

Assessment of Allergic Rhinitis Websites in Korea

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Objectives. The internet has become an important source of medical information and a great amount of information related to allergic rhinitis (AR) is available on the internet. However, the quality of this information is still a matter of debate. Therefore, this study was conducted to assess the AR-related information on Korean websites.

Methods. The key word “allergic rhinitis” was entered into 4 popular search engines, and this led to identifying 40 websites. After being categorized according to authorship, the informational value of these websites was evaluated using 4 different assessment tools such as the Journal of the American Medical Association (JAMA) benchmarks, the DISCERN questionnaire, the Allergic Rhinitis and its Impact on Asthma (ARIA) 2008 Update and the Health On the Net (HON) code.

Results. The 40 websites containing AR-related information were categorized according to their authorship as Western physician: 20, Oriental physician: 14, commercial: 1, and others: 5. The mean citation frequencies of the JAMA benchmarks and the ARIA 2008 Update concepts was 1.23 out of 4 and 4.33 out of 8, respectively, while the mean DISCERN score was 1.92 out of 5. When the websites were evaluated based on the type of authorship, the mean citation frequencies of the ARIA 2008 Update concepts were Western physician: 5.35, Oriental physician: 2.64. Additionally, three websites authored by Western physicians and 13 authored by Oriental physicians contained unreliable information. Among these 16 websites, only 3 websites met the requirements for the HON code “Justification”.

Conclusion. AR-related information available on Korean websites is of variable quality and not all of the information provided is justifiable. Thus, performing surveillance of the medical information on these websites is necessary. Furthermore, common criteria that can be used to evaluate the websites created by both Western and Oriental physicians are also needed.

Key Words. Internet, Allergic rhinitis

INTRODUCTION

There are many advantages to the internet such as easy accessibility and mutual communication, and so it has become an important source of information. In 2008, 1,600 million people world-

wide and 35 million people in Korea were thought to have used the internet as an information resource (1, 2). There are currently over one million domains registered in Korea (2) and the number is increasing by the day. Likewise, the spread of medical information has been increasing through the internet. As a result, medical information that was previously difficult to access is now widely available to many people.

However, the quality of the available medical information on these websites is still a matter of debate. As a result, web users have been warned of the possibility of receiving misleading or inaccurate medical information from websites (3). Indeed, many studies have been performed to assess the quality of the medical

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information presented in websites. Based on those studies, the Journal of the American Medical Association (JAMA) benchmarks (4), the Health On the Net (HON) code (5) and the DISCERN questionnaire (6) have been suggested as criteria for assessing the quality of websites.

Studies have been conducted to evaluate the quality of the medical information on several types of diseases. However, not many studies have been conducted to assess the quality of the information related to allergic rhinitis (AR). This current study was conducted to assess the quality of Korean websites that contain AR-related information.

MATERIALS AND METHODS

The four most commonly used search engines in Korea were adopted: Naver (www.naver.com), Daum (www.daum.net), Yahoo Korea (www.yahoo.co.kr), and Google Korea (www.google.co.kr). The search term “allergic rhinitis” was entered in the Korean language, and this resulted in obtaining a list of website addresses. We adopted the first 10 sites from each search engine in the order of the websites’ popularity. And duplicated websites were excluded. We then accessed these websites between November 2008 and January 2009. The authorship, the basic information, the informational value, and the information’s justifiability (defined below) were evaluated.

The websites were usually created by Western physicians, Ori-

ental physicians or commercial agencies. Accordingly, the authorship was categorized into 4 groups (7): 1) A Western physician, which indicates a registered medical practitioner who was certified by a Western medical university, 2) An Oriental physician, which indicates a practitioner of traditional Oriental medicine who was certified by a Oriental Medical university, 3) commercial, which indicates an author or authors in the marketing industry for selling medications or devices for AR, and 4) others, which indicates individuals or organizations not belonging to any of the previous categories.

