

# Arthritis information on the Web and its influence on patients and physicians: A Korean study

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## **Abstract**

### **Objectives**

*This study was conducted to assess the contents of Web-sourced arthritis information and to determine its influence on arthritis patients and medical practice in Korea.*

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### **Methods**

*An electronic search was conducted using the word "arthritis". Web sites found in the Korean language were critically assessed according to authorship, the type of publication, contents, financial interests, and the type of financial interest. Questionnaire surveys of arthritis patients and rheumatologists were performed to appraise the impact of the arthritis information on the Web.*

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### **Results**

*Among 138 web sites retrieved, 18.8% were classified as advertisement and 44.9% as having financial interests, such as the promotion of products or services. Among 257 arthritis patients surveyed, 28% reported that they searched for arthritis information on the web, and the parameters significantly associated with Internet searching were a younger age, being employed, and having a higher income and a higher education. While the difference in ratings regarding the accuracy of Web-sourced arthritis information between physicians and patients was not significant, only 16.1% of physicians responded that their patients understand the Internet content accurately. Physicians also tended to reply more negatively about the contents and the influence of Web-sourced arthritis information than patients.*

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### **Conclusion**

*Analysis of Korean arthritis web sites revealed many sites with financial interests. There was also a discrepancy found between patients and physicians regarding the impact of Web-sourced arthritis information on the doctor-patient relationship. Because the impact of the Internet on health care is expected to increase, physicians need to be prepared to help patients benefit from information obtained from the Internet.*

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### **Key words**

Internet, arthritis, information search, impact.

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## Introduction

The prompt acquisition of medical information from the Internet by patients is very likely to affect current medical practice, and a pressing need to evaluate the relevance and credibility of such information has recently surfaced. Although the Internet offers an opportunity to improve medical education, patient records and communication between professionals and patients, it is also likely that patients will increasingly present their doctors with information obtained from web sites with inaccurate contents.

Despite the situation that the Internet has become a major source of health information for patients, online information does not go through any peer review process, and some previous reports have expressed concern on this point. For example, unjustified claims of disease prevention, treatment, and cure were found to be prevalent on commercial Internet sites devoted to cancer cures through herbal supplementation (1). In a recent web site survey from North America, entering the words "rheumatoid arthritis (RA)" yielded 5380 hits, many of which involved industrial and commercial organizations (2). Another report showed that web sites featuring RA that were found using a standard web search engine were very likely to have a profit motive, or to represent one person's view of a disease, propounding some unconventional and alternative treatment as their primary message (3).

Nevertheless, the practice by patients of searching for medical information through the Internet is expected to increase every year, and it is imperative that its impact be studied systematically. Few reports have examined this matter with respect to arthritis patients. The percentage of Internet users among the general population in South Korea ranks third in the world, with a user rate of 53% (data from Korea Network Information Center, 2002, <http://stat.nic.or.kr>). In addition, Korea ranks first in terms of growth in the number of web sites per country code domain. This situation presents an ideal background for a survey about the influence of Web-sourced information on patients and medical practice. The objectives of this

study were: 1) to assess the nature of the arthritis information available on the Korean web sites, and 2) to delineate the influence of Web-sourced arthritis information on the behaviour of patients, on medical practice and on the doctor-patient relationship.

## Patients and methods

### Web search

An electronic search was conducted using 5 major search engines in Korea; Yahoo Korea, Lycos Korea, Empas, Daum, and Naver Korea in November 2002. The word "arthritis" was entered without restrictions or filters. Only Korean language sites were included. Web sites instead of web pages were included because Web page searches often led to an overwhelming number of search results, which is probably not very practical for patients performing real-life searches. For example, entering the key word "arthritis" in Yahoo Korea produced a search result extending to 55,290 Web pages. The web sites obtained were critically assessed by two authors, and discrepancies were resolved by consensus. The criteria used for analysis were those delineated by Suarez-Almazor *et al.* (3), with some modifications. Items in the assessment included: 1) authorship (commercial, universities, clinics, or individual); 2) the type of publication (advertisement, information, or on-line consultation); 3) the contents (general information, conventional therapy, or alternative therapy); 4) financial interests; and 5) the type of financial interest (primarily to promote products, primarily to promote services, seeking paid memberships). Because it was not possible for us to accurately mirror the patients' point of view regarding the relevance of a given web site, we only counted those sites that did not include the term "arthritis" anywhere on the main page as 'irrelevant'. Publication type was defined as follows: advertisements were defined as sites that promote specific merchandise, no matter whether they contain information on arthritis or not, whereas information sites were defined as sites that did contain information on arthritis and did not promote any form of merchandise. Sites with financial interests were defined as those primari-

ly promoting merchandise, services, or paid memberships. In this regard, some of the sites that were initially classified as informative were later considered to have financial interests.

