Specialized medical search-engines are no better than general search-engines in sourcing consumer information about androgen deficiency

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BACKGROUND: The Internet provides consumers with access to online health information; however, identifying relevant and valid information can be problematic. Our objectives were firstly to investigate the efficiency of search-engines, and then to assess the quality of online information pertaining to androgen deficiency in the ageing male (ADAM). METHODS: Keyword searches were performed on nine search-engines (four general and five medical) to identify website information regarding ADAM. Search-engine efficiency was compared by percentage of relevant websites obtained via each search-engine. The quality of information published on each website was assessed using the DISCERN rating tool. RESULTS: Of 4927 websites searched, 47 (1.44%) and 10 (0.60%) relevant websites were identified by general and medical search-engines respectively. The overall quality of online information on ADAM was poor. The quality of websites retrieved using medical search-engines did not differ significantly from those retrieved by general search-engines. CONCLUSION: Despite the poor quality of online information relating to ADAM, it is evident that medical search-engines are no better than general search-engines in sourcing consumer information relevant to ADAM.

Keywords: ADAM/androgen deficiency/Internet/quality of information

Introduction

The Internet is a continually expanding communications network with more than 530 million users worldwide, accessing an estimated 300 million web pages (Computer Industry Almanac, 2002; accessed on July 13, 2002; Lawrence and Giles, 1998). It provides consumers with continuous access to information presented in a multimedia format. Information once exclusive to health professionals is now readily attainable by anyone with Internet access (Jadad and Gagliardi, 1998).

Internet access to medical information, support networks and the purchase of medications online provides consumers with the opportunity to actively participate in decision-making processes, including screening and treatment procedures, that affect their health outcome (Silberg et al., 1997; Sacchetti et al., 1999; Paulter et al., 2001). Despite the potential benefit of such interactions, concerns remain regarding the quality of information provided on websites (Jadad and Gagliardi, 1998). The deregulated nature of the Internet provides a vehicle for anyone wishing to publish health-related information, evidence-based or anecdotal. Although copyright, libel and privacy laws exist, their interpretation and statutes may often differ between countries (Goudreau, 1999). The Internet represents a liberated medium that operates across geographical borders where national laws become increasingly difficult to enforce and have limited jurisdiction. Therefore without governance the quality of online information remains largely uncontrolled and has the potential to negatively influence consumer health outcomes.

In the pursuit of online health information, consumers face the concurrent challenges of finding the information and of determining its quality. Search-engines provide an index of the Internet, allowing an easy and efficient means of accessing and filtering vast amounts of information (Tay et al., 1998; Wukovitz, 2001). Although hundreds of general search-engines are available, finding relevant and valid health information remains difficult due to the structure and size of the Internet. Specialized medical search-engines have been developed with the aim to make searching easier by identifying websites, according to established criteria, to provide a specific index with medical or healthcare content (Wukovitz, 2001). However, even the most efficient search-engine cannot assess the validity and quality of the information, leaving the consumer to evaluate information independently.

*Professor C.A.Silagy contributed significantly to the design of this project but died prior to its completion. He was Director of the Monash Institute of Health Services Research.
Quality of information-rating tools, codes and logos have been developed to provide consumers with the opportunity to identify and appraise the quality of online information (Jadad and Gagliardi, 1998). The majority of these tools however, are not specifically designed to evaluate medical information. Most are concerned with the design and presentation of information with few containing validated criteria for quality assessment of that information (Jadad and Gagliardi, 1998). Tools such as DISCERN (Charnock et al., 1999) and the Health Summit Working Group IQ tool (Health Summit Working Group, 2001, accessed on December 11, 2001) have been developed to specifically appraise the quality of medical website information (Charnock et al., 1999), allowing the consumer to differentiate between websites containing information they can believe and websites with invalid information.

Although studies assessing Internet use and the quality of information have been performed on various health topics (Impicciatore et al., 1997; Graber et al., 1999; Latthe et al., 1999, 2000; Sacchetti et al., 1999; Okamura et al., 2002) none has assessed the nature of information regarding androgen deficiency in the ageing male (ADAM). We aimed to compare the search efficiency and the quality of the information available between general search and medical search-engines. We also aimed to determine whether any website characteristics were associated with a higher quality of website information. We chose to assess this health topic (i.e. ADAM) because of the current debate surrounding its physiological validity within the medical community and increasing consumer interest regarding treatment regimes. We also hypothesized that it is a topic that consumers may choose to investigate with the anonymity of the Internet.

