CE

Development of a Web-Based Gout Self-Management Program

HyunSoo Oh ▼ JiSuk Park ▼ WhaSook Seo

OBJECTIVE: This study was conducted to develop a web-based gout self-management program that can be applicable to each gout stage and to evaluate the validity of the developed program.

METHODS: A web-based gout self-management program was developed and evaluated in 5 stages: analysis (needs assessment on 60 gout patients and content analysis through a systematic review of literature and websites), design, development, implementation, and evaluation.

RESULTS AND CONCLUSION: The gout-related information section was structured with overview, causes, risk factors, symptoms, diagnosis, progress, treatments, and complications. The self- management section consisted of diet/nutrition, weight control, alcohol management, exercise, and pain and stress management. The program included bulletin board and expert section to promote bidirectional interactions between program users and providers. Self-assessment tool of gout stages and self-management checklist were provided. Program contents and ease of site navigation (http://goutin.kr) were found to be appropriate and satisfactory to both patient and expert groups.

Gout occurs when uric acid builds up in the blood and forms urate crystals in the joints due to either an increase in uric acid production or a decrease in urinary uric acid excretion (Schumacher & Chen, 2008). Although the exact cause is still unknown, significant risk factors of gout have been identified. These include age, gender, obesity, purine rich meat products and seafood, hyperlipidemia, and drugs such as thiazide diuretics and low-dose aspirin (Choi & Curhan, 2007; Eggebeen, 2007; Roddy, 2008). When gout remains untreated, it may progress to become chronic and result in joint disability and serious complications associated with kidney and heart, which can cause death.

Although the pathophysiology and treatment of gout have long been known, the management of gout remains challenging (Wortmann, 2006), mainly because of poor compliance with gout medication. Only around 50% of gout patients adhere to medications (de Klerk et al., 2003; Riedel et al., 2004; Schumacher & Chen, 2008).

For patients with chronic diseases including gout, the most important medical and nursing managements should aim to improve self-management ability on a daily basis. Web-based programs are an efficient tool for improving the self-management ability of patients with chronic disease and, in particular, for facilitating social interactions of peers with peers or supporters (Shigaki et al., 2008).

Gout appears to be well-suited to a web-based approach because it occurs most often in men, and men tend to be more active in computer-related learning. In addition, a web-based gout program may improve poor treatment compliance in gout patients by providing accurate gout-related information and supporting useful communications between patients and professionals about their experiences. Despite this potential, very few web-based gout intervention studies have been published. A few websites for gout patients have been developed in Korea, but they tend to be operated for advertising purposes by private clinics and include only rudimentary information. The present study developed an information-rich and user-friendly web-based gout self-management program applicable to each stage of gout.

Methods

Research Design

The study adopted a methodological research design to develop a web-based gout self-management program using the instruction guidelines for web-based education system proposed by Na (2005). For needs analysis/assessment and validity testing, a nonexperimental survey research design was used. For contents analysis, a systematic literature review on related studies was performed.

Subjects and Data Collection

For needs assessment, 60 gout patients were recruited from outpatient settings at the University Hospital, Incheon, South Korea. Only subjects who were able to communicate and consent to participation were included in needs assessment. After the developed program

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was installed on a web server, preimplementing and validity testing of the developed program were conducted on 20 conveniently selected subjects who participated in needs assessment. The selection criteria for these 20 subjects were (1) ability to conduct a computer-based Internet search and (2) experience in acquiring gout-related information from the Internet. Preimplementing and validity testing of the program were also conducted by an expert panel consisting of four physicians, one outpatient nurse, and 20 inpatient nurses including the head nurse in the rheumatoid arthritis clinic in the hospital where the data were collected.

Measurements

To assess patients' needs, face-to-face semistructured interviews were conducted. The interview contained both close- and open-end questions and allowed the patients to express their own views freely. The following topics and questions were prepared beforehand and used as a framework for semistructured interviews: (1) everyday lifestyle; (2) current state of gout; (3) knowledge on gout causes, treatments, prognosis, and self-management; (4) self-management technique currently used; (5) gout-related information source; (6) usefulness of information obtained; (7) experience of Internet searching to gather gout-related information; (8) usefulness of gout-related information obtained from the Internet; (9) intention to participate web-based education; and (10) information needed to be included in the web-based gout self-management program. All responses were recorded as written by the first author.

