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SUMMARY

Objective To establish the feasibility of and to generate preliminary evidence for the efficacy of a care management program addressing both physical and emotional pain associated with late-life depression and osteoarthritis.

Methods Treatment development pilot study in three university affiliated primary care clinics. Participants were patients 60 years or older with depression and osteoarthritis pain. The intervention entailed a nurse administered care management program supporting depression and arthritis treatment by primary care physicians. Outcomes include depression, pain severity and functional impairment from pain assessed at baseline and 6 months.

Results Fourteen patients participated in the pilot program. Between baseline and 6 months, mean HSCL-20 depression scores dropped from 1.78 (SD 0.56) to 1.06 (SD 0.59), a standardized effect size of 1.27 ($p = 0.004$). Pain intensity scores dropped from 5.67 (SD 1.69) to 4.18 (SD 1.98), an effect size of 0.88 ($p = 0.021$) and pain interference scores dropped from 4.91 (SD 1.75) to 3.49 (SD 2.14), an effect size of 0.81 ($p = 0.013$). Patients also experienced improvements in self efficacy, in satisfaction with depression care, and in timed 8-m walk and transfer tests.

Conclusion The combined intervention was feasible and well-received by patients. Preliminary outcomes are promising and comparisons to an earlier trial of care management for depression alone suggest that the combined program may be equally effective for depression but more effective for pain. Copyright © 2008 John Wiley & Sons, Ltd.

KEY WORDS — depression; chronic pain; care management

INTRODUCTION

Depression and osteoarthritis are among the most common and disabling conditions in late life and older adults often find it challenging to distinguish the physical and emotional pain associated with these conditions. Patients with osteoarthritis are at increased risk for depression and lower quality of life (Rosemann *et al.*, 2007). The combination of depression and chronic

pain is associated with higher health care costs and it may increase the risk of suicide (Tang and Crane, 2006).

Older adults with depression and arthritis often present in primary care and although efficacious treatments exist for both conditions (American Geriatrics Society Panel on Chronic Pain in Older Persons, 1998), patients often do not receive effective treatment in primary care (Unützer *et al.*, 1999a; Unützer *et al.*, 1999b; Callahan, 2001; Chodosh *et al.*, 2001; Unützer, 2002; Unützer *et al.*, 2004; Ganz *et al.*, 2006). Older patients and their providers may assume that pain and depression are a 'normal' part of aging (Gignac *et al.*, 2006) and that treatments will not help or are too dangerous (Ross *et al.*, 2001). Concerns about the social stigma associated with depression or potentially addicting or toxic effects of analgesic or psychotropic

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medications can be additional barriers to treatment (Sale *et al.*, 2006). Depression can also reduce patients' motivation, energy, and self-efficacy, and may decrease their adherence to treatments such as analgesics or physical activity.

Several programs have attempted to improve the care for depression (Oxman, 2005) and osteoarthritis (Thomas *et al.*, 2002; Lin *et al.*, 2004; Cochrane *et al.*, 2005; Osborne *et al.*, 2006) in older primary care patients, but in most studies patients with comorbid disorders were excluded or the comorbid disorders were not explicitly addressed. These studies have limited generalizability for real world practices that often treat patients with both conditions.

The IMPACT trial (Improving Mood—Promoting Access to Collaborative Treatment) (Unützer *et al.*, 2001, 2002) tested a primary care-based intervention in which a care manager (CM) worked closely with the patient's primary care provider (PCP) and a consulting psychiatrist to improve depression care. Compared to usual care, IMPACT was associated with substantial improvements in depression (Unützer *et al.*, 2002; Hunkeler *et al.*, 2006). IMPACT participants with both depression and arthritis (1,001 of the 1,801 study participants) also experienced less depression, less pain and less pain-related functional impairment than patients in usual care (Lin *et al.*, 2003). However, the effects of IMPACT on pain were limited to patients with relatively low levels of pain (Lin *et al.*, 2006) and intervention participants with moderate to severe pain had significantly less improvement in depression than patients without pain (Thielke, 2007).

These findings suggest that an intervention focusing on both depression and pain might have stronger effects on pain and overall quality of life than an intervention focused on depression alone. Based on our experience with IMPACT, we developed a combined care-management program called IMPACT-DP (depression and pain). In this paper, we report results from a treatment development study intended to assess the feasibility of this combined intervention and to generate preliminary estimates for the efficacy of this approach.

METHODS

Study design

We conducted a pilot study of IMPACT-DP at three primary care clinics in the University of Washington's Practice Network (UWPN). We compared pain and depression outcomes as well as performance on timed walk and transfer tests at baseline and at 6-month

follow-up assessments. All study procedures were approved by the Institutional Review Board at the University of Washington. Subjects gave written consent to participate in the study.

