Addressing Gaps in the Treatment of Rheumatoid Arthritis through Implementation of a Multi-Format Educational Curriculum and Application of Adult Learning Principles

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ABSTRACT

Background: Recent gaps we identified in the management of patients with rheumatoid arthritis (RA) were addressed with a continuing medical education (CME) initiative directed at practicing U.S. rheumatologists that incorporated a unique curriculum and instructional design, preceded by a knowledge and performance assessment.

Method: The CME initiative encompassed a 28-question pre-activity knowledge and performance assessment and 3 related modules, each of which could be completed separately and in any order for credit. For each module, multiple-choice knowledge and case-based questions were asked prior to and immediately following completion. A 22-question online survey, taken pre-participation and approximately 90 days after module participation, assessed attitudes, knowledge, and clinical use of updated RA guidelines and consensus statements. Statistical tests were used to compare aggregate pretest to posttest to follow-up survey data. Alpha was set at .05, and P values of less than or equal to .05 were considered statistically significant.

Results: The instructional design was well matched with the target audience of practicing U.S. rheumatologists. This was supported by the relatively high number of curriculum components downloaded by participants: rheumatologists accessed the CME content as print, audio, and audio-visual media. Additionally, they downloaded practice aids, which provided them with tools and resources to implement the curriculum into clinical practice. Participation in this CME initiative was associated with large gains in knowledge and competence. Statistically significant changes (P ≤ .0115) were found for all pre- and post-challenge questions, indicating that the CME content was highly effective in this target audience.

Conclusion: The unique instructional design of this CME initiative had an immediate positive effect on knowledge and competence. The results of the follow-up online survey revealed the presence of significant barriers, issues, and challenges in the clinical practices of the participating rheumatologists, including knowledge/familiarity/comfort regarding appropriate tools to assess disease activity, cost/reimbursement/managed care issues, and more practical and less time consuming tools for measuring disease activity. These important gaps should be addressed in future educational initiatives.

INTRODUCTION

The optimization of instructional design and incorporation of adult learning principles to address the identified knowledge and performance gaps in the treatment of rheumatoid arthritis (RA) is an ongoing challenge.

These gaps exist despite recent advances in the treatment and management of RA and introduction of several guidelines and consensus statements [1-3]. Left uncontrolled, RA erodes cartilage and bone and results in significant locomotor disability.

The literature on continuing medical education (CME) in RA suggests that further optimization of instructional design and incorporation of adult learning principles are needed. Hamburger et al reported that attendance by U.S. rheumatologists at a training seminar focused on the use of RA disease activity measures increased the subsequent self-reported use of these measures based on questionnaires completed following an encounter with a patient, compared to a control group not attending the seminar [4]. It should be noted that the training seminar was not CME accredited, involved only
21 rheumatologists, had a simpler instructional design—only this live seminar was offered—and did not assess attitudes, barriers, or knowledge gaps. In an editorial, Wise and Isacs recommended that educational activities in RA directed at general practitioners (GPs) include opportunities for GPs to receive feedback on their performance from specialists [5]. A systematic literature review of strategies for addressing gaps in inflammatory arthritis summarized several strategies used in education programs, including distribution of educational materials, workshops, mobile device apps, and presenting patients to experts via a video call [6]. The majority of the educational programs included only 1 instructional design component, thus highlighting the need for a more polyvalent approach.

To address these gaps, Penn State College of Medicine and PeerView Institute for Medical Education jointly sponsored a CME initiative titled “Improving Patient Outcomes in Rheumatoid Arthritis: The Importance of Tight Control and Treating to Target,” which incorporated a unique curriculum and instructional design, preceded by a knowledge and performance assessment. The activity was launched in June 2012 within its own unique web property (http://tinyurl.com/bggo3qj). Three components of the initiative were certified for AMA PRA Category 1 Credit™ (0.5, 0.75, and 1).

The CME initiative, including the development of the manuscript, was supported by an independent educational grant from UCB, Inc.

The instructional design and incorporation of adult learning principles of the CME initiative and high level results will be summarized and discussed.

### MATERIALS AND METHODS

#### Instructional Design

The curriculum elements of the CME initiative (Table 1) were hosted on a unique web property (http://tinyurl.com/bggo3qj). The target audience was 4,000 validated U.S.-based rheumatologists who manage patients with RA. Instructions recommended that learners first complete an assessment of their current knowledge and practice behaviors. Based on results from this self-assessment, learners were emailed recommendations to help match their needs and current practice behaviors with a specific set of curriculum components. Learners were not required to complete the self-assessment. Each of the 3 modules (InReview, InExchange, or InPractice) could be completed separately and in any order to obtain CME credit. The learning objectives of the 3 modules were closely inter-related (Table 2).