For validity testing of the developed web-based gout self-management program, a structured interview was conducted. Validity test questions consisted of two main sections: appropriateness or satisfaction with program contents and ease of site navigation and content access. Questions regarding the appropriateness or satisfaction with the program contents included (1) level of overall satisfaction on the program, (2) level of satisfaction on gout-related knowledge provided in the program, (3) level of satisfaction on gout self-management techniques provided in the program, (4) any additional content needed, and (5) ease of understanding of the program contents. Questions regarding the ease of site navigation and content access included (1) ease of access to the website, (2) ease of exploring the website, (3) success of the site in stimulating user interest, (4) intention to revisit the website, and (5) usefulness of the audiovisual materials. Except for a question concerning content that should be added, all validity test questions were answered using a 5- or 7-point Likert scale.

Procedures

A web-based gout self-management program was developed in five stages: analysis, design, development, preimplementation, and evaluation.

Analysis

At this stage, needs assessment, content analysis, target user analysis, and technical support and environmental analysis were conducted (see Table 1). Needs assessment on 60 gout patients was performed to analyze patients'

Table 1. Program Development Process: Analysis, Design, and Development Stages

	Stages	Development Process
Analysis stage	Need analysis	Explore knowledge, experience of gout, and problems related to self-management of gout .
	Content analysis	Conduct systematic review of related studies and websites
	Client analysis	Examine the usage of internet
	Technical, environmental analysis	Identify hardware, instruments, web designer and program developers
Design stage	Information design	Design contents of self-management program of gout.
	Interaction design	Design interaction methods or tools.
	Motivation design	Design motivation methods for clients.
	Preliminary examination	Conduct preliminary examination about contents, motivation, and interaction.
Development stage	Content frame	Develop contents.
	Multimedia	Develop visual materials, images, and video simulations.
	Integration	Develop web program and install the program.
	Demonstration	Preimplemented web program toward physician, nurses, and gout patients.
	Validity test	Test of validity about contents and system toward physician, nurses, and gout patients.

everyday lifestyle, current state of gout, knowledge about gout, self-management technique, and Internet searching experience. Target user analysis on the same 60 gout patients was performed to analyze the degree of utility and feasibility of a computer system for target users. Content analysis was performed through a systematic review of related literature and existing websites. A total of 113 gout-related studies were primarily selected through searches of PubMed, KoreaMed, and CINHAL using the key words "gout," "systematic review," "epidemiology," "treatment," or "self-management." The 113 study abstracts were prereviewed. Twenty-seven were directly relevant and the full texts of the articles were reviewed (see Table 2). In addition, the contents of 13 gout-related websites were analyzed. Technical support and environmental analysis was conducted to define specific hardware and instruments needed. An expert panel consisting of four physicians, one outpatient nurse, and 20 inpatient nurses including the head nurse was also established.

Design and Development

Specific contents and presentation methods of the program were finalized through information, interaction, and motivation design approaches (see Table 1). In terms of information design, various presentation mediums (text, images, and multimedia) and image creating tools (Illustration, PowerPoint, and Photoshop) were considered. Frameworks for text and image in detail were determined on the basis of needs assessment. Interaction and motivation designing was performed through discussions with professional web designers and program developers.

Implementation and Evaluation

The developed program was installed on a web server (http://goutin.kr) and then preimplemented with 20 conveniently selected gout subjects and the expert panel. One week after the launch of the preimplementation, the appropriateness or satisfaction of the program contents, ease of site navigation, and content access were evaluated with the subjects in a face-to-face or telephone interview, or e-mail communication.

Data Analysis

Statistical analysis was performed using Predictive Analytics Software version 18.0. Data from needs assessment and validity test were analyzed using descriptive analysis.

