Original Article

Panel-Based Pain Management in Primary Care: A Pilot Study

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Abstract
Although pain is an extremely common symptom presenting to primary care physicians, it frequently is not optimally managed. The purpose of this feasibility study was to develop and pilot-test an efficient, rapid assessment and management approach for pain in busy community practices. The intervention utilized the Dartmouth COOP Clinical Improvement System (DCCIS) and a telephone-based, nurse-educator intervention. Patients from four primary care practices in rural New Hampshire and Vermont were screened by mail for the presence of persistent pain. Patients with mild to severe pain were randomized to either the usual care control group (n = 383) or the intervention group (n = 320). Patients who reported pain but no psychosocial problems received a summary of identified problems and targeted educational material via mail (DCCIS). Patients who reported pain and psychosocial problems received the DCCIS intervention and calls from a nurse-educator who provided pain self-management strategies and a problem-solving approach for psychosocial problems. Post-treatment evaluation revealed that patients in the intervention group scored significantly better on the Pain, Physical, Emotional, and Social subscales of the SF-36 and on the total score of the Functional Interference Scale, as compared to a usual care control group. Feasibility and acceptability of the approach were demonstrated; however, the conclusions based on analyses of the post-treatment outcomes were tempered by baseline imbalances across groups. J Pain Symptom Manage 2001;22:584–590. © U.S. Cancer Pain Relief Committee, 2001.

Key Words
Pain, primary care, Dartmouth COOP Clinical Improvement System, nurse-educator, problem-solving

Introduction
Pain is an extremely common symptom presenting to primary care physicians and accounts for significant suffering on the part of patients, billions of lost work days per year, and increasing rates of disability and health care utilization. Unfortunately, pain frequently is not helped by the standard medical interventions. Several reasons may account for the lack of effectiveness of pain interventions in primary care. First, although researchers and clinicians have assumed that the majority of pain problems seen in primary care resolve in a month or less, with no or minimal intervention, recent data from the low back pain literature demon-
strate that when followed longitudinally, the majority of patients seeking health care for pain experience recurrent episodes of pain for one year or more. Two-thirds to three-fourths of patients continue to experience at least mild pain 1 month after seeking care, 33% report moderate pain at 1 month (20–25% having substantial activity limitations due to pain), and one-third report intermittent or persistent pain of at least moderate intensity for a year or more. These data and others suggest that once patients are seen in primary care, pain frequently becomes a chronic or recurrent problem.

Second, physicians typically work from a medical model and treat pain as if it were a symptom of an underlying physical problem. Yet, in the case of back pain, fewer than 15% of patients will have a clearly identifiable organic pathology that adequately explains the cause of the pain. Further, it has been found that many people with pain frequently do not seek medical attention for their pain until there are changes in psychological, social, or work-related functioning. Hence, there is often a mismatch between the treatment prescribed by the physician and the problem that prompted the patient to seek health care. Although improved health outcomes are achieved when physicians attend to psychosocial problems and engage patients in treatment planning, these interactions may be becoming less common as pressure from managed care companies reduces the time for each clinical encounter. Consequently, there is a critical need to develop systems that improve health outcomes but do not require more time on the part of primary care physicians.

How might the needs of patients with pain be better managed in an increasingly time-constrained primary care practice? A recent summary of the literature suggests that the most promising approach is to enhance the elements of a productive patient-provider interaction. The elements required for a productive patient-provider interaction that leads to improved functional and clinical outcomes include: 1) a supportive health system organization; 2) an informed, activated patient; and 3) a prepared, proactive practice team. Replicable systems are required that facilitate the evolution of these elements in a broad range of community practices. One such system shown to be effective in improving clinical practice in controlled trials is the Dartmouth COOP Clinical Improvement System (DCCIS).

