

Improving management of musculoskeletal disorders in primary care: the Joint Adventures Program

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Abstract Musculoskeletal disorders represent a large and growing clinical challenge to primary care clinicians. Unfortunately, there appears to be a gap in current training and continuing education to meet this challenge. We used script concordance within a continuing medical education program entitled “Joint Adventures” to assist family physicians to acquire the knowledge, skills, and tools they need to improve their management of musculoskeletal disorders. Program workshops were coordinated through a national continuing education program of the College of Family Physicians of Canada. A group of 54 experts in musculoskeletal disorders including family physicians, rheumatologists, and orthopedists developed cases for six areas of management that were identified by family physicians during a needs survey delivered at a national scientific congress in primary care. Script concordance methodology was used in the Joint Adventures workshop to address knowledge gaps or lack of group consensus in the six areas including (1) diagnosis of osteoarthritis, (2) treatment and

management of osteoarthritis, (3) treatment and management of rheumatoid arthritis, (4) diagnosis and treatment of back pain, (5) diagnosis and treatment of fibromyalgia and diagnosis, and (6) treatment of shoulder pain. Each workshop session included 5–30 family physicians, a specialist expert, and a family physician facilitator. Before each session, a group needs assessment was conducted to identify which one or two of the six cases would be used. Perceived knowledge and skill acquisition, self-assessed change in practice, and satisfaction with the program were measured at the conclusion of each session and again at 3 months post program. All programs were delivered from March 2003 to September 2005. Six hundred and fifty family physicians from across Canada completed the program. In general, participants reached concordance with each case. Measures of knowledge and skill acquisition and self-assessed change in practice were significantly improved with high rates of program satisfaction. The Joint Adventures program provided family physicians with knowledge and skills that changed their care of musculoskeletal disorders. This was achieved using consensus that was sensitive to local needs. Further use should be evaluated in other areas of medical practice as well.

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Introduction

Musculoskeletal (MSK) complaints are the most common reason for family physician visits [1] that parallel an aging population [2]. Despite the growing burden of MSK disorders in clinical practice, training has not kept pace. Medical school students receive only cursory instruction as

to the diagnosis and management of MSK disease or injury [3, 4], resulting in a discrepancy with the knowledge and skills needed in primary care practice [5, 6]. Even for physicians in practice for a number of years, perception of a gap in knowledge and skills is problematic [7, 8]. Overall, in Canada, few reports have described MSK continuing medical education programs with reference to addressing family physician needs including how the education is delivered [6, 8]. These shortcomings may exacerbate the gap in required skills and knowledge needed to address the growing burden of MSK disorders observed in practice in the long term [7–9].

To address these shortcomings, we developed a continuing medical education program entitled Joint Adventures to close the care gap using script concordance that attended to real-world learning and local peer needs.

Traditionally, continuing medical education has not supported the concept that a physician's analytical or deductive thought processes when dealing with an individual patient were not linear or algorithmic. Alternatively, knowledge acquisition may involve assembling blocks of prestored medical information or concepts, into linked networks known as "scripts." Such scripts are automatically activated when the doctor listens to a patient's history, and the doctor formulates his or her therapeutic recommendations by comparing the patient's comments with the information contained in those scripts. Diagnosing a patient's disorder, in effect, may be based on learned relationships and expectations, which the physician uses to arrive at the most probable diagnosis [10, 11]. Such scripts are built upon and modulated by experience, so it's not surprising that clinicians who have been practicing longer have a greater store of "scripts" to call upon. More experienced clinicians, therefore, may be better equipped to identify an MSK problem, but also to anticipate issues that might have an impact on treatment strategies. Script concordance as a teaching tool has been demonstrated and validated in previous studies involving therapeutic areas such as radiology [12], gynecology, and surgery [13, 14] and was identified as an important component of Joint Adventures.

Materials and methods

The Joint Adventures program was developed by an advisory group of 54 experts, including family physicians, rheumatologists, orthopedists, gastroenterologists, nephrologists, and endocrinologists recognized as leaders in MSK disorders. Six real-life scenarios and case studies were developed including osteoarthritis diagnosis, osteoarthritis treatment and management, rheumatoid arthritis treatment and management, back pain treatment and management, fibromyalgia diagnosis and treatment, and shoulder pain

