



Case Report

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Prevention Program to Prevent Chronic Pain, Substance Use Disorders, and Social Impact

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Abstract

Chronic pain conditions affect an estimated 100 million American adults, that's more than heart disease, diabetes and cancer combined. An estimated \$635 billion is spent annually on treating and managing chronic pain. Many people in chronic pain are not adequately treated with current therapies. Although opioids are the most effective analgesics, however, the use of opioids for the treatment of chronic non-cancer pain is controversial due to concerns about tolerance, abuse, and addiction. When acute pain becomes chronic, it is often associated with depression, disability, and intensive use of health care that can escalate to high-cost high-risk interventions such as opioid analgesics, multiple medications, and surgery. These treatments have the potential for poor long-term outcomes due to the lack of addressing patient-centered risk factors. The Institute of Medicine (IOM) stated that health professionals' primary role for chronic pain should be guiding, coaching, and assisting patients with this day-to-day self-care.

However, this is rarely done as health professionals lack the time, training, tools, and reimbursement to guide patients in self-care. Research on tools and strategies to implement self-care training programs is greatly needed. We developed an innovative online patient-centered platform called Pain Prevention Program (PPP) to provide a reimbursable solution for health professionals to include self-care training in routine health care. PPP uses an evidence-based cognitive-behavioral online training program supported by a telehealth coach to help patients reduce risk factors that contribute to delayed recovery and implement daily protective self-care behaviors including healthy habits, exercise, mindfulness, and relaxation. PPP includes online risk self-assessments, micro-lessons, a self-monitoring dashboard and telehealth coaching to support long-term change in pain and opioid use. In this paper we evaluate the outcomes of the PPP in clinical settings on 25 patients with chronic pain.

Keywords: Chronic Pain; Health Care; Opioid Crisis; Pain Prevention; Health Coaching; Telehealth Coaching

Abbreviations: CBT: Cognitive Behavioral Therapy; CCM: Chronic Care Model; CDC: Centers for Disease Control; ROI: Return on Investment; PEP: Patient Engagement Portal; PPP: Pain Prevention Program

Introduction

Chronic pain is the big elephant in the room of health care. It is the top reason to seek care, the #1 cause of disability and opioid addiction, and the primary driver of healthcare utilization, costing more than cancer, heart disease, and diabetes [1-9]. More than half

of the persons seeking care for pain conditions at 1 month still have pain 5 years later despite treatment due to lack of training patients in reducing the many lifestyle risk factors that lead to delayed recovery and chronic pain due to lack of patient self-management training [10-12]. This delayed recovery is primarily due to the lack

of addressing many patient-centered risk factors such as poor ergonomics, repetitive strain, inactivity, prolonged sitting, stress, sleep disorders, anxiety, depression, abuse, and many others that increase peripheral and central pain sensitization and lead to chronic pain and its consequences of disability, work loss, and addiction [13-19].

If usual care fails, clinicians and patients often escalate care to passive higher-risk interventions such as opioids, polypharmacy, surgery, or extensive medical and dental treatment instead of training patients to reduce the risk factors [5-9]. Yet, clinical trials have shown that the long-term outcomes of these passive interventions are no better and, in many cases, worse than patient-centered approaches that activate and empower patients with self-management strategies such as Cognitive Behavioral Therapy (CBT), therapeutic exercise, and mindfulness-based stress reduction to help patients lower risk factors for chronic pain and addiction by implementing protective actions [12-40]. However, health professionals cite the lack of reimbursement, adequate time, and skills as reasons why the critical task of self-management training rarely occurs in the health care system [1,2].

The Pain Prevention Program (PPP) was developed and tested with funding from the National Institutes of Health to support health professionals in implementing transformative care to prevent chronic pain substance use disorders, social impact, and the opioid crisis. PPP helps healthcare professionals add patient engagement in self-management training to be smoothly integrated with treatment to improve long-term outcomes of pain conditions and prevent chronic pain and addiction. This paper describes case series of using the Pain Prevention Program for transformative care using the Pain Prevention Program and its Patient Engagement Portal (PEP) to help prevent the chronic pain, substance use, and functional interference.