Based on the model of an improved patient-provider interaction, we designed a pilot/feasibility study with the primary propose of developing the best, most efficient rapid assessment and management approach for pain in busy community practice. The intervention model utilized the DCCIS and a telephone-based, nurse-educator intervention. The logic of the intervention was that patients with no psychosocial problems associated with their pain would very likely respond to an intervention that emphasizes rapid feedback regarding response to treatment and tailored education which forms the basis for effective communication between the patient and physician regarding pain management. However, because psychosocial problems are common and often the precipitant for a clinical encounter, we proposed that patients with associated psychosocial problems would also benefit from a problem-focused approach designed to treat identified psychosocial problems while the pain is being managed.

**Methods**

**Study Design**

Because this was our first attempt at conducting a panel-based screening for pain and the first evaluation of our intervention, we decided to keep the patient burden of completing questionnaires to a minimum. Consequently, patients were screened with a brief questionnaire (described below) for the presence of pain. Patients with persistent mild to severe pain were randomized to receive the intervention or to a usual care control group. Outcome assessment occurred at 6-months post-enrollment/screening only.

**Patient Selection**

Patients from four primary care practices in rural New Hampshire and Vermont (n = 3954) were mailed a three-page “Patient Health Screening Questionnaire” that assessed pain (intensity, duration, location, and adequacy of treatment), general health and specific common health problems (high blood pressure; heart trouble; diabetes; arthritis; asthma; bronchitis or emphysema; and nerves, anxiety, or depression), and general demographics (age, sex, race, marital status, education, and employment status). Thirty-two per-
cent \((n = 1277)\) were returned and 744 of the patients reported persistent “mild-severe” pain \((3–5\) on a 5-point scale) over the last 4 weeks.

Patients reporting mild to severe pain on the Patient Health Screening Questionnaire were randomized to either the usual care control group \((n = 383)\) or the intervention group \((n = 320)\). Patients randomized to the intervention group were mailed the DCCIS questionnaire, with a return rate of 92\% \((n = 295)\). The DCCIS questionnaire assessed a variety of areas of physical health and psychosocial problems, knowledge of preventive needs, patients’ evaluation of the medical care received from their clinician. Based on responses to the DCCIS questionnaire, patients were divided into two groups: 1) pain without self-reported psychosocial problems and 2) pain with self-reported psychosocial problems. Psychosocial problems were defined as level 4–5 impairment (5-point scale) on the DCCIS Questionnaire in one or more of the following areas: “feelings,” social activities, social support, sexual problems, substance abuse, or violence or abuse. Patients who completed the DCCIS Questionnaire received the stepped intervention described below. Patients reporting pain but no psychosocial problems received the DCCIS component of the intervention only, whereas patients reporting pain and psychosocial problems received the DCCIS and nurse-educator interventions.

**Intervention**

**Dartmouth COOP Clinical Improvement System (DCCIS).** The DCCIS emphasized rapid assessment of problems and feedback to patients and practitioners. For this study, a computer-based algorithm generated a “prescription” letter tailored to the patient’s responses on the DCCIS Questionnaire. The letter summarized the problems endorsed and referred them to specific pages of self-care educational information, particularly a section on pain management. The letter and educational material were mailed to the patient. Their physician was sent a computer-generated patient flow sheet designed to improve communication and covered easy-to-miss preventive and psychosocial problems that could be used as the basis for discussion at the next patient visit.

**Nurse-Educator Intervention.** The nurse-educator worked out of the research office and contacted patients by telephone only for all four practices. The intent of this intervention was to provide tailored interventions for pain-related and psychosocial problems that took patient preferences into account. Specifically, the nurse-educator: 1) conducted an assessment of pain and psychosocial problems; 2) established patient preferences for types of pain management strategies; 3) reviewed pain self-management strategies and provided, via mail, supplemental written and audiotaped materials describing basic pain management strategies (e.g., overview of pain management, relaxation, activity pacing, sleep, and pain); and 4) provided a problem solving approach for psychosocial issues based on a problem-solving manual developed for treatment of patients in primary care. The written materials were 1–2 page summaries of the topics described above which reinforced the teaching points presented by the nurse-educator. The relaxation audiotape included versions of progressive muscle relaxation and diaphragmatic breathing. The problem solving material included a description of the steps of problem-solving and worksheets on which patients could define the problem, list pros and cons of potential solutions to the problem, and record the solution chosen. The nurse-educator also provided rapid feedback to the primary care physician regarding the interventions initiated and recommendations for changes in the treatment plan.