Practice aids specific to each module were available for download. The aids, also reviewed in the modules, provided learners with tools to assist in applying the learning objectives to clinical practice.

The CME initiative also provided learners the option of participating in the 3 modules using print, audio (MP3), or audio-visual (podcast) media.

#### User-Friendly Tools

Several tools facilitated navigation within and across curriculum components, as well as access to other resources or media. Learners could navigate to a specific slide or start/stop within a module and view the audio as text on the screen. Icons for downloading a printer-friendly version of the activity, practice aids, activity slides, print, audio, or audio-visual media were provided at the bottom of each viewing screen.
Outcomes Measurement Tools
Changes in Moore levels 3 (knowledge) and 4 (competence) were assessed using challenge questions embedded within the 3 modules (Table 3). Respondents could immediately compare their responses against those of other participants. The challenge questions were not included in the print, audio (MP3), or audio-visual (podcast) media. An online survey was emailed to rheumatologists prior to and approximately 90 days following participation (Table 3). The survey consisted of 22 questions that addressed the attitudes, knowledge, and clinical use of updated RA guidelines and consensus statements [2,3,7-10].

Table 2. CME Activity Objectives

<table>
<thead>
<tr>
<th>InReview</th>
<th>InExchange</th>
<th>InPractice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discuss comorbidities, risk factors, and quality of life issues associated with rheumatoid arthritis (RA)</td>
<td>Differentiate among currently available and validated tools for assessing RA disease activity, focusing on relative advantages, disadvantages, and ease of use in daily practice</td>
<td>Identify the clinical features of RA, including extra-articular manifestations</td>
</tr>
<tr>
<td>Describe the pathophysiology of RA in the context of clinical presentation and therapeutic targets</td>
<td>Recognize the impact of early treatment and tight control on long-term patient outcomes in RA.</td>
<td>Apply contemporary classification/diagnostic criteria for RA and other rheumatoid diseases to facilitate early diagnosis</td>
</tr>
<tr>
<td>Apply updated classification criteria for RA to facilitate early diagnosis</td>
<td>Discuss the value of individualizing therapy based on patient factors and treat-to-target goals</td>
<td>Recognize the impact of early treatment and tight control on long-term patient outcomes in RA</td>
</tr>
<tr>
<td>Recognize the impact of early treatment and tight control on long-term patient outcomes in RA</td>
<td>Implement evidence-based data regarding the use of disease-modifying agents in the treatment of patients with RA to achieve tight disease control.</td>
<td>Implement evidence-based data regarding the use of disease-modifying agents in the treatment of patients with RA to achieve tight disease control</td>
</tr>
<tr>
<td>Discuss the value of individualizing therapy based on patient factors and treat-to-target goals</td>
<td>Describe the impact of adequate treatment on the comorbidities associated with RA.</td>
<td>Discuss the value of individualizing therapy based on patient factors and treat-to-target goals</td>
</tr>
<tr>
<td>Apply a multidisciplinary approach to achieve optimal outcomes in patients with RA</td>
<td>Describe the impact of adequate treatment on patients with RA and comorbidities</td>
<td></td>
</tr>
</tbody>
</table>

The survey featured several question types, including multiple-choice questions; agreement ratings; attitudinal and frequency of use ratings of different tools, guidelines, and clinical practice strategies; open-ended inquiries on current challenges and barriers; and ratings of statements based on current/desired level of knowledge/competence and the importance to clinical practice. Some of the multiple-choice questions were based on 2 hypothetical case descriptions of patients with suspected early RA (one involving a 32-year-old woman and the other a 43-year-old man).

Demographic questions were included in the online survey and evaluation form. Additional demographic data on participants were taken from PeerView’s internal database.

Table 3. Overview of Outcomes Measurement Tools

<table>
<thead>
<tr>
<th>Moore Level</th>
<th>Learning Area</th>
<th>Location</th>
<th>Question Type(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Knowledge: Immediate</td>
<td>InReview, InExchange, InPractice</td>
<td>Multiple choice: pre/post, post-only</td>
</tr>
<tr>
<td></td>
<td>Knowledge: Sustained</td>
<td>Online survey</td>
<td>Multiple choice and rating scales: pre- and follow-up (90 days)</td>
</tr>
<tr>
<td>4</td>
<td>Competence</td>
<td>InReview, InExchange, InPractice</td>
<td>Multiple choice: pre/post, post-only</td>
</tr>
<tr>
<td>5</td>
<td>Performance</td>
<td>Online survey</td>
<td>Multiple choice, rating scales, and open-ended responses: pre- and follow-up (90 days)</td>
</tr>
</tbody>
</table>
Table 4. Curriculum Downloads by U.S. Rheumatologists