#### Patients

Over a period of 3 months, we conducted a survey of consecutive patients routinely attending two rheumatology out-patient clinics affiliated to a medical college. Patients were eligible if they could follow the structured interview conducted by a trained nurse, and if their rheumatologic diagnosis fell into one of the following categories: 1) rheumatoid arthritis, 2) osteoarthritis, 3) ankylosing spondylitis, 4) gouty arthritis, or 5) some other rheumatologic disease the main complaint of which was arthritis. A 15-minute questionnaire-based interview was conducted at a clinic by a trained nurse after an out-patient visit. Respondents first answered questions designed to elicit demographic information, such as educational level, income, and marital status. The rheumatologic diagnosis and the duration of the rheumatologic illness was confirmed during a review of the subject's medical record.

Patients were then asked whether they had access to the Internet and, if they did, whether they actively searched for information on arthritis by themselves (Table I). The patient's opinion of the accuracy and fairness of the information on the Web was requested. The influence of the Internet on issues such as the patient's ability to cope with illness, the doctor-patient relationship and trust in physicians were asked. Finally, the impact of Web-sourced arthritis information on health care use was requested by asking the patient whether he/she: discussed the information obtained from the Internet with his/her physician, purchased any arthritis remedies posted on the Web, visited any physicians posted on the Web, asked his/her physician for treatment mentioned on the Web, and whether information on the Web ever persuaded the patient to give up a prescribed anti-arthritis treatment.

#### Physicians

A questionnaire was e-mailed to all Korean rheumatologists, using a mailing list obtained from the Korean

**Table I.** The questionnaire regarding Internet use given to patients (translated into English).

1.	Do you have access to the Internet ?	Yes/No
2.	During the last month how frequently did you log onto the Internet ?	
	1) Daily	
	2) 2-6 times per week	
	3) Once a week	
	4) 2-3 times per month	
	5) One time per month	
	6) Less than one time per month	
3.	Have you ever searched for arthritis information by yourself ?	Yes/No
4.	What specific category of arthritis information do you look for on the Web ?	
	1) General information	
	2) Therapeutics	
	3) Exercise	
	4) Diet	
	5) Others, specify	
5.	Is there any specific arthritis website that you bookmark and regularly visit ?	Yes/No
	If Yes, please specify.	
6.	How do you rate the Web-sourced arthritis information in terms of the following ?	
	Is it fair?	Yes/No
	Is it accurate ?	Yes/No
	How does it affect patients' coping with illness ?	Better/same/worse
	How does it affect trust in the physician ?	Better/same/worse
	How does it affect the doctor-patient relationship ?	Better/same/worse
7.	Do you discuss the arthritis information obtained on the Web with your physicians ?	Yes/No
8.	Have you ever paid for on-line arthritis information ?	Yes/No
9.	Have you ever visited an arthritis doctor posted on the Web ?	Yes/No
10.	Have you ever purchased an arthritis remedy posted on the Web ?	Yes/No
11.	Have you ever asked your physician for an arthritis treatment posted on the Web ?	Yes/No
12.	Have you ever stopped using your regular treatment due to arthritis information posted on the Web ?	Yes/No

Rheumatology Association. The same questionnaire was mailed by means of a stamped addressed envelope 1 and 4 weeks later to non-responders. The questionnaire contained questions regarding the physician's demographics, work setting, his/her opinion about the accuracy of arthritis information on the Web, the accuracy of their patients' understanding of this information, and the influence of Web-sourced arthritis information on medical practice and on the doctor-patient relationship (Table II).

#### Statistics

Demographic factors influencing the arthritis information search on the Internet were analyzed using the SPSS statistical package (version 8.0.; SPSS, Chicago, IL). Comparisons were made between Internet searchers and non-searchers using the Mann-Whitney U test for continuous variables and the chi-square test for categorical variables.