The nurse-educator initiated the first phone call after a patient had returned the DCCIS questionnaire and had been identified as experiencing pain and psychosocial problems, as defined above. Typically, the nurse-educator scheduled weekly calls; however, because of scheduling issues, some patient calls occurred every other week. The initial phone call lasted approximately 1 hour and the subsequent calls were approximately 30 minutes in duration. In designing the intervention, we were not certain how many phone calls would be appropriate; therefore, the protocol allowed for up to 8 phone calls. In reality, patients received an average of 3 calls (range, 1–5); hence, the duration of the intervention varied from 1 week to 3 months.

Patients in this group received the same prescription letter and educational material as patients in the DCCIS group. However, in addition, two weeks following the mailing of the prescription letter and the educational mater-
rial, the nurse-educator called the patient to review the material. Patients who reported a significant improvement in their pain (less than 3 level) received no further intervention. Patients who continued to report significant problems with pain received the nurse-educator intervention. Of the 115 patients eligible for the nurse-educator intervention, 97 (85%) agreed to participate.

**Usual Care.** The Usual Care group received routine care from the health care team.

**Outcome Assessment.** Six months post-enrollment, patients in the Intervention and Usual Care groups were mailed the questionnaires described below. Because of the variable length of the Nurse Educator intervention, patients in this group received their follow-up questionnaires 3–6 months post-intervention.

**Medical Outcomes Study-36 Item-Short Form (MOS-SF-36).** The MOS-SF-36 is a 36-item questionnaire measuring eight different health concepts: physical functioning, bodily pain, role limitations due to physical health problems, role limitations due to personal or emotional problems, emotional well-being, social functioning, energy/fatigue, and general health perceptions. It also includes a single item that provides an indication of perceived change in health. Each subscale is of either a 2-point, 3-point, 5-point, or 6-point scoring system. Each item is converted to a 0–100 scale and items within each subscale are summed and averaged. Thus, the highest score for the MOS-SF-36, or for any of its subscales, is 100. Higher scores indicate a more favorable health state. Because the primary purpose of the study was to evaluate the impact of this intervention on pain and psychosocial functioning, the following subscales were used as outcome measures: 1) Pain, 2) Role Physical, 3) Role Emotional, and 4) Role Social.

**Functional Interference Estimate (FIE).** The FIE assesses the degree to which pain interferes with one’s ability to walk, stand, work, and engage in social activities and recreational activities. Patients make ratings on a 6-point scale anchored on the left with “Pain usually or severely interferes” and on the right with “Pain rarely interferes”. Data supporting the reliability and validity of the measure have been reported for both pain clinic and general internal medicine populations. Two additional items were added to the FIE to assess interference with sexual activity and family/home responsibilities.

**Patient Knowledge Questionnaire.** Similar to the work of Roland and Dixon, we constructed a 10-item, true–false questionnaire based upon the educational materials developed for the project. This questionnaire assessed the patient’s understanding of basic pain management strategies.

**Process Questions.** A series of questions were used to assess satisfaction with pain treatment, communication with the health care team, and utilization of specific techniques presented as part of the intervention.

**Results**

The primary analysis was based on data from patients who returned the final questionnaire with usable data. Of 3954 adult patients in these practices, 703 reported on the screening health questionnaire that they had persistent mild to severe pain. Six months post-enrollment, 396 of these patients completed the follow-up questionnaire. Of the 187 intervention patients, 42 had received the nurse education and feedback of educational material tailored to their responses to the DCCIS, and 145 had received the tailored education only. The 209 usual care respondents served as the control group.

A comparison of responders and nonresponders to the follow-up questionnaire was conducted in order to assess the representativeness of the study population. Responders were not significantly different from nonresponders in terms of sex, overall health, pain intensity, or the presence of emotional problems. Responders were significantly older (49 years) than nonresponders (48 years, \( P < 0.03 \)); however, a one-year difference was not likely clinically significant. The lack of differences on the majority of baseline variables and the minor difference in age suggests that the study sample was fairly representative of the patients who received the initial screening questionnaire.

