Empowering patients with persistent pain using an Internet-based self-management program

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Acknowledgments

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Conflict of Interest Disclosure

Authors Conflicts of Interest

- A. Marian Wilson, No Conflict of Interest
- B. John Roll, No Conflict of Interest
- C. Cindy Corbett, No Conflict of Interest
- D. Celestina Barbosa-Leiker, No Conflict of Interest
Objectives

- Understand how gaps in current pain care can be addressed using self-management programs.
- Understand how Internet-based programs can be used to address gaps in care.
- Identify expected outcomes from engaging patients who receive opioids in Internet-based programs using study data.

Problem

Policy, treatment, education and research gaps = shortfalls in pain care.

Persistent pain impacts

- The annual U.S. cost is $600 billion.
- On any given day, an estimated 116 million U.S. adults are affected.

*Relieving pain in America - A blueprint for transforming prevention, care, education, and research.*

Institute of Medicine, 2011
Opioid Overdose: An Epidemic

U.S. Unintentional Opioid Overdose Deaths 1999-2010

- 2,900 deaths in 1999
- 11,500 deaths in 2007
- 15,500 deaths in 2010

CDC, 2011

Prescription painkiller overdose deaths among women

About 18 U.S. women die every day of an opioid overdose

National Vital Statistics System, 1999-2010
(deaths include suicides)

“Conundrum of opioids”

“Risks of diversion, abuse, and unintentional overdose co-exist with evidence of excellent pain control when opioids are used appropriately.”

$72 billion in direct healthcare costs related to opioid pain reliever misuse and abuse.
(IOM, 2011)
Gaps in persistent pain care

Self-management is an “an essential part of clinical practice guidelines” for persistent pain.

(ICSJ, 2011)

Yet access to behavioral and cognitive therapies is limited.

Self-management

The tasks individuals must undertake to live with chronic health conditions. Programs aim to increase knowledge, skills, and confidence.

(Lorig & Holman, 2003; Bender et al, 2011)

- Goal-setting: Adopt new behaviors
- Coping: Building confidence, self-efficacy
- Cognitions: Address thoughts & feelings
- Group persuasion: Social support
- QOL
- Education: Adherence
- QOL

Literature review

- Systematic review 17 RCTs of Internet-based pain self-management programs (N=2,503)
  - Most had positive effects pain, activity, costs
  - Inconsistent effects on depression/anxiety
  - More rigorous studies needed

(Bender et al. 2011)
Gaps in literature

- Few studies test self-management interventions for broader populations
- Few studies recruit from clinical settings or specifically target those with higher disability
- None specifically recruit patients on opioids
- Little known about how technology can be utilized in addressing access to care

(Foster et al., 2007)

Pilot study
2011

- Seek more stable population
- Expect major depressive disorder symptoms (54%)
- Find pain-specific self-management program

Research question

How does an Internet-based self-management program affect pain experiences among patients with persistent pain who receive opioid medications?
Social Cognitive Theory
Self-efficacy
Confidence in controlling pain experiences can have positive impact on physical & psychological functioning

(Gatchel et al., 2007)

Dr. Albert Bandura

Individual and Family Self-management Theory
Ryan & Sawin 2008 Self-Management Science Center

Context
Risks and Protective Factors
Condition-Specific Factors
Physical & Social Environment
Individual & Family Factors

Process
The Self Management Process
Knowledge & Beliefs (self-efficacy)
Self-regulation skills & ability
Social Facilitation

Outcome
Proximal Distal
Individual & Family Self Management Behaviors
Health Status
Quality of Life
Cost of Health

Intervention
Web-based pain self-management program
8 weeks of online lessons, activities, and support group

(Cognitive
Thinking Better

Emotional
Feeling Better

Behavioral
Doing More

Social
Relating Better

Chronic Pain Management Program

Ruehlman, Karoly, & Enders, 2011)
Primary aim:

Determine whether the Chronic Pain Management Program has a significant effect on pain intensity and pain interference among patients with persistent pain who are prescribed opioid medications.