Results

Needs, Content, Target Users, and Technical Analysis

Needs Analysis

Needs assessment was conducted on 60 male gout patients (mean age 51.47 ± 10.89 years; see Figure 1). Of these subjects, 78.9% reported drinking alcohol: 45.2%

Table 2. Summary of a Systematic Literature Reviews on Studies Related to Risk Factors of Gout, and Gout Treatments and Self-Management.

Author(s) (Year of Publication)	Risk factors of gout
Meiner (2001); Kim et al. (2003); Luk and Simkin (2005); Saag and Choi (2006); Choi and Curhan (2007); Eggebeen (2007); Weaver (2008); Roddy (2008)	Nonmodifiable risk factors: age, gender Modifiable risk factors: serum uric acid concentration, hyperuricemic drugs, diseases, diet, alcohol drinking, obesity, etc.
	Treatments for gout
Meiner (2001); Kim et al. (2003); Choy (2005); Hong and Lee (2005); Schlesinger, Moore, Sun, and Schumacher (2006), Wortmann (2006); Fang et al. (2006); Hoskison and Wortmann (2006); Chen and Schumacher (2006); Perez-Ruiz and Schlesinger (2008); Hoskison and Wortmann (2007); Eggebeen (2007); Pillinger and Keenan (2008); Schumacher and Chen (2008); Schlesinger, Dalbeth, and Perez-Ruiz (2009); Conway and Schwartz (2009)	Acute gout treatment (management of pain and inflammation): non-steroid anti-inflammatory drugs, COX-1 inhibitors (indomethacin, naproxen, ibuprofen), COX-2 inhibitors (etoricoxib, colecoxib), Colchicine, steroids Treatment for intercritical gout: prevention of the recurrence of gout attack (drugs, diet, regular blood test) Medication to treatment hyperuricemia: uricosuric agents (probenecid, sulfopyrazone), allopurinol, or newer drugs (xanthine oxidase, Febuxostat, anticytokine treatment)
	Self-management
Meiner (2001); Hong and Lee (2005); Saag and Choi (2006); Perez-Ruiz and Schlesinger (2008); Eggebeen (2007); Mineo, Kamiya, and Tsukuda (2008); Schumacher and Chen (2008); Pillinger and Keenan (2008); Becker and Chohan (2008); Hak and Choi (2008); Terkeltaub, Zelman, Scavulli, Perez-Ruiz, and Liote (2009); Choi (2010)	Foods increase or decrease blood uric acid levels: red meat, bean, high-carbohydrate diet, carbonated drink, milk, coffee, black bean, dark color fruits, spinach, bean sprouts, nuts, etc.) Alcohol management: blood uric acid levels and alcohol beverages (beer, hard liquor, wine, etc.), strategies to avoid alcohol consumption Weight control: concurrence of metabolic diseases (hypertension, diabetes mellitus, and cardiovascular disease) in gout patients, low-fat diet, exercise Health supplements: vitamin C, omega-3, eicosapentaenoic acid, docosahexaenoic acid, etc.