The majority of patients reported experiencing chronic pain (>6 months duration) in multiple sites, primarily low back and leg pain.
or head and neck pain. Table 1 describes basic characteristics from the Patient Health Screening Questionnaire for the intervention and usual care patients who completed the post-intervention evaluation survey. Significant differences emerged between the intervention (more women and older age in the intervention group) and usual care (higher percentage with emotional distress and fair to poor health in the usual care group) groups. Consequently, we used multiple regression analyses adjusting for age, sex, pain, health, and emotional distress as recorded on the baseline screening health questionnaire. All means presented in the tables represent unadjusted means. The analyses were performed using SPSS.

Table 2 describes the outcomes from the SF-36 and the FIE. All outcomes of care reported by the intervention patients were better than those of the usual care patients after adjusting for baseline variables. Patients in the intervention group scored significantly better on the Pain, Physical, Emotional, and Social subscales of the SF-36 and on the total score of the FIE.

In order to assess mechanisms by which the intervention produced these positive effects, items from the knowledge and process questionnaires were analyzed. Knowledge scores were slightly higher for intervention compared to usual care patients (85% vs. 81% correct responses, \( P < 0.02 \)). Within the intervention group, those who received the nurse education had the highest knowledge scores (90%).

Intervention patients reported much greater relief from medications and other treatments (intervention = 32% complete or a great deal of relief compared to control = 17%; adjusted \( P = 0.01 \)). Intervention patients also reported complete or a great deal of control over their own pain (intervention = 35% vs. control = 17%; adjusted \( P = 0.003 \)) and expressed greater satisfaction with pain treatment than usual care patients (intervention = 88% vs. control = 73%, \( P < 0.02 \)). On the provider side, intervention patients reported that their health care team: 1) provided a good explanation for their pain problem (intervention = 65%, control = 53%, adjusted \( P < 0.05 \)); 2) listened to what they had to say about their pain (intervention = 78%, control = 67%, adjusted \( P < 0.02 \)) and 3) were provided help with stress or emotional problems (intervention = 52%, control = 28%, adjusted \( P < 0.001 \)). Interestingly, we observed no difference in reported involvement in decision making regarding pain treatment (intervention = 68%, control = 63%, \( P = 0.8 \)).

### Table 1

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Usual Care (n = 209)</th>
<th>Intervention (n = 187)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Female (^a)</td>
<td>53%</td>
<td>69%</td>
</tr>
<tr>
<td>Average Age (^a)</td>
<td>48 years</td>
<td>51 years</td>
</tr>
<tr>
<td>Some College Education</td>
<td>55%</td>
<td>61%</td>
</tr>
<tr>
<td>Married</td>
<td>61%</td>
<td>68%</td>
</tr>
<tr>
<td>Working Full Time</td>
<td>48%</td>
<td>46%</td>
</tr>
</tbody>
</table>

\(^a\) \( P < 0.01 \) for these characteristics at baseline.

### Table 2

<table>
<thead>
<tr>
<th>Outcome Measures</th>
<th>Usual Care (n = 209)</th>
<th>Intervention (n = 187)</th>
<th>Adjusted ( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Component-SF 36</td>
<td>46.9 (21.0)</td>
<td>59.7 (22.1)</td>
<td>&lt;0.005</td>
</tr>
<tr>
<td>Role Physical-SF 36</td>
<td>37.5 (39.7)</td>
<td>54.8 (41.8)</td>
<td>&lt;0.03</td>
</tr>
<tr>
<td>Role Emotional-SF 36</td>
<td>62.0 (43.2)</td>
<td>81.9 (33.8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Role Social-SF 36</td>
<td>64.5 (27.9)</td>
<td>79.5 (25.5)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Functional Interference Estimate</td>
<td>14.1 (6.4)</td>
<td>17.7 (5.6)</td>
<td>&lt;0.006</td>
</tr>
</tbody>
</table>
Discussion