#### Results

##### Characteristics of the Web sites

Entering the word "arthritis" into the 5

major Korean search engines resulted in 183 web sites, of which 15 were inaccessible and 30 were irrelevant. The remaining 138 (75.4%) sites were scrutinized according to the criteria specified in 'Materials and Methods' (Table III). Forty-nine (35.5%) of these sites were posted by doctors working at private clinics and 29 (21%) were posted by commercial organizations. It is worth noting that herb doctors accounted for 18.8% of the authorship. Twenty-six sites (18.8%) were considered as advertisements for direct product promotion. Sixty-two (44.9%) sites were considered to have financial interests, among which 56.5% directly promoted their services, 41.9% directly promoted their products, and 1.6% asked for membership payments for access. In terms of the content of the information; 66.3% were of general arthritis information, 43% involved alternative therapy, and 22.4% conventional therapy.

##### Influence of Web-sourced information on patients

A total of 280 patients were surveyed;

**Table II.** Questionnaire regarding Internet use given to physicians (translated into English).

1.	Are you interested in web sourced arthritis information?	Yes/No
2.	Are you posting an arthritis web site by yourself now?	Yes/No
3.	How do you rate the web sourced arthritis information in terms of the following?	
	Is it accurate?	Yes/No
	Do patients understand the contents of it accurately?	Yes/No
	How does it affect patients' coping with illness?	Better/same/worse
	How does it affect trust in the physician?	Better/same/worse
	How does it affect the doctor-patient relationship?	Better/same/worse
	Is it helpful for patient care?	Yes/No
4.	Have you ever experienced your patients asking about Web-sourced arthritis information?	Yes/No
5.	Have you ever experienced your patients' transferring to other health care service due to web sourced arthritis information?	Yes/No
6.	Have you ever experienced your patients' distrusting regular treatment due to web sourced arthritis information?	Yes/No

among these 23 were excluded because they refused to answer the questionnaire. The demographics of the 257 patients included are shown in Table IV: 174 (67.7%) patients were female; the mean age of the participants was 52.9 (range 15-87), and the mean duration of arthritis was 7.5 years (range 0.1-28). About 20% of the patients had finished college, and a similar proportion of patients had an annual household income above the Korean standard (about US \$30,000).

165 (64.2%) patients responded that they had access to the Internet, and among these 72 (44%) reported that they had actively searched for arthritis information on the Web themselves. This represented 28% of the total patients surveyed. More than half of these patients reported logging onto the Internet more than twice a week. Among the demographic factors, younger age, being employed, having a higher income and a higher education were all significantly associated with Internet searches for arthritis information.

These 72 Internet users were questioned further about their opinion on Web-sourced arthritis information. To the question: "What specific category of arthritis information do you look for on the Web?" 65.3% reported general information on arthritis, 36.1%, a cure for arthritis, 25%, exercise for arthritis and 15.3%, diet for arthritis. Twenty-one patients (30.6%) reported 'bookmarking' and regularly visiting a specific arthritis web site. These included 17 sites posted by a university or private arthritis clinic, 4 by an arthritis patient group (rheumatoid arthritis sup-

port group, ankylosing spondylitis support group, lupus support group, and arthritis exercise group), and 1 by an herb doctor.

The patients' opinions regarding Web-sourced arthritis information were as follows: fair – 68.1%; accurate – 58.3%; helps me to better cope with my illness – 61.1%; leads to the same or more trust in my physician – 98.6%; does not diminish or else has a positive influence on the doctor-patient relationship – 98.6% (Table V). However, only 29% of patients who search the Web reported that they discussed the information obtained with their physician. The impact of the information obtained on the health seeking behaviour of patients were found to be as follows: paid for on-line information, 5.6%; visited the doctor posted on the web, 22.2%; purchased the arthritis remedy posted on the web, 8.3%; stopped current treatment due to arthritis information on the web, 7.5%; and asked the physician for the treatment posted on the web, 1.4%.

#### *Influence of Web-sourced information on rheumatologists*

Eight-four rheumatologists were surveyed, and 56 (66.7%) responded. The majority of the responders (67.9%) worked at university-affiliated hospitals. Thirty-five (62.5%) responded that they were interested in the arthritis information furnished on the Web. 17 (30.4%) reported that they were involved in an arthritis web site themselves.