Secondary aims:

- Determine the effect of the CPMP on depressive symptoms, opioid medication misuse behaviors, pain self-efficacy, health care utilization, and patients’ impression of clinical change.
- Evaluate engagement in the program.
- Categorize and compare self-reported self-management strategies, medication use, health care utilization, goals, and perceptions of using the CPMP.

Methods

Design

- Prospective, longitudinal, randomized controlled experimental design with repeated measures of primary outcomes
- Treatment group trialing Chronic Pain Management Program (CPMP) versus treatment as usual (TAU) wait-list group
Methods: population & setting

- Adult patients with persistent pain with a current opioid prescription
- North Idaho primary care providers
  - Internet recruitment from pain sites and Pacific Northwest clinics added
    - Rural and urban communities
    - Federally qualified health centers
    - Pain clinics

Procedure

1. Baseline measurements via secure computer survey system: TX group receives program
2. Both groups tested every 2 weeks: pain intensity, pain interference, depressive symptoms, health care utilization, coping strategies.
3. Posttest at 8 weeks includes: opioid misuse measures, patient impression of change, pain self-efficacy, medication inventory, progress towards stated goals.
4. TAU group offered program - continues with bi-weekly measurements

Measurements

Selection guided by IMMPACT the Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials (Dworkin et al., 2005)

- Brief Pain Inventory (BPI)
- Patient Health Questionnaire (PHQ-8)
- Pain Self-efficacy (PSEQ)
- Current Opioid Misuse Measure (COMM)
- Patient Global Impression of Change (PGIC)
- Bi-weekly surveys (health care utilization, coping)
- Program evaluation
- Medication inventory and goals
Primary data analysis

• Descriptive statistics

• Chi-square and independent samples t-tests

• Analysis of Variance (ANOVA)
  • 2 (between: treatment vs. comparison) x 5 (within: time 1-5) mixed design ANOVA
  • 2 x 2 mixed design ANOVA

• Number Needed to Treat (NNT)

Secondary data analysis

Descriptive and exploratory

• Inferential statistics to estimate effects of secondary outcomes measurements

• Correlations to evaluate relationship between engagement level and outcomes measurements

• Descriptive and inferential statistics to categorize and compare: self-management strategies, medication use, health care utilization, goals, and perceptions related to use of the CPMP.

Findings: Recruitment results

<table>
<thead>
<tr>
<th>Referral source</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider referred</td>
<td>42</td>
<td>46</td>
</tr>
<tr>
<td>Self-referred</td>
<td>50</td>
<td>54</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 mile radius of Coeur d’Alene, ID</td>
<td>38</td>
<td>41</td>
</tr>
<tr>
<td>29 U.S. states</td>
<td>54</td>
<td>59</td>
</tr>
<tr>
<td>Rural</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>Urban</td>
<td>73</td>
<td>79</td>
</tr>
</tbody>
</table>

Randomized 114: (57 TX, 57 TAU)
Lost to follow up: 21% TX, 18% TAU: Final 45 TX, 47 TAU

Those who did not complete (n = 12) were significantly more likely to have been referred from a provider than self-referred ($\chi^2 = 4.6, p = .03$).
Findings: Sample description

<table>
<thead>
<tr>
<th></th>
<th>N (%)</th>
<th>Mean (SD)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>72 (78.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>20 (21.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married/Partner</td>
<td>60 (65.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some college</td>
<td>36 (39.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 yr degree or higher</td>
<td>33 (35.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most common diagnoses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back/spine conditions</td>
<td>41 (45)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fibromyalgia</td>
<td>27 (29)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arthritis/osteoarthritis</td>
<td>24 (26)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Migraine headache</td>
<td>20 (22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>49.3 (11.6)</td>
<td>24 - 78</td>
<td></td>
</tr>
<tr>
<td>Daily morphine equivalent in milligrams</td>
<td>95 (109.5)</td>
<td>5 mg – 640 mg/day</td>
<td></td>
</tr>
</tbody>
</table>
Number Needed to Treat

Pain Intensity:
- Clinically meaningful improvement of 2 points
- 18% of TX group and 6% of TAU group
- On average, 8 people would need to be treated to achieve clinically meaningful improvement in pain intensity within 8 weeks.