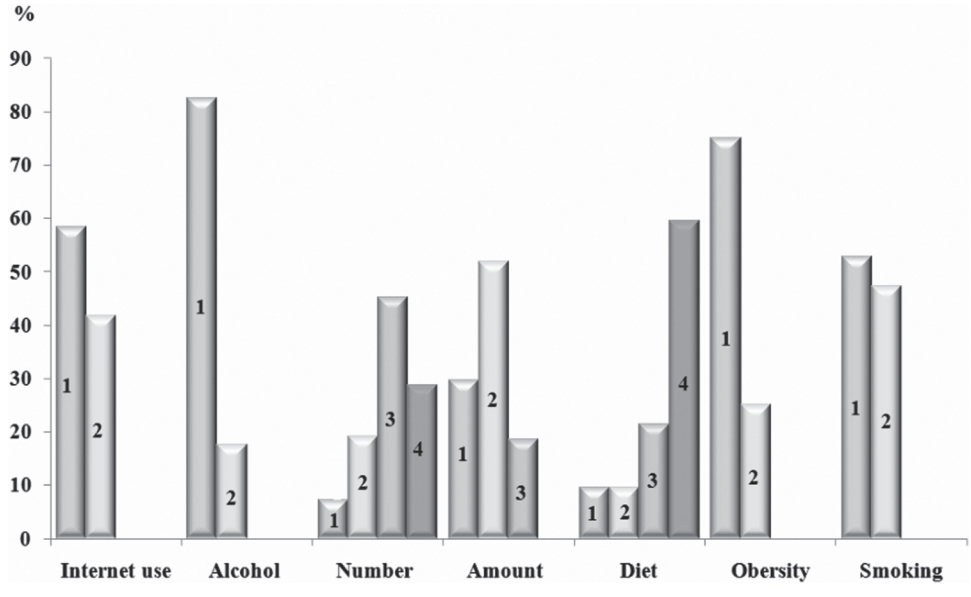

FIGURE 1. The results of need analysis/assessments related to lifestyle.

Internet use: 1 (yes); 2 (no),

Alcohol consumption: 1 (yes); 2 (no)

Number of consuming alcohol: 1 (1–2 times/month); 2 (1–2 times/week); 3 (3–4 times/week); 4 (every day)

Amount of consuming alcohol (Soju, Korean distilled spirits, 300 ml/bottle): 1 (0.5–1 bottle); 2 (1.5–2 bottles); 3 (≥2.5 bottles)

Diet: 1 (vegetable based diet): 2 (vegetable-based diet with fish); (vegetable-based diet with meat); 4 (meat based diet)

Obesity: 1 (yes); 2 (no)

Smoking: 1 (yes); 2 (no)

drank 3–4 times weekly and 28.6% drank daily, with the mean amount of alcohol consumed per sitting being 1.64 ± 0.71 bottles of Soju (a Korean distilled spirits available in 300 ml). In terms of diet, 9.5% of subjects indicated having a vegetable-based diet, 9.5% a vegetable-based diet with fish, and 59.5% a meat-based diet. Twenty-five percent of the subjects were of normal body weight, and 75% were overweight. Most of the subjects did not know about their current state of gout, and 38.3% treated their gout only using medications. Of the latter, 15% did not take medications continuously (see Figure 2).

Gout-related knowledge level was high, moderate, and low in 11.7%, 45%, and 42.6% of the subjects, respectively. Gout-related information was obtained mostly from medical personnel, followed by Internet posts. Thirty-four percent of subjects found both sources of information useless and 64.6% valued it as useful information.

Regarding Internet searching experience, 43.3% of the subjects used the Internet to search for gout-related information only after being first diagnosed with gout, with no searches conducted thereafter. In addition, 45.8% of the subjects strongly desired a web-based gout program, and 42.2% would consider using such a program in the future. Subjects indicated that a web-based program needed to include information concerning medications (65.4%), self-management techniques (57.0%), nonmedication treatments (48.5%), and diet (17.5%).

Content Analysis

A systematic review of 27 gout-related studies identified three types of causes/risk factors of gout: lifestyle-, disease-, and drug-related (see Table 2). Lifestyle-related risk factors were a purine-enriched diet, alcohol consumption, high-protein diet, and obesity. Disease-related risk factors were hypertension, diabetes, hyperlipidemia, and renal failure. Drug-related risk factors were diuretics, low dose of aspirin, L-dopa and post-transplant medications.

In terms of gout treatment, content analysis of related studies shows that medications are most commonly used gout treatments to provide gout symptom relief and prevent recurrence and progression to the chronic stage. To relieve acute gout attack, nonsteroidal anti-inflammatory drugs (NSAIDs), colchicines, and steroids are frequently used. Nonsteroidal anti-inflammatory drugs are the first-line gout medication because of the many side effects experienced with colchicines. Nonsteroidal anti-inflammatory drugs inhibit cyclooxygenase-1 (COX-1) and/or COX-2. The recently developed COX-2 inhibitors, etricoxib and colecoxib, have become popular (Hoskison & Wortmann, 2007). On the contrary, to prevent recurrence and progression to chronic stage, probenecide (which improves the kidney's ability to eliminate uric acid) and allopurinol (which inhibits uric acid production) are commonly used (Meiner, 2001; Kim, Schumacher, Hunsche, Wertheimer, & Kong 2003; Schumacher & Chen, 2008).