Recruitment, enrollment, and dropout

We mailed recruitment letters to clinic patients age 60 and older who had an ICD-9 visit diagnosis of osteoarthritis in the prior year. These letters included a two-item screen for depression (Li *et al.*, 2007). Patients were encouraged to complete and return this screen and those who returned a positive screen were contacted by telephone and invited to participate in an eligibility interview administered by a trained research assistant. The screening interview included the nine-item Patient Health Questionnaire (PHQ-9) (Kroenke *et al.*, 2001) and questions about pain and functional impairment related to arthritis. Eligibility criteria included a depression severity score of 10 or greater on the PHQ-9, a score of 2 or greater on at least one of two core depression symptoms (depressed mood or anhedonia), and self-reported functional impairment from osteoarthritis pain. Patients were excluded if they had severe cognitive impairment on a six-item cognitive screener (Callahan *et al.*, 2002), if they screened positive for problem drinking on the CAGE, or if they reported prior diagnoses or treatment for bipolar disorder, schizophrenia, or schizoaffective disorder. Eligible patients then completed a baseline interview with questions about depression and pain symptoms, functional impairment related to pain, self-efficacy, current medications, and other treatments for depression and pain.

Of 17 patients identified as eligible for the study, 14 agreed to participate and were enrolled. We completed 6-month follow-up interviews with 13 of the 14 enrolled patients. One patient dropped out of the study after the first visit with the CM.

Intervention

We adapted the IMPACT treatment manual (Unützer, 1999) in a 1-year iterative consultation process with experts in geriatric medicine and pain management to include care management guidelines for both depression and osteoarthritis pain in older adults. We trained a registered nurse experienced with the IMPACT model in an expanded role as a nurse care manager (CM) supporting primary care for depression and osteoarthritis pain. We provided ongoing weekly supervision of the CM by a geriatric psychiatrist throughout the course of the pilot study.

Patients who enrolled in the study had an initial assessment with the CM at their regular primary care clinic. During this visit, the CM conducted a structured clinical assessment of pain, depression and their effects on physical and social functioning. The assessment also included a history of current and prior treatments for pain and depression, and patients' treatment preferences for these two conditions. Other topics covered included current stressors, psychological strengths and resources, physical activities and engagement in pleasurable activities. After the initial assessment, the CM offered patients education about pain and depression including written educational materials on depression from the original IMPACT trial and educational materials on osteoarthritis, arthritis pain, and exercise developed by the National Institute of Arthritis, Musculoskeletal and Skin Diseases. The CM discussed available treatment options for both conditions as well as strategies to improve self-care for pain and depression. Patients received a behavioral activation plan that included specific plans for physical or social activities and scheduling of pleasant events at the initial visit and each subsequent follow-up contact.

Follow-up visits (either by telephone or in person) started with assessments of pain severity using three items (average pain, maximum pain, and pain interference) from the Brief Pain Inventory (BPI) (Tan *et al.*, 2004) and depression severity using the PHQ-9. Visits also included a review of treatment adherence to analgesics, antidepressants, or other pain treatments, treatment effectiveness and side effects, a review of behavioral activation plans, and ongoing activity scheduling. The CM used a pain diary in which patients tracked the severity of their pain and the timing of medications and other interventions to relieve pain over a 24-h period to help explore the patient's use and effectiveness of analgesics and other pain treatments. The intervention followed a stepped care philosophy in which interventions for pain and depression could be made simultaneously or sequentially based on the preferences of the patient and his/her PCP and the intensity of interventions was increased if patients were not responding to initial treatments. To help implement this stepped care approach, the CM regularly consulted with the study psychiatrist and coordinated with the patient's PCP to help adjust treatment plans for patients who were not improving as expected. Such changes might include changes in analgesic or antidepressant medications following evidence-based treatment guidelines, additional physical or psychosocial interventions, or referrals for consultation from a

rheumatologist, a physical therapist, an orthopedic surgeon, or a psychotherapist. All patients were followed by the CM for a 6-month period.

Outcome measures

Independent outcomes assessments were performed by a trained research assistant at baseline and 6 months using the same outcomes measures as used in the original IMPACT trial (Unützer *et al.*, 2001, 2002). They included depression severity assessed by the 20-item depression scale of the Hopkins Symptom Checklist (HSCL-20) and the nine-item Patient Health Questionnaire (PHQ-9). Both instruments have been found to be sensitive to change in depression in a population of older primary care patients. Pain severity and pain-related functional impairment were assessed by the BPI (Tan *et al.*, 2004). We also administered the Aggregate Locomotor Function (ALF) (McCarthy *et al.*, 2004) test which contains a timed 8-m walk test and a timed test of transferring from sitting to standing position. Three repetitions of each test were conducted and the mean times were used for analysis.