Pain Interference:
- Clinically meaningful improvement of 1 point
- 28.9% of TX group and 29.8% of TAU group

Depressive Symptoms (PHQ-8)

Main effect for time:
\[ F(1, 68) = 5.952; \ p = .00; \ \eta^2_{\text{partial}} = 0.08; \ \text{observed power 98.4%} \]

Group x time interaction:
\[ F(1, 68) = 1.13; \ p = .34; \ \eta^2_{\text{partial}} = 0.016; \ \text{observed power 35.4%} \]

Pain Self-efficacy

Main effect for time:
\[ F(1, 82) = 10.7; \ p = .002; \ \eta^2_{\text{partial}} = 0.116; \ \text{observed power 89.9%} \]

Group x time interaction:
\[ F(1, 82) = 13.8; \ p = .00; \ \eta^2_{\text{partial}} = 0.142; \ \text{observed power 95.4%} \]
Main effect for time: 
\( F(1, 81) = 22.65; \quad p = .00; \quad \eta^2_{\text{partial}} = 0.219; \quad \text{observed power } 99.7\% 

Group x time interaction: 
\( F(1, 81) = 4.097; \quad p = .046; \quad \eta^2_{\text{partial}} = 0.048; \quad \text{observed power } 51.6\% 

Group x time interaction: 
\( F(1, 88) = .005; \quad p = .94; \quad \eta^2_{\text{partial}} = 0.00; \quad \text{observed power } 5.1\% 

Program Engagement

Treatment “dose” positively associated with improvements:

- pain intensity 
  \( r = .30, \quad p = .048 \)
- pain interference 
  \( r = .33, \quad p = .028 \)
- pain self-efficacy 
  \( r = .34, \quad p = .029 \)
Bi-weekly surveys

Behaviors or activity changes to control pain?
➢ 21 “yes” responses attributed to CPMP

TX group reported adding more new behaviors (M = 1.6, SD = 1.6) than those in the TAU group (M = 0.9, SD 1.1; t (90) = -2.364, p = .02).

Bi-weekly surveys

➢ TX group 7 of 43 (16.3%) report increasing opioid medicines over the study period compared to TAU 9 of 47 (19.1%). No significant difference between groups ($x^2 = 4.11, p = .13$).

➢ TX group 8 of 26 (30.8%) report adding or increasing antidepressant over the 8-week study period compared to TAU 7 of 39 (17.9%). No significant difference between groups ($x^2 = 1.44, p = .23$).

Bi-weekly surveys

➢ TX group, 9 of 43 (20.9%) reported decreasing or stopping opioid medicines over the study period compared to 3 of 44 (6.8%) in the TAU group ($x^2 = 4.11, p = .04$).

➢ No difference in reported healthcare utilization: most visits to primary care.
**Most Frequently Reported New Behaviors to Control Pain**

<table>
<thead>
<tr>
<th>Behavior</th>
<th>TX n (%)</th>
<th>TAU n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical activity/stretching</td>
<td>21 (47%)</td>
<td>20 (42%)</td>
</tr>
<tr>
<td>Relaxation/breathing exercises/meditation</td>
<td>19 (42%)</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>Positive thinking</td>
<td>13 (29%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Pacing activities/rest</td>
<td>12 (27%)</td>
<td>13 (28%)</td>
</tr>
<tr>
<td>Hobby/diversional activity</td>
<td>2 (4%)</td>
<td>2 (4%)</td>
</tr>
</tbody>
</table>

**Progress Towards Goals**

Top goals related to medicines:
- reduce or eliminate pain medicines (n = 24)
- reduce or eliminate non-specified medicines (n = 15).

TX group, 17 of 21 (81.0%) at least some progress towards stated medication goal compared to 17 of 35 (48.6%) in the TAU group ($x^2 = 5.77, p = .02$).