<table>
<thead>
<tr>
<th></th>
<th>Practice Aids</th>
<th>Activity Slides</th>
<th>Transcripts</th>
<th>Audio [MP3]</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>InReview</td>
<td>49</td>
<td>28</td>
<td>21</td>
<td>4</td>
<td>102</td>
</tr>
<tr>
<td>InExchange</td>
<td>39</td>
<td>48</td>
<td>9</td>
<td>23</td>
<td>119</td>
</tr>
<tr>
<td>InPractice</td>
<td>8</td>
<td>16</td>
<td>9</td>
<td>9</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>96</td>
<td>92</td>
<td>39</td>
<td>36</td>
<td>263</td>
</tr>
</tbody>
</table>

**RESULTS**

**Participation and Curriculum Downloads**

There were 956 unique U.S. rheumatologist participants in the curriculum. Of these, 437 participated in 1 module, 268 participated in 2 modules, and 251 participated in all 3 modules. Participants were defined as learners who accessed the media player, regardless of whether challenge questions were completed.

The number of curriculum downloads by U.S. rheumatologists is provided in Table 4. The majority of downloads were from the first 2 modules. Additionally, there were 2,293 podcasts downloaded by all participants including a broader audience from the medical community. iTunes does not report demographic data on subscribers. The number of podcast downloads by rheumatologists alone from the PeerView channel in iTunes could not be calculated.

**Demographics**

**PeerView Database Results**

Of the 956 U.S. rheumatologists who participated in the curriculum, the majority (25%) were from the mid-Atlantic region, with the Southeast region being the second most populous source (22%). The respondents reported seeing an average of 107 patients with RA or another disease in a typical week. Seventy-eight percent were in an urban area. Fifty percent of respondents practiced in suburban areas; 41% practiced in an urban area. Fifty-two percent indicated that their patients experienced symptoms for 3 to 6 months before being seen. For another 20%, the interval was 7 to 12 months.

**Online Survey Results**

As previously reported, 96 unique U.S.-based practicing rheumatologists from 29 different states (top 5 states: CA, NY, NJ, PA, CT) completed the pre-participation online survey: 44% self-reported treating 25 to 49 patients with RA during a typical week; another 20% treated 50 to 75 patients with RA in a typical week [11]. Seventy-seven percent practiced in a “community-based” clinical setting, and 21% practiced in an “academic” setting. Approximately half of respondents practiced in suburban areas; 41% practiced in an urban area. Fifty-two percent indicated that their patients experienced symptoms for 3 to 6 months before being seen. For another 20% the interval was 7 to 12 months. Demographic results from the follow-up survey (n = 94) and from paired data (n = 36) were not significantly different from the pre-participation results.

**Outcomes Measurement**

Completion of the challenge questions within each module was not mandatory in order to continue, and the number of respondents completing these varied (Table 5). The highest number was found for the online survey (96 pre- and 94 for follow-up). For the 3 modules, the number of respondents completing the post-participation questions was higher than that for the pre-topic question.

Online survey completion, which was not linked with the CME activity, took 20 to 30 minutes, and respondents received a $50 honorarium for their participation. Estimates of the response rates for the challenge questions versus the number of participants suggest that they were in the low single digits.

The pre-participation levels for the correct responses for challenge questions were ≥80% for 3/8 (inPractice), 1/9 (inPractice), and 2/8 (inReview) questions. Statistically significant pre- to post-participation changes were found for all challenge questions (Table 6). The challenge questions comprised multiple-choice knowledge and case vignette questions.

For each module, the post-participation proportion of respondents correctly answering was ≥80% for all but 1 of the challenge questions. The median change for the inExchange questions was higher than that for the other modules. Statistical tests were not undertaken between the median values.

**Summary of Online Survey Results**

Paired and aggregate comparisons revealed the presence of significant barriers, issues, and challenges in the clinical practices of the participating rheumatologists, including knowledge/familiarity/comfort regarding...
appropriate tools to assess disease activity, cost/reimbursement/managed care issues, and more practical and less time-consuming tools for measuring disease activity.

For the paired results (n = 36), there were pre- to follow-up differences in the individual selection of the most frequently reported barriers to optimal implementation of RA quality indicators in clinical practice. The 3 most frequently reported barriers (pre- and follow-up) were “Lack of regular patient visits,” “Lack of health insurance coverage and/or out-of-pocket patient costs,” and “Time constraints.” The total number of barriers selected was similar: 82 (pre-) versus 88 (follow-up). The most commonly submitted open-ended responses to the question “What issues, challenges, or problems do you or your colleagues currently face in the assessment/monitoring of patients with RA that you would like to see addressed in future educational activities?” fell into 2 categories: more practical and less time-consuming tools for measuring disease activity and cost/insurance issues.