Semi-structured interviews

At the completion of the program, the principal investigator conducted a semi-structured interview with each participant. This interview solicited information about patients' experiences and suggestions for program improvements. Detailed interview notes were used to summarize patient experiences and suggestions for improvement.

Statistical analyses

We calculated descriptive statistics for each variable at baseline and 6 months. We also used Cohen's *d* derived from change between baseline and 6-month follow-up to estimate treatment effect sizes and we calculated confidence intervals and *p*-values for changes in clinical outcomes between baseline and 6 months. All the analyses were performed using SAS 9.1 (SAS Institute Inc., Cary, NC).

RESULTS

Study participants

Study participants included two men and 11 women with a mean age of 72.2 (SD 8.5). Most (9/13) were white and the rest were from ethnic minority groups (one African American, one Asian, one Native

American, and one Latino). Two participants (15%) were married and the majority (9/13) lived alone. Five participants (38%) were college graduates. Patients reported moderate to severe depression and pain at baseline (Table 1). In addition to arthritis pain, eight participants reported chronic back pain and the mean number of body areas affected by pain (from a list of ten) was 5.46 (SD 1.98).

Intervention

The 13 patients who completed the care management intervention had an initial assessment visit with the CM and an average of nine follow-up contacts (ranging from 6–13) during the 6-month intervention period. This included a mean of 7 in person contacts (range 3–11) and a mean of two telephone contacts (range 0–6). At baseline, 11 of 13 patients were taking an analgesic medication and six of 13 patients were taking antidepressants. This increased to 13 of 13 and 9 of 13, respectively, at 6 months. Use of acetaminophen increased from 5/13 to 9/13, use of non-steroidal anti-inflammatory medications decreased from 7/13 to 6/13, and use of opioid analgesics remained unchanged at 5/13 participants. At baseline, 8/13 patients used other non-pharmacologic methods of pain control (such as heat or cold, massage, or acupuncture). This number increased to 13/13 at the 6-month follow-up. All patients participated in behavioral activation planning.

Quantitative analyses

Intervention participants experienced substantial improvements in depression, pain severity, and functional impairment from pain over the 6-month study period (Table 1). They also experienced substantial improvements in their self efficacy and their sense of confidence that they can overcome or manage depression or pain. At baseline, 5/13 participants (36%) reported

their satisfaction with the quality of depression care as 'good, very good, or excellent' and this increased to 10/13 (77%) at 6 months. Improvements in pain occurred on all BPI (Tan *et al.*, 2004) variables including average pain intensity which was reduced from 6.08 (SD 1.93) to 4.46 (SD 1.85) and maximum pain intensity which was reduced from 8.15 (SD 1.77) to 5.41 (SD 3.07). Pain related interference was reduced in all areas examined including general activity, mood, walking ability, normal work, relationships with others, sleep, and enjoyment of life. Participants experienced a reduction in the total number of body areas in which they experienced pain from 5.46 (SD 1.98) to 3.62 (SD 2.40). We also observed substantial improvements in both the 8-m walk test and the transfer test between baseline and 6 months.

Exit interviews

Exit interviews revealed a high level of satisfaction with the program that was consistent with patient satisfaction ratings in the quantitative surveys. Comments included 'I thought I was going to have to live with this for the rest of my life', 'I hadn't realized how much I had let go of things', 'this program helped me get back on track', 'this program saved my life'. Participants described the CM as helpful and 'easy to talk to'. '[The CM] knew what she was taking about.' Participants appreciated that the CM took time to listen, 'time to talk about how to use the medicines', and time to support them through several trials of medications. The CM was also described as an advocate and facilitator with other health care providers.

Several participants commented on the fact that they could not easily distinguish emotional pain from depression and physical pain from arthritis and that the program helped with this. Participants also commented on the value of behavioral activation in addition to medications prescribed by their PCPs. Patients also reported that problem solving techniques made them 'focus and keep on track'. Several participants

Table 1. Clinical outcomes of IMPACT-DP (changes from baseline to 6-month follow-up)

Variables	Category	Baseline	6-month	Effect size	95% C.I.	P-value
Depression severity (HSCL-20; 0–4)	Mean(SD)	1.78 (0.56)	1.06 (0.59)	1.27	[0.27, 1.16]	0.004
Depression severity (PHQ-9; 0–27)	Mean(SD)	13.46 (5.09)	6.31 (5.39)	1.40	[4.00, 10.31]	0.000
Depression Self Efficacy (confidence in managing depression; 0–10)	Mean(SD)	5.28 (2.16)	6.95 (2.13)	–0.77	[–3.13, –0.20]	0.029
Pain Intensity (0–10)	Mean(SD)	5.67 (1.69)	4.18 (1.98)	0.88	[0.27, 2.72]	0.021
Pain Interference (0–10)	Mean(SD)	4.91 (1.75)	3.49 (2.14)	0.81	[0.36, 2.47]	0.013
Total number of body areas with pain (0–10)	Mean(SD)	5.46 (1.98)	3.62 (2.40)	0.93	[0.80, 2.89]	0.002
8 m walk test (seconds)	Mean(SD)	12.07 (2.65)	10.34 (1.57)	0.66	[0.41, 3.34]	0.017
Transfer test (seconds)	Mean(SD)	11.93 (4.66)	9.81 (3.02)	0.46	[–0.53, 5.13]	0.101

expressed surprise that medications they had tried earlier (both antidepressants and analgesics) turned out to be helpful when used more consistently or at higher doses than previously.