JAMA benchmarks (4) were used to assess the basic information provided on the websites, and these benchmarks consisted of the following 4 concepts: 1) authorship, for which the authors and their contributors, their affiliations and their relevant credentials should be provided in the websites, 2) attribution, which requires references and sources for all the contents to be clearly listed and all the relevant copyright information to be noted in the websites, 3) disclosure, meaning that the website “ownership” should be prominently and fully disclosed, as well as any sponsorship, advertising, underwriting, commercial funding arrangements or support and any other potential conflicts of interest, and last 4) currency, the dates when the contents were posted or updated on the websites.

DISCERN (6), as proposed by the British Library, was used to judge the quality of the health information. DISCERN consists of 16 questions (Table 1), and each of them are rated on a 5-point scale. The rating scale ranged from 1=No (that is, the criterion is

Table 1. Sixteen questions of the DISCERN questionnaire and the score by authorship

DISCERN question	Mean score			
	Western physician (n=20)	Oriental physician (n=14)	Commercial (n=1)	Others (n=5)
1. Are the aims clear?	4.50±0.89	4.86±0.53	5.00	4.60±0.89
2. Does it achieve its aims?	4.15±1.04	2.21±1.31	5.00	3.40±1.52
3. Is it relevant?	4.15±1.04	2.21±1.31	5.00	3.40±1.52
4. Is it clear what sources of information were used to compile the publication (other than the author or producer)?	0	0	0	1.00±2.24
5. Is it clear when the information used or reported in the publication was produced?	1.00±2.05	0.71±1.82	0	3.00±2.74
6. Is it balanced and unbiased?	3.70±0.73	2.14±0.53	4.00	3.80±1.10
7. Does it provide details of additional sources of support and information?	0	0	0	1.00±2.24
8. Does it refer to areas of uncertainty?	0	0	0	0
9. Does it describe how each treatment works?	3.05±2.19	0.86±0.36	5.00	2.80±2.28
10. Does it describe the benefits of each treatment?	2.30±2.18	2.14±2.07	3.00	1.80±1.64
11. Does it describe the risks of each treatment?	2.40±2.09	0.36±1.34	0	1.20±1.64
12. Does it describe what would happen if no treatment is used?	1.80±1.96	0.93±1.33	2.00	0.40±0.89
13. Does it describe how the treatment choices affect the overall quality of life?	1.75±1.92	0.93±1.33	2.00	0.40±0.89
14. Is it clear that there may be more than one possible treatment choice?	3.35±2.06	1.14±1.79	3.00	2.20±1.64
15. Does it provide support for shared decision-making?	2.15±1.81	1.29±1.27	2.00	1.20±0.84
16. Based on the answers to all of the above questions, rate the overall quality of the publication as a source of information about treatment choices.	2.35±0.88	1.36±0.63	2.00	1.80±0.84
Mean score	2.29±0.91	1.32±0.62	2.37	2.00±0.90

not fulfilled by the publication) to 5=Yes (the criterion is fulfilled by the publication). The mean score of the 16 questions was used for evaluation.

