
**What Do Internet Users Seek to Know
About Depression From Web Searches?
A Descriptive Study of 21 Million Web Queries**

To the Editor: Depression has become a major public health challenge, making an increasing contribution to the global disability-adjusted life-years measure.¹ However, many individuals with depression are underdiagnosed or untreated,² probably due in part to the stigma attached to psychiatric illness. In light of this reluctance, the Internet may prove to be a widely used tool for patient education and self-help.³

In a 2006 study, about 1 in 5 American users of the Internet had searched online for information on depression, anxiety, stress, or mental health issues in their lifetime.⁴ A number of surveys found increased use of the Internet to obtain health information among people with psychiatric illness.⁵ Besides these survey-based studies, which rely heavily on self-report data and may suffer from response bias, no research has been conducted to date that specifically examines the naturalistic characteristics and patterns of Internet users searching for depression-related information.

Method. Information from a Web search dataset generated by America Online (AOL) research was analyzed. The dataset was obtained by randomly sampling from all AOL users' Web queries from March to May 2006 and consisted of roughly 21 million instances of such queries, collected from about 657,000 users.⁶ This dataset represents approximately 1.5% of the total number of searches

conducted through the AOL networks, whose share of the overall market was about 6.7%.⁷ In response to previous concerns about privacy,⁸ additional measures were taken to replace all possible personal identifiable information from the dataset before undertaking any analysis. The Human Research Ethics Committee for Nonclinical Faculties of the University of Hong Kong approved the ethical aspect of the study protocol.

A keyword matching technique was used to sample all query strings containing the term *depression*. Queries that appeared to be unrelated to depression as a psychiatric disorder were excluded, such as “great depression” or “depression glass.” Text analysis was then used to classify the key groups in the sample. On the basis of the frequencies of the single-, double-, and triple-word phrases found in the search queries, those with a high occurrence (≥ 5 queries) were classified into groups defined by the researchers according to the connotation of the phrases used in the query string. Categories with too few unique users (≥ 10) were not labeled.

Results. We found 3,297 instances of Web queries consisting of the keyword *depression*, generated by 2,040 unique users. About 3 of every 1,000 Web searchers had sought depression-related information. Given an estimate that 7.4 billion Web searches were conducted in May 2006 in the United States,⁷ it can be projected that about 1.16 million (95% CI, 1.12–1.20 million) of those were depression-related.

About 69% of these users had clicked through the result pages, whereas the click-through rate for searches overall was only 53%. In roughly 59% of the depression-related queries, the user had clicked through the items on the first 10 items, that is to say, the first result page, compared with 49% for the total searches. Both observations suggest that the click-through responses of depression-related user queries outperformed those of the general searches. This may imply that Internet users who seek out depression-related information might be more motivated and determined to pursue further facts and knowledge.

Key groups were drawn from the top categories of the Web searches and included (1) general inquiries—depression in general (18.6% of the total instances; 28.0% of the total unique users); (2) how to identify or manage depression—treatment, signs and symptoms, dealing with depression, and research (15.5%; 17.8%); (3) a pharmaceutical company’s Web site, called “Depression Hurts” (7.2%; 10.5%); (4) depression-related psychiatric disorders— anxiety and manic/bipolar depression (5.9%; 7.1%); (5) female and pregnancy-related depression (5.4%; 5.2%); (6) teenage depression (5.1%; 4.9%); and (7) suicide (0.6%; 0.6%). These key groups accounted for 55% (1,814/3,297) of the total instances in the sample and were submitted by 66% (1,343/2,040) of the total number of unique users.

Some observations are worth noting. Besides general inquiries, the largest group of Web queries was about how to identify and manage depression, which consists of concerns about the signs and symptoms of depression, how to treat and deal with it, and searching for related research. This supports the idea that the Internet may be a useful tool for patient education and self-help treatment. The next-largest group was a specific search for a Web site supported by a pharmaceutical company, “Depression Hurts”; however, its click-through rate was only 48%, considerably lower than the other categories. The relatively low click-through rate seems to suggest that Internet users might be more interested in a broader understanding of depression rather than a specific psychiatric treatment. The other major groups of Web queries were about depression-related psychiatric disorders, suicide, and high-risk groups for depression, that is, females, teenagers, and new mothers. It is especially striking that only 30% of the suicide-related Web queries clicked through the first result page, and over 50% clicked on the items ranked 22nd and above (third result page and beyond). This hints that this specific group of Web searchers was very determined to seek

out information related to suicide and depression, but the search returned items that did not satisfy their needs.

This study provides evidence for health promotion campaign organizers to develop programs or Web sites to meet public information requests. Emphasis should be placed on the provision of high-quality and evidence-based content to meet the public need for knowledge about the various ways to manage depression, other associated mental disorders, demographic-specific risk factors, and the connections between depression and other life events, such as pregnancy, or behaviors, such as suicide.

REFERENCES

1. Ustün TB, Ayuso-Mateos JL, Chatterji S, et al. Global burden of depressive disorders in the year 2000. *Br J Psychiatry*. 2004;184(5):386–392.
2. Thornicroft G. Most people with mental illness are not treated. *Lancet*. 2007;370(9590):807–808.
3. Leach LS, Christensen H, Griffiths KM, et al. Websites as a mode of delivering mental health information: perceptions from the Australian public. *Soc Psychiatry Psychiatr Epidemiol*. 2007;42(2):167–172.
4. Fox S. Online Health Search 2006. Pew Internet & American Life Project. October 29, 2006. <http://www.pewinternet.org/Reports/2006/Online-Health-Search-2006.aspx?r=1>. Accessibility verified August 2, 2010.
5. Powell J, Clarke A. Internet information-seeking in mental health: population survey. *Br J Psychiatry*. 2006;189(3):273–277.
6. Pass G, Chowdhury A, Torgeson C. A picture of search. Presented at: 1st International Conference on Scalable Information Systems; May 30–June 1, 2006; Hong Kong.
7. Google sees its US search market share jump a full point in May, marking tenth consecutive monthly gain. ComScore releases May 2006 search engine rankings [press release]. Reston, VA: comScore Networks; June 21, 2006.
8. Barbaro M, Zeller T, Hansell S. A face is exposed for AOL searcher no. 4417749. *New York Times*. August 9, 2006.

King-wa Fu, PhD
kwfu@hku.hk

Paul W. C. Wong, DPsyc (Clinical)
Paul S. F. Yip, PhD

Author affiliations: Journalism and Media Studies Centre (Dr Fu); Department of Social Work and Social Administration (Drs Wong and Yip); and Hong Kong Jockey Club Centre for Suicide Research and Prevention (all authors), The University of Hong Kong, China. **Potential conflict of interest:** None reported. **Funding/support:** None reported. **Previous presentation:** Paper presented at the Conference on Emerging Mode of Communication: Technology Enhanced Interaction; March 26–27, 2009; Hong Kong, China.

doi:10.4088/JCP.09105903blu

© Copyright 2010 Physicians Postgraduate Press, Inc.