treatment and management. These topics were selected based on needs assessments conducted during a workshop at the Annual Scientific Congress of the College of Family Physicians of Canada and on focus groups with family physicians using a previously described format [6]. Each case study included a 75-min workshop, and completion of each workshop would represent a continuing medical education credit from the requirements of the College of Family Physicians of Canada. Using script concordance [10] methodology, participants were presented with a case study followed by a list of questions, diagnostic hypotheses, investigational actions, or treatment options. Participants were instructed to consider relevant aspects of the patient history that could impact the hypotheses, treatment options, or investigational procedures, and they were asked to score their responses on a linear 5-cm Likert-type scale. Scoring ranged from -2, meaning the hypothesis was not supported, to +2 meaning the hypothesis was strongly supported. A score of 0 neither supported nor ruled out the physician's hypothesis. Respondents marked their score with a vertical line that completely bisected the linear Likert scale line. Hence, script concordance provided the workshop participant with a comparison of his or her responses with the responses obtained among the peer group in the session and those of the panel of experts. Such comparisons were designed to identify the presence or absence of gaps in the participant's hypothetico-deductive processes and to provide a venue for joint discussion and learning (aka "Joint Adventures") among workshop participants.

Case expert answers were used to guide the script concordance methodology. The answers were determined by aggregate responses among the panel of experts and modified over the first 3 months of the program using modal answers from participants if these differed from the panel responses. Workshops were promoted in several ways including notifications through each Canadian medical school continuing education program, pharmaceutical industry representatives detailing in family practices, medical journals advertising, local hospital continuing education programs, and notices at the Annual Scientific Congress of the College of Family Physicians of Canada.

The workshops were led by a trained facilitator family physician, who was assisted by an expert specialist drawn from one of the subspecialties that helped design the case studies. Both facilitators and experts received training in script concordance [11] and in the goals of the Joint Adventures program. Specifically, a goal of the Joint Adventures program was to enable participants to select a topic of interest and then the group would determine optimal management with input from the clinical expert within the context of available resources in their host community. Attendees were presented with the case and asked to answer at least ten carefully constructed "script" questions, after

which the case was opened for facilitated, focused discussion, and the rationale behind each answer was discussed. The expert participated when requested by the group.

Participating physicians completed pre-workshop personal needs assessments (areas of perceived knowledge gaps in diagnosis and treatment, management of community resources etc) followed by a post-workshop reflective questionnaire (regarding change in practice, change in knowledge, change in resource utilization, and satisfaction with the Joint Adventures program in terms of format and addressing individual needs) 2–3 months later to determine change in practice knowledge and specific program Joint Adventures delivery and future utility issues. Responses to the questions were measured using a 5-cm Likert scale anchored from -2 (limited knowledge) to +2 (completely adequate knowledge). Completion of the post-workshop reflective questionnaire was required to receive accreditation from the College of Family Physicians of Canada.

Case study example

Mrs. G. is a 66-year-old Caucasian clerical worker who presents to your office complaining of bilateral knee pain. The pain has been gradually progressive over the past 5 years, and she now describes it as unbearable. She has difficulty walking up the two flights of stairs to her apartment and is unable to kneel down to reach the bottom drawers of filing cabinets. She also notes pain in her hands and left hip for the past year and morning stiffness lasting about 20 min in her hands most days. She has been using over-the-counter analgesics, but claims they no longer help.

Past history reveals Type 2 diabetes, diagnosed 3 years ago and managed with oral hypoglycemics, diet, and exercise. She also recalls a distant history of peptic ulcer disease. She is a nonsmoker and consumes alcohol socially.

Current medication status includes:

Metformin	500 mg t.i.d.
Glyburide	10 mg b.i.d.
Conjugated estrogen	0.625 mg o.d.
Medroxyprogesterone acetate	2.5 mg o.d.
Acetaminophen	1–2 tablets p.r.n.

The diagnostic hypotheses, possible courses of action, and degree of concordance as presented to participants are shown in the table below

Diagnostic hypothesis	How does this course of action affect the hypothesis					
Q1 Prescribing acetaminophen	She has been taking 1–2 g of acetaminophen/day without relief.	-2	-1	0	+1	+2

Q2 Prescribing a traditional NSAID	She is taking low-dose ASA for cardiovascular prophylaxis.
Q3 Prescribing a traditional NSAID or a coxib	Her serum creatinine is normal.
Q4 Injecting her with a corticosteroid	Her blood sugar has been poorly controlled.
Q5 Starting a course of intra-articular visco-supplementation	Her X-ray indicates severe OA.
Q6 Prescribing a coxib	Her BP is 152/86.
Q7 Prescribing a coxib over an NSAID	She is taking warfarin for atrial fibrillation.
Q8 Advising exercise	Her symptoms are worsened by walking.
Q9 Referring her for occupational therapy	Her disease is limited to OA of the knee.
Q10 Referring her for nutritional counseling	Her BMI is 29.