Allergic Rhinitis and its Impact on Asthma (ARIA) 2008 Update (8) was proposed at the World Health Organization (WHO) workshop, and this was used to assess the value of the AR-related information. The ARIA 2008 Update contains several concepts about the definition, symptoms, subdivision, severity, risk factors, mechanisms, diagnosis and management of allergic rhinitis. To fulfill each concept, websites should contain the following concepts. 1) Definition. Websites should define AR as a symptomatic inflammation of the nose that is induced by allergen exposure. 2) Symptoms. Websites should contain three or more of the following four symptoms: rhinorrhea, nasal obstruction, nasal itching and sneezing, which are reversible either spontaneously or with treatment. 3) Subdivision. Websites should subdivide AR into “intermittent AR” and “persistent AR” according to the consecutive days of suffering with symptoms. 4) Severity. Websites should subdivide AR into “mild AR” and “moderate/severe AR” according to the impairment of activities and social functioning. 5) Risk factor. Websites should contain the following ideas: AR is a multifactorial disease that is induced by gene-environment interactions. Indoor inhalant allergens (mites, animal dander, insects and molds) and outdoor inhalant allergens (pollens and molds) cause AR. 6) Mechanisms. Websites should contain the following ideas: AR is generally caused by a sustained overproduction of IgE in response to common environmental antigens such as indoor and outdoor allergens and other allergens. 7) Diagnosis. Websites should contain the following ideas: The diagnosis of AR is based upon the concordance between a typical history of allergic symptoms and diagnostic tests. The typical symptoms of AR include rhinorrhea, sneezing, nasal obstruction and pruritus. The diagnostic tests are based on the demonstration of allergen-specific IgE in the skin (skin tests) or the blood (specific IgE). 8) Management. Websites should recommend three or more of the following four treatments of AR: preventive measures of controlling indoor allergens, second-generation oral or intranasal H1-antihistamines, intranasal glucocorticosteroids and allergen-specific immunotherapy.

The ARIA 2008 Update was used as the standard criteria of AR, and any concept that differed from the ARIA 2008 Update was regarded as unreliable. The “Justification” code of the HON principles was used to evaluate this unreliable information. The HON principles (5) are the oldest and the most widely used ethical and trustworthy code for the medical and health-related information available on the Internet. These principles were created by the HON foundation, which is a non-governmental organization that is internationally known for its pioneering work in the field of health information ethics. The criteria of the “Justification” code requires that any claims relating to the benefits or performance of a specific management, commercial product or services be supported by appropriate and balanced evidence

and clear references (5).

The Mann-Whitney *U*-test was used to compare the means among the groups. SPSS ver. 12.0 (SPSS, Chicago, IL, USA) was used for all the statistical analyses. A *P*-value <0.05 was considered to be statistically significant.

RESULTS

Some websites came up on the search with using more than one search engine. The duplicated websites were excluded, and a total of 40 different websites were finally obtained with 10 websites from each search engine. These websites were assigned to 4 groups according to the authorship: Western physicians: 20 (50%), Oriental physicians: 14 (35%), commercial: 1 (2.5%) and others: 5 (13%). Although the authors of other websites were not identified, it is suspected that they were ordinary webmasters, not medical professionals, and the contents of these websites were taken from other websites that were written by medical professionals.

The mean citation frequency of the JAMA benchmark concepts for all the websites was 1.23 out of 4 and the median was 1 (range, 0 to 3). No significant differences were shown in the mean citation frequencies between the 40 websites as a whole and that of each individual group (Table 2). The information regarding authorship was included in more than 85% of the Western physician and Oriental physician websites. However, the information about attribution, the age of the information and disclosure was ignored in many websites.

The mean DISCERN score was 1.92 out of 5, and the median was 1.88 when the websites were evaluated as a whole. When the websites were grouped by author, the mean score of the Western physician websites was 2.29 and the mean score of the Oriental physician websites was 1.32, which was significantly different (*P*<0.01) (Table 1). Questions 4, 7, and 8 in the DISCERN questionnaire pertain to information regarding the references and the uncertainty of treatment, and these questions were ignored

Table 2. Citation frequency of the Journal of the American Medical Association (JAMA) benchmark concepts by the type of authorship

JAMA benchmarks	Citation frequency (%)			
	Western physician (n=20)	Oriental physician (n=14)	Commercial (n=1)	Others (n=5)
Authorship	17 (85)	14 (100)	0 (0)	0 (0)
Attribution	0 (0)	0 (0)	0 (0)	1 (20)
Currency	2 (10)	2 (14)	1 (100)	3 (60)
Disclosure	4 (20)	2 (14)	0 (0)	3 (60)
Mean citation frequency of all concepts	1.15±0.59	1.29±0.61	1.00	1.40±1.13

Table 3. Citation frequency of the Allergic Rhinitis and its Impact on Asthma (ARIA) 2008 update concepts by authorship