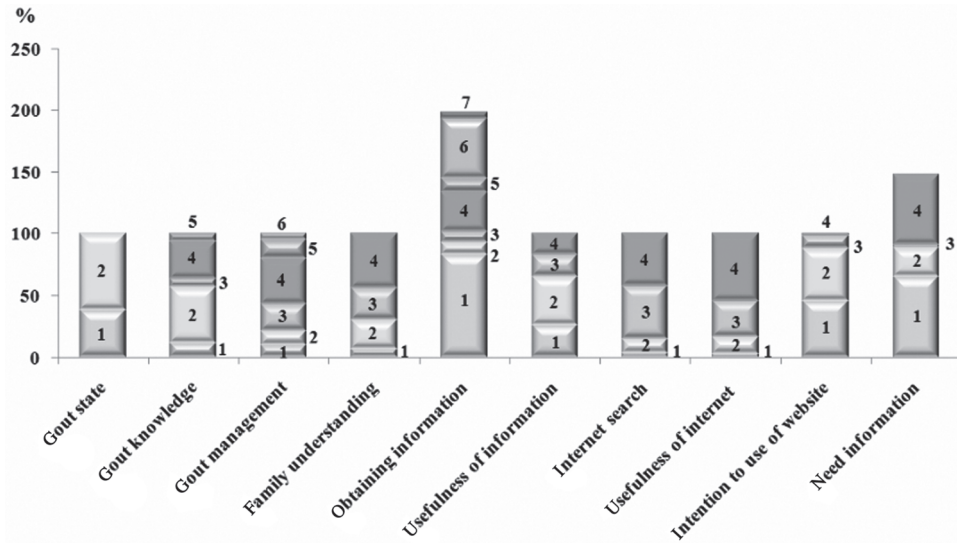

FIGURE 2. The results of need assessments and target user analysis.

Since individuals answered at more than one categortze, some of combined percentages were more than 100%.

Gout state: 1 (individual knows that gout was managed with medication for reducing serum uric acid); 2 (do not know).

Gout knowledge: 1 (high level); 2 (moderate level); 3 (low level); 4 (not at all); 5 (do not have interest).

Gout self-management: 1 (self-managed very well in every aspects); 2 (only medication and managing alcohol consumption); 3 (only medication and diet management); 4 (only taking medicationl); 5 (not even taking medication regularly); 6 (do not know how to self-manage gout).

Family understanding about gout: 1(high level); 2 (moderate level); 3 (low level); 4 (not at all).

Ways of obtaining knowledge about gout: 1 (physicians or nurses); 2 (leaflets); 3 (family, relatives, friends); 4 (mess media); 5 (other gout patients); 6 (internet site); 7 (not at all).

Usefulness of obtaining information: 1 (highly helpful); 2 (moderately helpful); 3 (somewhat helpful); 4 (uselessness).

Frequency of Internet search for gout: 1 (often); 2 (sometimes); 3 (only immediately after gout diagnosis); 4 (never).

Usefulness of Internet information of gout: 1(highly helpful); 2 (moderately helpful); 3 (somewhat helpful); 4 (uselessness).

Intention to participate to website education: 1 (having strong intention); 2 (considering participating); 3 (do not know); 4 (won't participate).

Information that need to self-manage gout: 1 (medication); 2 (diet); 3 (disease progression); 4 (nonpharmacological modalities); 5 (self-management).

Probenecide and allopurinol reduce and maintain the level of plasma uric acid level at 6 mg/dl or less and prevent uric acid crystal formation (Becker & Chohan, 2008; Perez-Ruiz & Schlesinger, 2008). Febuxostat, a newly developed selective inhibitor of xanthine oxidase, may be a potential alternative to allopurinol. Anticytokine therapy has also proven effective for managing acute gout attacks and preventing recurrence (Pillinger & Keenan, 2008; see Table 2).