The physicians' opinions regarding Web-sourced arthritis information were as follows: accurate – 55.4%; patients

**Table III.** Characteristics of Korean arthritis Web sites [n = 138 (%)].

<i>Category of authorship</i>	
Doctors in clinics	49 (35.5)
Commercial organizations	29 (21)
Herb doctors	26 (18.8)
Universities	21 (15.2)
Patient support groups	7 (5.1)
Individuals	3 (2.2)
Pharmacists	1 (1.4)
Unknown	2 (0.7)
<i>Type of publication</i>	
Information	111 (80.4)
Advertisement	26 (18.8)
On-line consultation	1 (0.7)
<i>Main type of information*</i>	
General	71 (66.3)
Alternative therapy	46 (43)
Conventional therapy	24 (22.4)
Service provided in the clinic	7 (6.5)
<i>Date of posting</i>	
Present	117 (84.8)
Absent	21 (15.2)
<i>Financial interest</i>	
Present	62 (44.9)
Absent	76 (55.1)
<i>Type of financial interest</i>	
Direct promotion of service	35 (56.5)
Direct promotion of products	26 (41.9)
Paid membership	1 (1.6)

\* Because of multiple answers, the numbers do not sum to the total shown.

understand the content accurately – 16.1%; helps patients to better cope with their illness – 42.9%; leads to more or the same trust in physician – 57.2%; has no impact or else has a positive impact on the doctor-patient relationship – 73.2%; helpful for patient care – 28.6% (Table V). Physicians responded more negatively regarding the influence of Web-sourced arthritis information on the patients' ability to cope with their illness and on the doctor-patient relationship. Of the 56 responders, 94.6% reported that they had had experience with patients asking about arthritis information obtained on the Internet. To questions about the impact of the information available on their medical practice, they answered as follows: patients' transferring to another health care service because of Web-sourced information – 46.4%; and patients' distrusting the current treatment due to Web-sourced information – 39.3%.

#### **Discussion**

The development of electronic infor-

mation technologies has significantly affected knowledge transfer, and the field of medicine is not an exception. Current surveys show that it is possible to use the Internet not only to exchange information among health care professionals for better patient care, but also to deliver medical information to its target audience and to influence the way a disease is self-managed (4, 5). However, the distribution of inaccurate, misleading or false information through the Web has been of considerable concern. In a study that compared the quality of information on non-commercial and commercial web sites on chronic obstructive lung disease, non-commercial websites were found to provide higher quality information, including simple preventive measures (6). Sites that do contain educational material are not without problems, however. In an analysis of educational Web sites for asthma, the educational material posted was found to contain many accessibility barriers, to be highly variable in quality and content, and to make little use of technology, and thus failed to meet the information needs of patients (7). In line with previous reports, an analysis of Korean web sites showed that there are considerable numbers of commercial sites directly promoting unapproved remedies for arthritis. It was noteworthy, however, that compared to reports from North America and Europe, doctors in private clinics outnumbered commercial organizations in terms of authorship of arthritis web sites in Korea. This might stem from the different health care system offered in Korea. First of all, most health care is provided by the private sector in Korea. This situation, together with a law that prohibits doctors from advertising their practice in the media, has probably persuaded doctors to advertise their practices on the Web. Secondly, because the Korean health care system does not pose any restrictions on 'shopping around' for doctors, patients may use on-line information as a guide to select their physician, which would increase the pressure on physicians to set up a web site. Our study thus shows that the Internet can serve as an uncensored medium for advertising a medical practice. It can be criticized that we did not analyze for-

**Table IV.** Demographic characteristics of the study patients.

	Total (257)	Internet Search	
		Yes (72)	No (185)
Age, years (mean $\pm$ SD)	52.9 $\pm$ 15.1	39.3 $\pm$ 10.9*	58 $\pm$ 13.1
Sex, female (%)	67.7	60	70.7
Marital status, married (%)	72	81.4	68.5
Occupation, yes (%)	35.5	50*	30.1
Education (%)*			
6 years	31.3	4.3	41.8
6-12 years	49.6	58	46.3
12 years	19.1	37.7	11.9
Household income/year*			
\$ 10,000	30.8	9	39.3
\$ 10 – 30,000	50	58.2	46.8
\$ 30 – 50,000	15.0	23.9	11.6
\$ 50,000	4.2	9	2.3
Duration of arthritis			
Mean $\pm$ SD	7.54 $\pm$ 9.1	4.7 $\pm$ 5.6	8.6 $\pm$ 9.9

\*  $p < 0.01$  for the comparison between the groups doing and not doing the Internet search.