Materials and methods
We performed a keyword search on the Internet between November, 2001 and February, 2002 to identify websites providing relevant information about ADAM. This search was performed using four general search-engines (AltaVista, Excite, Google and Yahoo) and five medical search-engines [DrKoop, HealthInsite, Health on the Net (HON), NHSDirect (NHS) and National Library of Medicine (NLM Medline Plus)]. Eighteen keywords, or phrases, and two ‘Boolean searches’ relating to ADAM were used (Table I). Keywords were searched across all nine search-engines while the two Boolean searches were used only when searching the general search-engines, as the medical search-engines did not have the capacity for Boolean logic. The objective of this search strategy was to evaluate the efficiency of the search-engine rather than the online health seeker. None of the searches was restricted in the form of language, file format, domain or occurrence in the page. We examined the first 50 websites from each search keyword query because most people rarely examine beyond 50 websites when performing an Internet search (Sacchetti et al., 1999). When reviewing search results from Yahoo, only the websites returned from the Yahoo directory were examined because the Yahoo search combines its directory with an index supplied by Google (SearchEngineWatch, 2002; accessed May 23, 2002).

Websites were considered to be relevant if they provided sufficient information to answer the question, “How is ADAM recognized as a...
medical condition and what treatment regimes are available?’’. In particular we sought information describing the background of the condition, its symptoms, diagnosis and treatment options. Relevant resources included medical or general information websites, online journals and news reports. We excluded websites featuring information on hypogonadism as it is considered a condition independent of ADAM (Petak et al., 2002). Websites were excluded from the analysis if they were repeated under a different URL, were a ‘dead’ link, the server was unavailable or had password requirements, and those in a language other than English.

The quality of website information was assessed using the DISCERN quality assessment tool (Charnock et al., 1999) The DISCERN quality assessment tool rates the quality of website information on a five point Likert scale (1 = ‘‘the publication is ‘poor’ quality and has serious shortcomings and is not a useful or appropriate source of information about treatment choices’’, 5 = ‘‘the publication is ‘good’ quality and is a useful and appropriate source of information about treatment choices’’) (Charnock, 1998). Whilst originally validated to assess written patient information with respect to treatment options, it has since been modified for consumer use in validating health information on the Internet.

Overall search-engine efficiency was measured as the percentage of relevant websites identified by each search-engine from the total number of websites identified for each search query. The efficiency of search-engines in retrieval of quality website information was assessed in addition to the presence and absence of predetermined website characteristics including target audience, authorship and evidence citation to assess if these easily identified criteria were assessed in addition to the presence and absence of predetermined website characteristics including target audience, authorship and evidence citation to assess if these easily identified criteria were associated with a higher quality of information rating. Analysis of all statistical parameters was performed using a one-tailed Mann–Whitney U-test.

**Results**

We reviewed 4927 websites of which 52 (1.06%) non-repeated websites were identified as containing information relevant to ADAM. A total of 47 (1.44%) of 3267 and 10 (0.60%) of 1660 websites were located through general and medical search-engines respectively. Five websites were identified on both types of search-engines. We determined that general search-engines were significantly more efficient at retrieving websites relevant to the topic than medical specific search-engines ($P = 0.007$). Google was identified as the most efficient general search-engine, generating 4.1% relevant websites whilst HON was the most efficient medical search-engine, generating 1.6% relevant websites (Table II).

Of the 52 websites identified, four had a DISCERN score equal ≥3, out of a possible 5. Using the DISCERN analysis it was determined that the quality of website information available on ADAM was of a poor standard, the mean (± SD) quality score for all websites being 1.7 ± 0.66. The mean quality scores for websites retrieved on general and medical search-engines were 1.6 ± 0.56 and 2.0 ± 0.94 respectively; however, the quality of website information retrieved using general search-engines did not differ significantly from those retrieved on medical search-engines ($P = 0.14$).