**Progress Towards Goals**

Top goals related to overall health and well-being:
- 1) increase activity, strength or fitness (n = 27)
- 2) reduce weight (n = 9).
### Program evaluation
Assessed usability, quality of information, usefulness
- 7-item Likert scale 1 – 7 (N = 65; Mean 5.2)

Most frequent positive responses:
- stopping negative thoughts and/or focusing on the positive (n = 15).
- engaging in healthy activities, including paced physical exercise, relaxation or socialization (n = 12).

### Program evaluation
Most frequent negative responses:
- difficulty navigating program features (n = 16)
- desire for more direction or reminders (n = 12).

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### Wait-list results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline Mean (SD)</th>
<th>Posttest 8 Mean (SD)</th>
<th>Posttest 16 Mean (SD)</th>
<th>d</th>
<th>F</th>
<th>p</th>
<th>Partial Eta squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPI Pain Intensity</td>
<td>5.3 (1.9)</td>
<td>5.2 (2.1)</td>
<td>5.2 (2.1)</td>
<td>.48</td>
<td>.069</td>
<td>.95</td>
<td>.003</td>
</tr>
<tr>
<td>BPI Pain Interference</td>
<td>5.2 (2.3)</td>
<td>5.5 (2.6)</td>
<td>5.5 (2.6)</td>
<td>.48</td>
<td>1.067</td>
<td>.359</td>
<td>.042</td>
</tr>
<tr>
<td>PHQ-8</td>
<td>12.7 (5.6)</td>
<td>11.3 (6.1)</td>
<td>4.7 (5.0)</td>
<td>.248</td>
<td>39.05</td>
<td>.00*</td>
<td>.619</td>
</tr>
<tr>
<td>PSEQ</td>
<td>24.2 (13.2)</td>
<td>21.9 (15.0)</td>
<td>25.4 (14.6)</td>
<td>.240</td>
<td>1.761</td>
<td>.19</td>
<td>.081</td>
</tr>
<tr>
<td>COMM</td>
<td>11.2 (4.9)</td>
<td>9.3 (5.1)</td>
<td>10.0 (6.7)</td>
<td>.242</td>
<td>2.237</td>
<td>.119</td>
<td>.096</td>
</tr>
<tr>
<td>PGC</td>
<td>3.3 (1.9)</td>
<td>3.5 (2.0)</td>
<td>3.3 (2.2)</td>
<td>.248</td>
<td>.178</td>
<td>.838</td>
<td>.007</td>
</tr>
</tbody>
</table>

* Significant at the 0.001 level.
Participant comments

“This program really helped me to realize that chronic pain and a diagnosis of a condition that has no cure doesn't mean it's hopeless. I've come to realize that a lot of how I need to deal with the pain is my attitude.”

“Before, I felt so alone, that no one understood me. I also had given up on finding work I could do. Because of this program, it encouraged me to find resources that would help me find work...I found a program that does vocational rehabilitation...they will help me find a line of work that I can do with my limitations.”

“It was extremely helpful for me to shift my mind and spirit to focus on the good and wellness instead of sickness!”

“My actual pain is about the same, but it seems to cause me less stress. I feel I have better coping mechanisms in place now.”

“We don't have many tools to bring to the fight against our pain...this is a tool everyone NEEDS.”

Limitations

- Sample underpowered to detect small, significant differences
- Placebo/attention effects -> equivalent change in depressive symptoms/pain interference
- Variations in participant referral source
- Variations in pain conditions and how pain scores can be impacted
- Lack of diversity in gender, race
Future research
➢ How can we increase engagement?
➢ Prompting, reminders, encouragement
➢ Provider-led, insurance reimbursement
➢ Computer access and assistance

➢ How can we identify and address depression?

➢ Which self-management techniques are most helpful? Can they be matched to participant characteristics to optimize response?
➢ Diagnosis, opioid dose, goals of treatment

Conclusions
Internet-based self-management interventions can improve pain self-efficacy and reported opioid misuse behaviors among patients with persistent pain.

Participation levels are positively associated with improvements in pain intensity, pain interference and pain self-efficacy.

Questions?
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References

References


