Experiences with Web Search on Medical Concerns and Self Diagnosis

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Outline

- Motivation
  - Online Medical Search
  - Cyberchondria
- Study
  - Research Questions
  - Methodology
- Findings
  - Undiagnosed Conditions
  - Diagnosed Conditions
- Implications
Online Medical Search

- Healthcare websites for worried well
  - Provide valuable information, address concerns, etc.

- 80% US adults use search engines to find medical info
  - 75% don’t verify quality (validity, date, etc.)

- Problem: Search engines for diagnostic reasoning
  - Link to pages with alarming content
  - More written about serious than benign explanations
  - Ranking algorithms use click logs; reinforce alarming pages
Online Medical Search

- Challenge: Linking to troubling scenarios in absence of likelihood information
  - Consumers seek confirmation and disconfirmation
  - Search engines relied upon for quality information but perform information retrieval rather than diagnosis
  - Likelihood information not considered in ranking of lists
  - Influence of signs & symptoms on likelihoods not provided
  - Search engines suffer from & fuel biases of judgment: base-rate neglect, availability, confirmation
Cyberchondria

- Unfounded escalation of concerns about common symptomology based on review of search results and literature online

1. Query search engine for [headache]
2. Review results
3. Browse Web pages
4. Query for [caffeine withdrawal] – Medical anxiety

- Previous log analyses - cyberchondria common; lacked qualitative data
Study: Overview & Objectives

- Survey of experiences with Web use for self diagnosis
- Considered *diagnosed* & *undiagnosed* conditions

Research Questions:
- *What are characteristics of Web-based medical diagnosis?*
- *Are these characteristics associated with age or gender?*
- *What are key dependencies among characteristics?*

- Prior studies have not answered these questions
- Self-report data from 500+ volunteers within Microsoft
Methodology

- Survey designed to elicit:
  - Perceptions of online medical information
  - Experiences in searching for this information
  - Influence of the Web on healthcare concerns & interests
- Anonymized. 70 open & closed questions
  - Covered health issues, including medical history & engagement with health professionals
- Five-point scales used to measure frequency:
  
<table>
<thead>
<tr>
<th>Always</th>
<th>Often</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Never</th>
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Findings: Background

- 350 males, 165 females; median age = 36 years
- Most used search engines to find medical information
  - 5-10 medical searches/month - medical domain novices
- 4% self-identified as “hypochondriac”
  - 5 times average number of medical searches
- Subjects had low level of medical anxiety (3 on 10 pt scale)
- 3/4 of subjects searched for medical symptoms
- 2/3 searched for undiagnosed cond. at least once/month
- Subjects generally searched for themselves
  - Women on behalf of relatives more than men (66% vs. 53%)
Findings: Undiagnosed Conditions

<table>
<thead>
<tr>
<th>Question</th>
<th>Group</th>
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<tbody>
<tr>
<td>How often do your Web searches for symptoms / basic medical conditions lead to your review of content on serious illnesses?</td>
<td>% Always or Often</td>
<td>21.1</td>
<td>19.3</td>
<td>25.0</td>
</tr>
<tr>
<td>Has searching for health-related information online ever made you feel more anxious about a perceived medical condition?</td>
<td>% Yes</td>
<td>38.5</td>
<td>35.4</td>
<td>45.2</td>
</tr>
<tr>
<td>Has searching for health-related information online ever made you feel less anxious about a perceived medical condition?</td>
<td>% Yes</td>
<td>50.3</td>
<td>49.6</td>
<td>51.7</td>
</tr>
<tr>
<td>Does searching the Web for health-related information make you behave differently with respect to a perceived medical condition?</td>
<td>% Yes</td>
<td>39.2</td>
<td>38.9</td>
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χ² significance: $p < .05$, $p < .01$

- 20-25% of searchers escalate frequently

- Main factors contributing to anxiety:
  - Mention of serious conditions (64%)
  - Escalatory terms (e.g., grave, fatal) (41%)
  - No benign explanations (36%)

- Main factors reducing anxiety:
  - Authoritative sources (90%)
  - Synthesis from multiple sources (48%)

- Behavioral changes manifest as:
  - Searches for serious concerns increase (61%)
  - Visits to relevant Web sites increase (72%)
  - Engage. w/ medical specialists increase (60%)
Findings: Undiagnosed Conditions

• Conditioning on answers to pivotal questions:
  
  • **RankAsLikelihood (Always-Never):** “If your queries contain medical symptoms, how often do you consider the rank of the Web search results as indicating the likelihood of illnesses, with more likely diseases appearing higher up on the result page(s)?”
  
  • **Hypochondriac (Yes-No):** “Do you think that you are a hypochondriac?”
  
  • **OverThreshold (Yes-No):** “Do you believe that you have ever been in a situation where Web content “put you over the threshold” for scheduling an appointment with a health professional, when you would likely have not sought professional medical attention if you had not reviewed Web content?”
# Findings: Undiagnosed Conditions

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## Findings: Diagnosed Conditions

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<td>Did your use of the Web [for related medical searches] occur solely after your diagnosis?</td>
<td>% Yes</td>
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<td>Did the Web help reassure you?</td>
<td>% Yes</td>
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<td>Did the Web help you understand the terminology or explanation used by the health professional?</td>
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<td>Did the information help you to actively participate in the conversation with the health professional?</td>
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- ~80% used Web to study diagnosed medical conditions
- ~60% informed physician
- ~15% felt uncomfortable bringing their own research to physician

**Physician reaction (from patient’s perspective):**
- 37% happy
- 51% neutral
- 5% discontent or irritated
- 7% could not interpret
**Findings: Diagnosed Conditions**

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Findings: Summary

- Presented findings of survey of participants’ experiences with investigating medical concerns & performing self-diagnosis
- Escalation reported to occur frequently for 20% subjects
- Web increases anxiety (40% people), reduces (50% people)
  - Web can help, but can also cause distress, especially for those that are pre-disposed to anxiety
  - Key marginalizations revealed larger effects
- Web plays a key role in helping patients understand conditions before and after diagnosis
Implications

- Content providers & search engine designers should be aware of their influences on consumers
  - Caution with alarming content linked to common symptoms
  - Additional context (e.g., predispositions, likelihoods, incidence)
  - Dependable ways to investigate medical info online
- Web content facilitates patient-physician interaction
  - Receptiveness to patient research by clinicians
  - Investigate ways to combine patient-driven research and professional advice to improve care provided
- Periodic surveys and analysis with different cohorts
  - Opportunities for ongoing tracking of health experience with web search and browsing
  - Track changes in goals, perceptions, activities, outcomes