The current evidence underpinning the condition of ADAM is poor. There are no recognized clinical guidelines rationalizing a standard diagnosis or treatment procedure for ADAM. Despite this lack of evidence, 19 of the 52 websites recommended treatment with testosterone replacement therapy (TRT), two opposed the use of TRT, 24 provided neutral information relating the benefits and risks associated with TRT and seven recommended alternative therapies. Evidence supporting website recommendations were cited in seven of the 19 websites recommending TRT, seven of the 24 providing neutral information and two of the seven websites recommending alternate therapies. No evidence was cited in the two websites opposing TRT.

The website characteristics identified, which, when present, resulted in a significantly better quality of website information as assessed by DISCERN, included websites with a ‘‘target group identified’’, ‘‘links to the website from other websites’’ and ‘‘citation of the evidence’’ (Table III). Approval of website information from central organizations such as HON attempt to guide consumers to websites with a better quality of information. This study identified that there was no significant difference between websites with external approval and those without ($P = 0.21$) (Table III).

**Discussion**

This study demonstrates that although the quality of websites about ADAM identified by general and medical search-engines is similar, general search-engines were significantly more efficient in identifying websites with relevant information

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**Table III. Parameters of website quality scores relating to presence/absence of website characteristics**

<table>
<thead>
<tr>
<th>Website Characteristic</th>
<th>Presence of website characteristic</th>
<th>Absence of website characteristic</th>
<th>Quality score in sites with characteristic</th>
<th>Quality score in sites without characteristic</th>
<th>P-value for the difference between quality scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target group identified</td>
<td>16</td>
<td>36</td>
<td>2.06 ± 0.77</td>
<td>1.55 ± 0.55</td>
<td>0.01*</td>
</tr>
<tr>
<td>Sponsorship identified</td>
<td>24</td>
<td>28</td>
<td>1.87 ± 0.79</td>
<td>1.57 ± 0.50</td>
<td>(0.09) NS</td>
</tr>
<tr>
<td>Membership available to users</td>
<td>13</td>
<td>39</td>
<td>1.84 ± 0.68</td>
<td>1.66 ± 0.66</td>
<td>NS</td>
</tr>
<tr>
<td>Direct service available to users</td>
<td>15</td>
<td>37</td>
<td>1.73 ± 0.70</td>
<td>1.70 ± 0.66</td>
<td>NS</td>
</tr>
<tr>
<td>Links to the website from other websites</td>
<td>33</td>
<td>19</td>
<td>1.87 ± 0.64</td>
<td>1.42 ± 0.60</td>
<td>0.004*</td>
</tr>
<tr>
<td>Currency of information</td>
<td>37</td>
<td>15</td>
<td>1.78 ± 0.71</td>
<td>1.53 ± 0.51</td>
<td>NS</td>
</tr>
<tr>
<td>Authorship recognized</td>
<td>25</td>
<td>27</td>
<td>1.88 ± 0.72</td>
<td>1.55 ± 0.57</td>
<td>(0.06) NS</td>
</tr>
<tr>
<td>Referral links to other resources listed</td>
<td>29</td>
<td>23</td>
<td>1.75 ± 0.63</td>
<td>1.65 ± 0.71</td>
<td>NS</td>
</tr>
<tr>
<td>Citation of the evidence</td>
<td>16</td>
<td>36</td>
<td>2.18 ± 0.75</td>
<td>1.50 ± 0.50</td>
<td>0.001*</td>
</tr>
<tr>
<td>Approval of the website from an external source</td>
<td>15</td>
<td>37</td>
<td>1.80 ± 0.56</td>
<td>1.67 ± 0.70</td>
<td>NS</td>
</tr>
</tbody>
</table>

Values are total number of websites with website characteristics present/absent and mean ± SD DISCERN quality score.

*P < 0.05
In conclusion, although the quality of online information regarding ADAM is shown to be poor, it is apparent that medical search-engines are no better than general search-engines in sourcing for such information. Approval from external bodies does not necessarily assure a better quality of website information whilst current quality assessment tools can only raise consumer awareness regarding website information. Future tools must evaluate whether treatment recommendations are supported by current evidence in the next step to aid consumers in their search for quality online information.

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References


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