed also showed that, users evaluate online health information based on various design features\textsuperscript{[11]–[18]}. In HCI context, Reeves & Nass\textsuperscript{34} say that, design features have the potential to activate emotional responses. The general tendency among researchers in health information is to focus on the content and not on the design features. Given the crucial role of design features in evaluating online health information, it is important to investigate whether these design features affect users’ emotions. This study is a part of ongoing research on investigating users’ emotions during Web searching for health information provides a useful snapshot of young adults searching behaviour. Building on these initial results, the factors causing the negative emotions during Web searching for health information will be investigated further.
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