Participants also offered suggestions for program improvements. Several comments concerned the multimodal nature of the intervention. 'You should take more time to explain all of it', 'it took me some time to figure out who is supposed to be doing what', and 'it could feel overwhelming all at once'. One participant felt it more useful to 'sequence' intervention components and take things 'one step at a time'. Several participants felt that more time with the CM (particularly in-person visits) would have been helpful. Three participants commented on loneliness in old age and felt that a group might have been helpful as part of the program. Over half (8) of the participants expressed feelings of loss at terminating the program and suggested that the program be longer.

DISCUSSION

The combined intervention program for depression and arthritis pain was feasible and well received by patients in the participating clinics and it showed promising improvements in both pain and depression outcomes.

Limitations of this pilot study include the small sample size, the fact that the majority of participants were women and white, and the lack of a randomly assigned control group. To mitigate this lack of a control group, we compared the 6-month outcomes from IMPACT-DP with participants with both depression and arthritis in the original IMPACT study (Unützer *et al.*, 2002; Lin *et al.*, 2003, 2006,). While these comparisons include samples from different studies, we used identical sampling frames and outcome measures to facilitate this preplanned comparison. We found that at 6 months IMPACT-DP participants had similar improvements in depression severity measured on the HSCL-20 as patients in the original IMPACT intervention (effect sizes of 1.27 and 1.25 respectively). We saw substantially larger reductions in pain and pain-related functional impairment in the combined program (IMPACT-DP) than in the original IMPACT depression intervention.

Another limitation is the fact that the IMPACT-DP intervention period was only 6 months. The original IMPACT intervention lasted for 12 months and we observed the largest differences between intervention and usual care participants at 12 months (Unützer *et al.*, 2002; Lin *et al.*, 2003). Although several pilot study participants experienced substantial improve-

ments in both depression and pain at 6 months, our experience and comments from the participants suggested that it was not always possible to complete a rigorous application of the stepped care treatment algorithm outlined in the intervention manual during a 6-month period. Antidepressant trials, coordinating treatment changes with the patient's PCP and specialist consultants can take, considerable time. Three study participants ended up receiving surgical treatments for arthritis (knee replacements) during the intervention period and, while patients and providers felt that the program was helpful in preparing for surgery, it takes more than 6 months to complete several medication trials and subsequent joint replacement and rehabilitation.

Our pilot study suggests several revisions in the intervention protocol. These include extending the program to 12 months, articulating more clearly the 'stepped care' approach to this multimodal intervention program, and increasing emphasis on skills training and support regarding the effective use of analgesic medications. Several participants were reluctant to take their analgesic medications as often as prescribed, a finding that has been reported with other cohorts of older arthritis patients (Sale *et al.*, 2006). We found that the use of a diary summarizing pain and pain medication use over a 24-h period to support 'planned experiments' (e.g. changes in the timing of analgesics such as taking the medication before physical activity rather than afterwards or use of analgesics before bedtime to minimize sleep disruption from pain) can be helpful in maximizing the effect of pain treatments. Busy primary care practitioners often do not have the time to support this kind of systematic experimentation, careful tracking of symptoms, and time to work with patients to make small changes in treatments to maximize the beneficial effects of analgesics. We also learned that additional clarification of the patient and provider roles in this collaborative care model is helpful to increase patient comfort with the program.

Although our findings are limited by the small sample size and the lack of a randomized control group, they are promising. They suggest that a care management intervention that is delivered by a nurse CM with support from a consulting psychiatrist may substantially reduce the suffering and functional impairment caused by depression and arthritis pain, two of the most common and disabling conditions experienced by older adults. A larger randomized controlled trial of such a combined intervention is needed in order to further establish the effectiveness of this approach.

KEY POINTS

- Depression and osteoarthritis are among the most common and disabling health conditions in older adults
- Few older adults receive effective treatment for these conditions
- A combined care management program for depression and osteoarthritis pain in primary care was feasible and well received by patients
- Preliminary findings of reduced depression, pain, pain-related functional impairment, and improved self efficacy associated with this combined program are promising

CONFLICT OF INTEREST

None known.

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