Scale: -2 The proposed action is contraindicated totally or almost totally; +2 the action is necessary or absolutely necessary, 0 the proposed action is neither more not less useful.

In the example here, concordance was not achieved for Q2, 5, 6, 7, and 9 leading to core learning areas group discussion and consultation with expert in attendance.

Analysis

Differences between baseline and follow-up measures of areas of perceived knowledge gaps in diagnosis and treatment and management of musculoskeletal disorders were determined using Student’s *t* tests. No formal sample size determination was made. All data are reported as mean (SD). Significance was accepted at *p*<0.05.

Results

Workshops were initiated in March 2003–September 2005 in nine of ten Canadian provinces. In all, 659 of 829 invited physicians participated in the Joint Adventures program workshops (mean of 10 per workshop, range 6–48). Attendees were asked to select in advance one to two of the six case studies that would be the focus of the workshop. Attendees completed a mean of 1.3 (0.6) case studies each, spending 1.82 (0.30) hours per case. Forty-nine participants repeated the program at least twice. There was no difference between

attendees and those who chose not to attend in terms of practice demographics or gender.

There was representation among urban and rural sites (<10,000 population) with 19 workshops held in rural centers, while 42 were held in cities, including ten that were university-supported continuing medical education programs.

Our pre-workshop needs assessment of MSK management showed a significant ($p < 0.05$) gap between the levels of information the attendees had before the workshops [2.3 (1.5)], and the level of knowledge they would like to have [4.7 (0.5)] as measured on the 5-point visual analogue scale (where 0 represented limited knowledge and 5 completely adequate knowledge).

Regarding specific knowledge/skills change in the cases overall, Table 1 shows that significant improvements after the workshop in the differentiation of pain source from inflammation vs mechanical pain, diagnostic tests, treatment, risk with NSAIDs, exacerbation of shoulder pain, and how to utilize community resources were observed after a representative case.

The respondents claimed a high level of satisfaction with the content and format of the workshop. Specifically, of the 216/659 who completed the post-workshop assessment for this case, responses showed a high level of overall satisfaction with the format and meeting individual needs [4.6 (1.1) and 4.8 (0.4), respectively]. Individual responses are shown in Fig. 1.

Qualitative answers to questions about the workshop were also encouraging, although they were somewhat more

difficult to quantify. When the attendees were asked whether or how this workshop would lead to a change their clinical practice, common responses included more frequent use of complementary therapies including over-the-counter medications; more avoidance of NSAIDs; more frequent monitoring for adverse events; more frequent use of specific radiographics in cases of suspected osteoarthritis; more time spent focusing on history of osteoarthritis, rheumatoid, and psoriatic arthritis; and more aggressive pain management.

With respect to the specific query “what knowledge and skills did you learn from the program that you didn’t know or have before?”, responses included more detailed history taking skills, more knowledge of the impact of NSAIDs on hypertension, increased knowledge of safety issues surrounding both NSAIDs and Cox-2 inhibitors, and skills in calculation of creatinine clearance to assist medication prescription.

Discussion

The primary goal of the Joint Adventures program was to use the script concordance methodology to improve physician knowledge and skills in MSK disorders diagnosis and management that are common in the family practice setting. The large number of participants and broad distribution of practice locations/settings suggest that the results could support generalization nationally. We observed a high degree of satisfaction and knowledge/skills acquisition for translation into practice change. Few barriers to implementation of new knowledge and skills were observed and were justified by participants as being necessary to overcome and improve care of these patients.

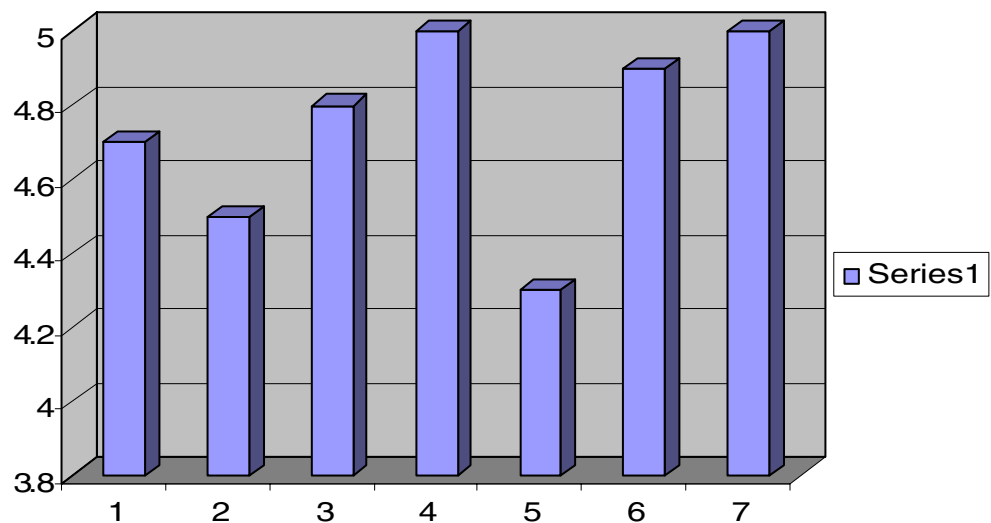
We found more interest in cases that dealt with the diagnosis, management, and treatment of osteoarthritis (570/659) and rheumatoid arthritis (200/659) compared to fibromyalgia (45/659) or back pain (85/659). This may have reflected the fact that physicians recognize that these latter two topics are somewhat less common in their practice or were limited in their knowledge and skills needs. Furthermore, fibromyalgia and back pain management may represent more difficult clinical presentations that many family physicians would prefer to refer away to a specialist.