ARIA 2008 update	No. of websites (%)			
	Western physician (n=20)	Oriental physician (n=14)	Commercial (n=1)	Others (n=5)
Definition	20 (100)	8 (57)	1 (100)	2 (40)
Symptoms	20 (100)	13 (93)	1 (100)	4 (80)
Subdivision	9 (45)	6 (43)	1 (100)	2 (40)
Severity	0 (0)	1 (7)	0 (0)	1 (20)
Risk factors	9 (45)	3 (21)	1 (100)	2 (40)
Mechanisms	16 (80)	3 (21)	1 (100)	4 (80)
Diagnosis	19 (95)	2 (14.3)	1 (100)	4 (80)
Management	14 (70)	1 (7)	1 (100)	3 (60)
Mean citation frequency of all concepts	5.35 ± 1.27	2.64 ± 1.69	7.00	4.40 ± 2.19

Table 4. Details of the unreliable information by the type of authorship

ARIA 2008 update	No. of websites (%)			
	Western physician (n=3)*	Oriental physician (n=13)*	Commercial (n=0)*	Others (n=1)*
Symptoms	0 (0)	1 (8)	0 (0)	0 (0)
Mechanisms	1 (33)	2 (15)	0 (0)	1 (100)
Management	3 (100)	13 (100)	0 (0)	0 (0)

*Number of sites containing unreliable information.
ARIA: Allergic Rhinitis and its Impact on Asthma.

in many websites.

The mean citation frequency of the ARIA 2008 Update concepts for all the websites was 4.33 out of 8, and the median was 5 (range, 1 to 7 concepts). When the websites were grouped by authors, the mean citation frequency of the Western physician websites was 5.35, while that of the Oriental physician websites was 2.64, which was significantly lower ($P < 0.01$) (Table 3). In addition, more than 70% of the Western physician websites contained information regarding the definition, symptoms, mechanisms, diagnosis and management provided in the ARIA 2008 Update, while only 57% of the Oriental physician websites contained such information. Moreover, less than 21% of the Oriental physician websites contained information about the mechanisms, diagnosis and management as provided in the ARIA 2008 Update. Three (15%) Western physician websites, 13 (93%) Oriental physician websites and 1 of the other websites included unreliable information, most of them concerning the management of AR. Unreliable information relating to the symptoms and mechanisms of AR was also revealed (Table 4). Only one (33%) of the Western physician websites and 2 (15%) of the Oriental physician websites that contained unreliable information presented appropriate

Table 5. Number of sites containing unreliable information by authorship

	No. of websites (%)			
	Western physician (n=20)	Oriental physician (n=14)	Commercial (n=1)	Others (n=5)
No. of sites containing unreliable information	3 (15)	13 (93)	0 (0)	1 (20)
No. of sites containing unreliable information, but satisfying the criteria of justifiability	1 (5)	2 (14)	0 (0)	0 (0)

ate and balanced evidence as well as clear references for the unreliable information. Almost all of the websites did not supply evidence or references for the unreliable information, and so they failed to fulfill the HON code "Justification" (Table 5).

DISCUSSION

In this study, we found that 42.5% (17/40) of all the surveyed websites contained unreliable information, and only 17.6% (3/17) of the websites satisfied the HON code "Justification". All together, the results of this study suggest that the AR-related information currently available on Korean websites is of variable quality.

Silva et al. (9) assessed the quality of 173 websites that contained AR-related information using the Manual of Ethical Principles produced by the Regional Council of Medicine of the state of Sao Paulo. The criteria to meet the standards of this manual consisted of transparency, honesty, quality, privacy, medical ethics, informed consent, responsibility and origin. In their study, 24.3% of the included websites contained unreliable information, which was lower than the 42.5% of the present study. The reason for this difference might be that we evaluated the contents of websites in addition to the basic information they provided. This difference may also have been due, at least in part, to the fact that 35% of the websites included in this study were created by Oriental physicians. The majority of the Oriental physician websites presented the same definitions, symptoms and subdivisions suggested by Western medicine. However, for the mechanisms, diagnosis and management of AR, the majority of the Oriental physician websites showed quite a different view from that of Western medicine (Table 3). For example, allergic rhinitis was defined as a hypersensitive response to allergens that does not cause a hypersensitive response in unaffected individuals. Yet, the mechanism of AR was explained as the weakness of "Ki" (energy), and the Oriental physician websites recommended herbal medication and natural foods to support "Ki" as the management for AR. As a result, fewer ARIA 2008 Update concepts were included in the