Thirteen websites were analyzed for their content. The websites were mayoclinic.com, Centers for Disease Control and Prevention (CDC), adam.about.com (Health Topics A-Z), GOUT.com, MedicineNet.com, niams.nih.gov, webmd.com, wikipedia.org, medcity.com, angelpharm.co.kr, HealthKorea.net, healthcare.joins. com, and goutpal.com. Most of the websites for gout patients that have been designed in Korea were not included in this content analysis because they are operated for advertising purposes by private clinics and included rudimentary information. Commonly included information in the 13 gout websites were definition, symptoms, causes, risk factors, complications, diagnostic tests, treatment, and self-management. Some websites included information on gout stages, but none included information on specific treatments or management according to each gout stage.

Target User, Technical Support, and Environmental Analysis

All 60 gout subjects had a computer with an Internet connection at home and 58.3% were experienced in Internet use. Even those who did not have Internet experience were able to learn with the assistance of one of their children. Therefore, presentation of the information in a web-based format was not an obstacle. Based on the results of technical support and environmental

analysis, specific hardware and instruments needed were identified and supplied, and the aforementioned expert panel was established.

Design and Development Stage

Information Design

The program contents were structured on the basis of the results of needs assessment and content analysis through systematic reviews on related literature and websites (see Table 3). Gout-related information consisted of seven headings: overview, causes, risk factors, symptoms, diagnosis, progress, and treatments and complications. Each heading was further divided into subheadings. Overview of gout included definition, frequency, and historical evidence. Causes of gout included information about blood uric acid levels and gout. Risk factors of gout were presented in three different categories: lifestyle-, drug-, and disease-related risk factors. A self-diagnostic questionnaire for gout risk factor was provided. Symptoms of gout included characteristics of a gout attack and common sites. Diagnosis of gout included direct and indirect tests. Progress and treatment of gout were presented according to four gout stages: stage 1 (asymptomatic hyperuricemic stage), stage 2 (acute gout stage), stage 3 (intermittent stage), and stage 4 (chronic tophaceous stage). A self-diagnostic questionnaire for gout stage was also provided (see Table 3).

In addition to gout-related information, self-management techniques were included in the last part of the program. Five main subjects were presented: diet and nutrition, weight control, alcohol management, exercise, and pain and stress management. In the diet and nutrition section, purine-rich foods and low-purine diet were introduced. In the weight control section, a combination of diet and regular exercise was suggested. In the alcohol management section, the effect of alcohol on gout and various tips to limit or avoid alcohol consumption were included. In the exercise section, specific exercise types with detailed explanation and illustrations for gout patients were included. In the pain and stress management section, the effects of tension and stress on health and pain were described and stress management techniques were presented (see Table 3). Recommended diet menus and recipes for gout patients were provided.

A bulletin board was established to post patients' gout-related experiences. In addition, an expert section was made to introduce recent information about gout management and treatment compliance. An online questionnaire was made available on the website to evaluate the effects of the program on treatment compliance, health-related quality of life, and self-care ability. Program contents had been modified several times on the basis of discussions of the expert panel. Web design was done by the authors and professional web designers and program developers.

Interaction Design

The bulletin board and expert section were to facilitate user–program, user–expert, and user–user interactions. In particular, user–expert interactions were supported through the bulletin board and e-mail, and user–user interactions were supported through the bulletin board and information section.

Motivation Design

Each subject was monitored by the system operator in terms of the time and duration that a subject had logged into the program. On the basis of the data, each subject was telephoned by the first author and encouraged to visit the website more than three times a week. In addition, frequent site updates provided the most recent information about gout treatments or management techniques as a means of motivating frequent site visit.

Website Development

The overall framework of the presently developed website is shown in Figure 3. To make the website easy to understand, text contents were written in a simple and brief way, and image contents (figures, illustrations, and diagrams) were fully used to increase visual effects. Image contents were created using PowerPoint and Photoshop.