Participant physicians qualified for continuing medical education accreditation with the College of Family Physicians of Canada. Members of the College of Family Physicians of Canada were required to accumulate 24 h of credits over a 5-year period to maintain membership at the time of the Joint Adventures program. Hence, accreditation of the program was perceived as a further professional benefit among participants. It was felt that the 2-month post-program evaluation would allow physicians time to reflect on the

Table 1 Changes in knowledge in representative group

	Pre-workshop knowledge	Post-workshop level of knowledge	<i>p</i> level
Differentiating inflammatory and non-inflammatory arthritis	3.1	4.0	<0.001
Differentiating mechanical pain from inflammatory pain	3.4	4.0	<0.01
Ordering lab tests in the diagnosis and management of arthritis	3.0	4.0	<0.001
Choosing appropriate pharmacotherapy for MSK pain	4.1	5.0	<0.001
Identify patients at high risk for NSAID-induced GI, and/or cardiorenal complications	3.0	5.0	<0.001
Identify the causes of shoulder pain and comfortable with shoulder anatomy	4.0	5.0	<0.001
Examining the shoulder	3.0	5.0	<0.01
Availability of community resources for patients	3.0	5.0	<0.001

Fig. 1 Satisfaction with Joint Adventures program among participants. 1 The program met the stated objectives. 2 The program met my expectations. 3 The program met my personal learning objectives. 4 The program was credible and non-biased. 5 The program was well-organized. 6 The program was relevant to my daily work. 7 I would recommend this program to my peers



implementation of the knowledge and skills learned and to determine the impact on their change in practice. However, this was also at risk of a lower response rate to our study. In contrast, we observed a high response rate in part due to the requirement that physicians complete all evaluations to receive credits with the College of Family Physicians of Canada. Of the 659 participants who completed the workshops, all but 57 obtained accreditation.

Possible limitations

The strengths of the Joint Adventures program include the case selection based on physician needs in musculoskeletal disorder diagnosis and management, and the assembly of a large, multidisciplinary expert panel from across Canada with expertise in the six key areas. We also accredited the program with a national continuing education organization and sampled the impact from family physicians from all regions and practice settings across Canada.

Despite these strengths, there are some potential limitations to our study and program. One limitation to script concordance learning is that there is no guarantee that practicing clinicians will “assemble” such blocks of information or “scripts” in any particular way that will enhance their learning or their practice patterns. However, we observed higher rates of practice knowledge and satisfaction although this is limited to only 2-months follow-up. Furthermore, responses to the post-workshop questionnaires were largely qualitative rather than quantitative. It is impossible to measure how strongly the physicians felt about changing their practice patterns to reflect what they learned, nor can we say whether the physicians applied what they learned in all cases of suspected MSK injury.

From a practical standpoint, the opportunity to organize a facilitator/experts for every clinical session and assembling an

expert panel as changes in diagnostic and management recommendations occur may not be feasible in the long term. To address this potential limitation, we have developed an online format of case delivery and content updating that may also provide greater flexibility among interested physicians to participate, as well as providing easier ways to facilitate sessions and update content.

Conclusion

Given the need to provide quality musculoskeletal continuing education among medical students and practicing family physicians, we believe that script concordance provided a relevant format within the Joint Adventures program that can improve knowledge and skills and effect a change in practice. The high degree of satisfaction among this large cohort of representative family physicians that was tailored to their perceived needs suggests sustainability of knowledge and skills, as well as longevity of this program as a strategy to address new knowledge gaps in musculoskeletal disorders. Further study is needed to determine whether our impact in practice change is sustained in musculoskeletal disorders and whether this format is effective in other clinical and therapeutic areas.

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