**Table V.** Opinions about the Web-sourced arthritis information and the impact of information searching.

	Patients (n = 72)		Rheumatologists (n = 56)	
	No.	%	No.	%
<i>Accuracy</i>				
Yes	42	58.3	31	55.4
No	30	41.7	22	39.3
No response			3	5.4
<i>Patients understand the contents accurately</i>				
Yes	-	-	9	16.1
No	-	-	45	80.4
no response			2	3.6
<i>Helpful for patient care</i>				
Yes	-	-	16	28.6
No	-	-	39	69.6
No response			1	1.8
<i>Coping with illness*</i>				
better	44	61.1	24	42.9
Same	26	36.1	18	32.1
Worse	2	2.8	12	21.4
No response			2	3.6
<i>Trust in physicians*</i>				
More	27	37.5	8	14.3
Same	44	61.1	24	42.9
Less	1	1.4	21	37.5
No response			3	5.4
<i>Impact on patient-physician relationship*</i>				
Better	24	33.3	5	8.9
Same	47	65.3	36	64.3
Worse	1	1.4	12	21.4
No response			3	5.4

\* $p < 0.001$  for the comparison between patients and physicians

eign language web sites on arthritis, including English language sites, resulting in an inaccurate reflection of what our patients find in real life. In a limited survey of our patients who reported searching for arthritis information on

the Internet, however, only one patient among 20 (5%) stated that he searched for foreign language web sites on arthritis. Although the patients who use the Internet represent the more educated of our patients surveyed, we believe that

searching through foreign language web sites for arthritis information is not common among Korean patients.

In the second part of our study, we explored the extent of Web-sourced information use among our arthritis patients and its influence on their perceptions and behaviour. The usage rate of Web-sourced information varies significantly according to the patient's demographics and disease state. In a US study which evaluated Internet use among orthopaedic patients in a general orthopaedic practice, 20% were found to have used the Internet to research their orthopaedic diagnosis; the search rates were found to be lowest for patients with arthritis (8). On the other hand, in a similar setting in England 52.0% reported obtaining medical information from the Internet, and 12.3% researched their particular orthopaedic condition (9). Similarly to our findings, in a recent report from a rheumatology clinic in the UK, 27% of arthritis patients were found to search the Internet for medical information (10). Notably, many patients found it easier than asking their physicians. It is of interest that rheumatologists' replies about the content and the influence of Web-sourced arthritis information were more negative than those of the patients in our study. Few studies have compared the opinions of patients regarding Internet health information with those of physicians. In such a survey of cancer patients and oncologists conducted in Canada, more than 90% of oncologists thought that it was difficult for their patients to understand and interpret medical information in the media or on the Internet correctly (11). This report also showed that physicians tended to have a more negative opinion about the impact of information searching on the patient-physician relationship (20.8% of patients versus 7.9% of physicians said that information from the Web had a positive impact on the patient-physician relationship).

Many reports suggest that patients are reasonably satisfied with on-line health information (12-15). For example, a survey of internal medicine practices reported that 60% of patients felt that

the information on the Internet was "the same as" or "better than" information obtained from their doctors. Another study showed that doctors believe patients benefit from Internet use, which suggests that some of the stated risks of information searching through the Web may have been exaggerated (16). However, in view of the number of reports that show widespread inaccuracies in on-line health information, the overwhelmingly positive appraisal made by patients may well be a cause for concern.

Our results show that the impact of Web-sourced arthritis information has not been pervasive enough (as yet) to change the patients' health care use significantly, but it is of note that as many as 22% had visited a doctor posted on the Web. It may be only a matter of time before the Internet has a considerable impact on patient health care use. Thus, it is urgently required that physicians be prepared to assist patients in getting appropriate medical information from the Internet. The Japan Internet Medical Association (JIMA) for example, was founded by medical professionals, lawyers, researchers, consumer representatives, patients and their families, and aims at establishing a framework for medical Internet usage (17). Another way to inform Web browsing patients of the quality of medical information on the Web is through a formal certification process, such as the one provided by the Health on the Net code of conduct (HONcode) for medical and health web sites. HONcode principles include authority, complementarity, confidentiality, attribution, justifiability, transparency of authorship/sponsorship/advertising & editorial policy (more information in more than 20 languages is available at <http://www.hon.ch>). Unfortunately none of the Korean web sites for the current study has been certified by HONcode yet. Searching for health information on the Internet is bound to increase globally, as so therefore is the potential for misleading or deceptive advertising. It cannot be denied that the key to patient empowerment lies in the hands of medical professionals.

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