Implementation and Evaluation Stage

The developed program was installed on a web server (http://goutin.kr) and preimplemented to 20 gout subjects and the panel of 25 gout experts. Appropriateness or satisfaction with the program contents and ease of site navigation and content access were evaluated. Regarding causes, symptoms, diagnosis, treatments, and prognosis of gout, 90% of gout subjects and 80%–88% of the experts indicated that such information was useful to understand gout. Regarding self-management techniques, 90% of gout subjects and 84% of the gout experts indicated satisfaction. In addition, 90% of gout subjects and 88% of the experts responded that the website was useful in the understanding of patients' gout-related experiences. In terms of site navigation and content access, 85%–90% of all the gout subjects indicated that the site was easy to access and navigate. However, only 70% of gout subjects and 44% of the experts opined that the website aroused their interest. All subjects indicated a willingness to use the website frequently. Further information on diet and gout progress/medications was suggested by 75% of gout subjects and 60% of experts, respectively.

Discussion

The results of the needs assessment showed that most of the surveyed subjects did not know about the general gout process and their current state of gout. This implied that the clinical progression and chronic complications of gout needed to be emphasized in the program. Accordingly, four stages of gout (asymptomatic hyperuricemic, acute gout, intermittent, and chronic tophaceous stage) and potential gout complications on kidney and cardiovascular system were presented in detail on the website.

Approximately 80% of the study subjects reported drinking alcohol, with two thirds being considered as heavy drinkers (3–4 times a week). Sixty percent of

Table 3. Program Contents

	Subheadings	Contents
Overview	What is gout?	Definition; occurrence rate; historical evidence
	Causes of gout	Uric acid levels in the blood; what is uric acid?; characteristics of uric acid; what causes uric acid build up?
	Risk factors of gout	Lifestyle-related risk factors; drug-related risk factors; disease-related risk factors; other risk factors; gout risk factor questionnaire; your risk factors?
Symptoms and diagnosis	Symptoms of gout	What are the symptoms?; what is gout attack?; characteristics of a gout attack; common sites of gout attack
	Diagnosis of gout	Direct test; indirect test
Progress and treatments	Progress of gout	Stages 1–4; your stage of gout?
	Treatment for gout	Stage 1 (Asymptomatic hyperuricemic stage)
		Self-care (diet, alcohol restriction); routine blood test
		Stage 2 (Acute gout stage)
		Dealing with acute gout attack; gout attack treatment; prevention of the recurrence of gout attacks (hypouricemic drug: Allopurinol); newer drugs
		Stage 3 (Intermittent stage)
		Gout attack treatment; prevention of the progression to chronic stage (self-care: hypouricemic drug, diet, alcohol restriction, weight control)
		Stage 4 (Chronic tophaceous stage)
		What is "tophi" or chronic nodule?; treatment for chronic tophaceous gout; drugs; complications of gout
Self-Care for Gout	Diet and nutrition	Low purine diet gout recipe; high and low purine foods; recommended diet menu
	Weight control	Low-fat diet; exercise
	Alcohol management	Alcohol and uric acid; high purine alcohol beverage; strategies to limit or avoid alcohol consumption
	Exercise	Gout and exercise; how to exercise; what types of exercise are best for gout patients?; joint exercise
	Pain and stress management	How do tension and stress affect on health?; coping to pain and stress; deep breath; muscle relaxation; guided imagery; some useful tips to reduce stress
Expert section	Most recent issues related to gout and treatment compliance	Barriers to gout management; recent trends in the gout treatment; new conceptualization of treatment compliance; a new conceptualization of treatment compliance according to the variation theory of learning
Bulletin board		Provide a place to share gout-related experiences between program users; provide a place for Q&A between program users and experts; provide a place for experts to understand the patient's experience
Questionnaire		Evaluation of appropriateness and satisfaction about the program contents and ease of site navigation and content access