Pain is a common symptom among the panel of patients of the majority of primary care physicians. Despite research supporting the role of education, self-management techniques, and doctor-patient communication in the management of pain, these approaches have not been effectively and efficiently integrated into most primary care practices. The intervention evaluated in this study provides rapid assessment and feedback to physicians regarding the effectiveness of pain interventions, educates patients regarding pain and basic self-management techniques, and addresses psychosocial problems when relevant. Data from the SF-36 and the FIE provide preliminary evidence supporting the efficacy of the approach. Patients in the intervention group scored significantly better on the Pain, Physical, Emotional, and Social subscales of the SF-36 and on the total score of the FIE.

The intervention was designed to be broad-based, with the intent of improving provider/patient communication regarding pain, general information about pain management, and specific training in pain self-management skills and problem solving. Therefore, it is likely that multiple factors contributed to the overall effect of the intervention. Examination of data from the process measure supports this hypothesis, in that patients in the intervention group were slightly more knowledgeable about pain, felt more in control, were more satisfied with their treatment, and felt that the treatments provided were more effective. Patients in the intervention group also evaluated their health care team as better at providing a good explanation for the pain, listening to them about their pain, and providing help with stress and psychosocial problems.

The Clinical Improvement System/Nurse-Educator intervention addresses several important issues in the management of pain in primary care. The intervention provides a method for: 1) assessing pain and psychosocial problems and for providing appropriate interventions; 2) informing patients about evidence-based pain management strategies and approaches for coping with psychosocial problems and activating them to utilize these techniques; and 3) informing physicians about the presence of pain and psychosocial issues so they can be prepared to provide appropriate levels of interventions. Further, the intervention can be implemented with minimal increase in time or effort from the primary health care team. This is critically important given the time demands imposed by the current health care climate and the fact that pain is only one of many problems treated in primary care. The major expense of the intervention is the nurse-educator. However, this cost can be kept to a minimum since one nurse can cover multiple practices by phone and still be perceived as part of the health care team.

This intervention also has potentially important implications for a panel-based approach to pain management. Data have clearly shown that many patients experience pain without consulting their physicians. Therefore, this approach may be effective for a wider group of people with pain who prefer not to seek health care. Further, research suggests that patients access the health care system when they begin experiencing limitations due to pain or an increase in psychosocial distress. Although not explicitly addressed in the current study, this intervention may prevent the need for patients to access the health care system because basic pain self-management and strategies for coping with psychosocial stress are provided.

Despite the initial positive results, there are limitations to the current study. First, the patient response rates were low. Only 32% of the 3944 patients in the practices responded to the screening health questionnaire. We presume that a large proportion of the patients who did not respond did not have pain because the purpose of the survey—to screen for pain—was stated in the patient consent form. However, patient response to the final questionnaires was also low (53%), even though non-respondents were sent a reminder postcard. Future studies will have to more aggressively encourage patients to respond to the final questionnaire.

Second, the study was not formally designed as a randomized control trial, but as a feasibility study in order to undertake a future randomized control trial. As a result, the presence of psychosocial problems and depression were not determined prior to randomization. Analysis of the Patient Health Screening Questionnaire revealed baseline imbalances in sex, age, health status, and emotional distress. Although these differences were controlled for in the analysis of post-intervention outcomes, it is possible that they are confounding the observed intervention effect.

Finally, because of the pilot nature of this
study, we targeted a relatively small number of patients for the nurse-educator phone intervention. Therefore, although we were able to demonstrate feasibility, the number of patients involved did not allow for adequate statistical power for tests of efficacy. Therefore, the “intervention” effect represents a combination of patients that received the Clinical Improvement System alone and in combination with the Nurse-Educator Intervention compared to Usual Care patients.

In summary, the initial results provided preliminary support for the feasibility and efficacy of the Clinical Improvement System/Nurse-Educator intervention. In the next phase of our research, we are conducting a randomized controlled trial examining the efficacy of the intervention in a larger group of primary practices with a design that will allow us to directly compare the impact of each component of the intervention alone and in combination.

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References