Oriental physician sites than in those websites based on Western medicine.

When the websites authored by Western physicians were evaluated, the mean citation frequency of the ARIA 2008 Update concepts was 5.35, and 15% of the websites contained unreliable information concerning management. This proportion was lower than the rate of 24.3% reported by Silva et al. (9). However, these websites that contain unreliable information concerning management cannot be overlooked. Such websites are likely to confuse and prevent people from receiving correct information.

Well-qualified websites are able to provide balanced and clear information to people. This can bring a positive transformation in the patient-doctor relationship from that of a doctor arbitrarily making decisions about patient's health to that of patients and doctors working together as partners. Further study is needed to understand how patients and clinicians use the internet.

It is important to note that there were some limitations to this study. Even though the Oriental physician sites occupied 35% of the AR websites in Korea, we used the ARIA 2008 Update concepts, which are basically based on Western medicine, to evaluate the contents of the AR-related information. To cover this problem, the HON code "Justification" was used. However, the contents of the Oriental physician sites were not fully evaluated.

In conclusion, the AR-related information that is currently available on Korean websites is of variable quality and not all of the information provided is justified. Thus, performing surveillance of the medical information on the websites is necessary. Furthermore, common criteria are also needed that can be used to evaluate websites created by both Western and Oriental physicians.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. International Telecommunication Union [Internet]. Geneva: International Telecommunication Union; 2008 [cited 2008 Nov 11]. Available from: <http://www.itu.int/ITU-D/ict/statistics>.
2. ISIS [Internet]. Seoul: Korea Internet & Security Agency; 2008 [cited 2008 Nov 11]. Available from: <http://isis.nida.or.kr>.
3. Winker MA, Flanagan A, Chi-Lum B, White J, Andrews K, Kennett RL, et al. Guidelines for medical and health information sites on the internet: principles governing AMA web sites: American Medical Association. *JAMA*. 2000 Mar;283(12):1600-6.
4. Silberg WM, Lundberg GD, Musacchio RA. Assessing, controlling, and assuring the quality of medical information on the Internet: caveat lector et viewer. Let the reader and viewer beware. *JAMA*. 1997 Apr; 277(15):1244-5.
5. Health On the Net Foundation: health on the net code of conducts. version 1.6 [Internet]. Geneva: Health On the Net Foundation; 2006 [cited 2008 Nov 11]. Available from: <http://www.hon.ch/HONcode/Patients/Korean>.
6. Charnock D, Shepperd S, Needham G, Gann R. DISCERN: an instrument for judging the quality of written consumer health information on treatment choices. *J Epidemiol Community Health*. 1999 Feb;53(2): 105-11.
7. Park HW, Min KU, Kim YY, Cho SH. Assessing the quality and contents of asthma-related information on the Korean internet as an educational material for patients. *J Korean Med Sci*. 2004 Jun;19(3):364-8.
8. Bousquet J, Khaltav N, Cruz AA, Denburg J, Fokkens WJ, Togias A, et al. Allergic Rhinitis and its Impact on Asthma (ARIA) 2008 update (in collaboration with the World Health Organization, GA(2)LEN and AllerGen). *Allergy*. 2008 Apr;63 (Suppl 86):8-160.
9. Silva LV, Mello JF Jr, Mion O. Evaluation of Brazilian web site information on allergic rhinitis. *Braz J Otorhinolaryngol*. 2005 Sep-Oct; 71(5):590-7.