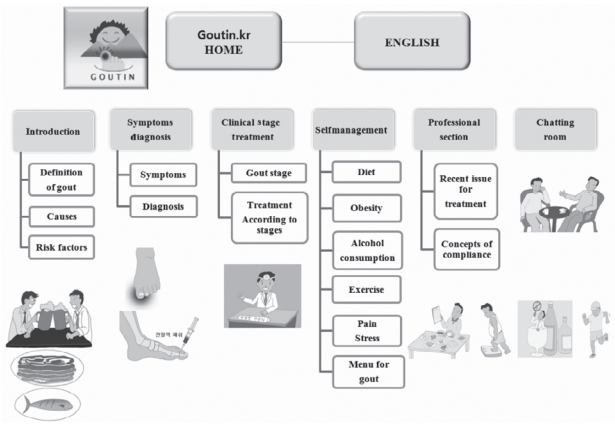

FIGURE 3. Framework of the web-based gout self-management program contents.

subjects consumed a meat-based diet and 75% were overweight. These findings are consistent with previous findings (Choi & Curhan, 2007; Eggebeen, 2007; Roddy, 2008; Weaver, 2008), which reported alcohol drinking, a meat-enriched diet, and obesity as risk factors of gout. Therefore, self-management techniques related to alcohol drinking, diet, and weight control were specifically concentrated in the program.

Because 38.3% of subjects indicated that they did not currently use any specific self-management practices, such as weight control, diet therapy, and alcohol restriction, but treated their gout only by medications. Of those patients treated only by medication, 15% did not take medications regularly, indicating an extremely poor compliance with treatment. This might result from a lack of knowledge on drug actions or consequences of uncontrolled uric acid due to an inconsistent use of medication. Strategies to improve patient understanding about gout drug actions and the relationship between gout and uncontrolled blood uric acid levels are needed to increase compliance with medication use and self-management practices.

According to the variation theory of learning, interventions to improve treatment compliance should focus on the qualitative change of experiencing or understanding a disease rather than focusing on obedience, behavior, or transfer of knowledge (Friberg & Scherman, 2005). To change patient experience and understanding, an important suggested strategy has been to encourage and facilitate the sharing of patient experiences with other patients, and to compare their understanding with others. In addition, healthcare professionals also need to understand patients' experiences and recognize their ways of understanding the same disease. An online-based program may be most suitable to achieve bidirectional communications between patients and patients–professionals. In this regard, the present program supports user–expert and user–user interactions through a bulletin board and an expert section.

Content analysis of the 13 websites indicated that text-centered websites were less likely to arouse interest in the user, indicating the importance of visual image presentation. Therefore, we included illustrations as much as possible to enhance visual effects. In addition, we found that most other websites for gout patients transferred information unidirectionally–from program producer to users. We made a self-assessment questionnaire for gout stage and a self-management checklist to help program users evaluate their current gout stage and their self-management performance available. We also found that there were no family participation sections in other web-based gout programs. Most gout victims are middle-aged men. To facilitate use of the website by a patient's spouse, recommended diet menus and recipes were included (and illustrated) in the program. Results of evaluation of appropriateness or satisfaction with program contents and ease of site navigation and content access showed that both patient and expert groups were highly satisfied.

Conclusions and Recommendations

The present study was conducted to develop a web-based gout self-management program that can be applicable to each gout stage and to evaluate the validity of the developed program. Based on the results of needs assessment of gout patients and content analysis of related literature and preexisting websites, the gout-related information section of the program were structured with seven main topic areas: overview, causes, risk factors, symptoms, diagnosis, progress, and treatments and complications. The self-management section of the program consisted of five main topic areas: diet and nutrition, weight control, alcohol management, exercise, and pain and stress management. The program also includes a bulletin board and an expert section to promote bidirectional interactions between program users and providers. A self-assessment tool of gout stages and self-management checklist are provided. The program contents and ease of site navigation and content access were judged to be appropriate and satisfactory by patient users and gout experts.

According to suggestions from the program users, real images related to gout symptoms and detailed information about everyday Korean foods that should be avoided or recommended would be a very useful addition to the website, in aiding the development of a gout self-management program. In addition, more systematic evaluation studies will be needed to determine the effect of a web-based gout self-management program on treatment adherence, self-management ability, and quality of life.

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