**DISCUSSION**

The instructional design was well matched with the target audience of practicing U.S. rheumatologists. This was supported by the high number of curriculum components downloaded by respondents: rheumatologists accessed the CME content as print, audio, and audio-visual media. Additionally, they downloaded practice aids, which provided them with tools and resources to implement the curriculum into clinical practice. It is likely that many of the user-friendly tools, which facilitated navigation and access to other resources, contributed to these activities.

The demographic findings for rheumatologists were consistent with those from a previous survey of this target audience in the United States [12] as well as the 2009 American College of Rheumatology Benchmark Economic study [13], suggesting that the rheumatologists participating in this initiative were representative of the larger audience.

This initiative incorporated adult learning principles at several levels. Learners were instructed to first complete an assessment of their current knowledge and practice behaviors and, based on this self-assessment, were emailed a specific set of recommended curriculum components to complete. For example, learners demonstrating advanced knowledge were encouraged to bypass the inReview module and proceed to the more advanced inPractice and inExchange modules. Completion of the 28-question self-assessment was not a requirement for participating in the core activities, and a majority of participants opted to access the core activities directly. There are several possible explanations. The self-assessment was not certified for credit, and respondents may have viewed the number of questions as too numerous; others likely came into the initiative with a particular idea of what information they were seeking. There are natural limitations to obtaining completions in assessments not providing an incentive. It is recommended that future CME activities focus on optimizing synergies between different assessment tools and consider additional strategies to encourage self-assessment.

Participation in this CME initiative was associated with large gains in knowledge and competence. The pre-participation proportion of respondents correctly answering the multiple-choice knowledge and case-based questions suggests that the needs assessment for this initiative was on target. Statistically significant changes were found for all pre/post challenge questions indicating that the CME content was highly effective in this target audience. The use of challenge questions posed to participants before the education concept was covered, and an instant polling feature that allowed participants to see how their responses compared with those of their peers were used in all modules. Despite the inclusion of these features, however, the proportion of participants completing the optional challenge questions was low. Further efforts in future CME activities to increase engagement with these features would be beneficial.

Differences in range of pre- to post-participation increases for the multiple-choice questions suggest that the inExchange module may have been more effective than the inReview or

### Table 6. Summary of Results from Challenge Questions

<table>
<thead>
<tr>
<th>Curriculum Component</th>
<th>Number of Questions with Statistically Significant Differences*</th>
<th>Range of Pre to Post Changes; Median</th>
<th>Topic Area of Question with the Largest Pre to Post Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>InReview</td>
<td>8/8</td>
<td>19% (2.6-fold); 32%</td>
<td>Index-based definition of remission per ACR/EULAR</td>
</tr>
<tr>
<td>InExchange</td>
<td>9/9</td>
<td>18% (8.5-fold); 58%</td>
<td>Cutoff score for remission of an ACR-recommended composite tool</td>
</tr>
<tr>
<td>InPractice</td>
<td>8/8</td>
<td>13% (2.8-fold); 34%</td>
<td>Appropriate follow-up for assessment of disease activity following treatment initiation with anti-TNF/MTX</td>
</tr>
</tbody>
</table>

*P ≤ .0115
The content of the inExchange module was focused on overcoming barriers to initiating early/aggressive therapy and early referrals, which was a theme common to many of the open-ended responses provided by rheumatologists in the online survey.

The online survey, assessed pre-participation and approximately 90 days following completion, measured the attitudes, knowledge, and clinical use of updated RA guidelines and consensus statements [2,3,7-10]. The questions were multiple choice, rating scales, or open ended. The open-ended responses provided by rheumatologists in the online survey suggest that significant barriers remain in the treatment of RA and that additional CME interventions are needed to address them.

CONCLUSIONS

An online CME initiative with a unique instructional design was effective at increasing the knowledge and competence of practicing U.S. rheumatologists. Respondents availed themselves of the user-friendly tools, which also facilitated participation in print, audio, or audio-visual media. An accompanying online survey provided rich insight into the practice patterns, attitudes, and frequency of using different guidelines and recommended disease activity measures. Rheumatologists found important barriers to their implementation of the new guidelines and recommended tools.

ACKNOWLEDGMENTS

The authors gratefully acknowledge Jennifer Boyd, Melissa Klingler, Michael Beyer, Miriam Timmerman, and Bonnie Bixler for their assistance with this manuscript.

REFERENCES