Preventing the Opioid Crisis: Chronic pain is also the primary reason for developing opioid addiction and the current opioid crisis. According to the Centers for Disease Control (CDC), the most recent data estimates that 142 Americans die every day from a drug overdose. Since 1999, the number of deaths from prescription opioids has more than quadrupled and are now about 100,000 deaths per year, a greater number than from motor vehicle accidents and gun homicides combined.² From 2000-2021, there was alarming 800,000 deaths from opioid overdoses, with many under the age of 40 years.⁶⁻⁷ Since the opioids are often blamed for this crisis, the solution most providers are currently implementing involves withdrawal and denial of the use opioids for pain conditions. This does not address the specific pain condition that the patient has or if they have addiction behavior, which may also involve illicit drugs, gambling, sugar, social media or other addictions. Medication replacement strategies with less addicting opioids is another common strategy to help patients taper off the use of opioid but does not address the continued chronic pain that they may have. Interventions including physical therapy, chiropractic therapy, injections, implants and other passive pain treatments are often used by health professionals to help with pain but may be temporary if patient-centered risk factors continue. A

patient-centered multi-modal approach is needed to prevent both chronic pain and addiction behaviors that includes both treatments as well as training of patients in self-management strategies to reduce risk factors and improve protective actions such as healthy habits, mindful pauses, and calming practice. Transformative care provides both patient self-management training with treatments to improve the pain with immediate treatment while addressing the risk factors that lead to chronic pain.

Pain Prevention Program (PPP): The PPP program engages participants through 5 strategies including: 1) chronic pain risk assessment, 2) chronic pain and addiction risk reduction training, 3) telehealth coaching, and 4) remote telehealth monitoring with a patient-centered dashboard. PPP is accessible by any on-line device and integration with preventive medicine counseling with the care of their health professional, a family and friend support network, addressing the whole person, engaging animated characters, interactive content, simple but powerful action plans, outcomes and engagement dashboard, reminders, written handouts and more. The goal of PPP is to help participants to learn self-management strategies that will result in less pain, better function, less medication, and less need for on-going healthcare to achieve the Institute for Health Care Improvement's triple aim of improving the patient's experience and engagement in care, enhancing the health of the patient, and controlling the cost of health care [41-44]. An analysis of the cost impact that the PPP patient-centered pain program can have demonstrated that the total cost of care for patients with pain conditions can be reduced by 50% or more with estimated minimum 8:1 annual Return on Investment (ROI) with long-term sustainability in future years [45-46]. Using these figures, it is estimated that health plans can reduce the total cost of care by billions of dollars annually by integrating patient-centered self-care programs such as PPP for their members. PPP has completed a full research and development cycle to allow broad implementation. The PPP and core technologies include:

a) **Pain and Risk Assessment:** Digitally delivered validated assessment tool that assesses patients' pain, risk and protective factors in all areas of a patient's life, readiness to change, and adherence to training. This innovative assessment is used by health coaches and health providers to better understand a patients' personal characteristics, risks, and outcomes associated with a specific chronic condition and develop personalized care programs.

b) **Digital Training Platform:** The digital platform is licensed by health professionals is similar to an electronic health record systems, except focused patient engagement. It integrates algorithms based on risk assessments to personalize self-management training of patients to reduce the cause of pain. It also documents outcomes with remote tracking for the provider and telehealth coaching. The platform also engages social support, allows for health coach documentation, and billing within a clinic setting to offer self-manage pain conditions. It also creates a network of health care providers to document aggregate outcomes and allow for predictive analytics to improve long-term successful management.

c) **Telehealth Coaching:** Telehealth coaches are both trained in advanced education programs and are nationally board certified in health coaching [35-38]. Health coaches provide support for pain self-management with telehealth visits to provide support to patients in making the lifestyle changes needed to recover from pain conditions in addition to medical and rehabilitative interventions. Health coaching has been shown to enhance outcomes. PPP also leverages a supportive social network of family, friends, and health professionals to enhance motivation, understanding, and compliance, thereby improving long-term success [47-59].

d) **Remote Monitoring Dashboard:** A dashboard presents data to health coaches, health professionals, patients, and support team to better understand the personal characteristics of patients and track their progress. The dashboard includes results of baseline assessment of each patient's personal characteristics, pain characteristics, current self-care, risk factors, protective actions, patient engagement, pain severity, and life interference. In addition, follow-up assessments provide detailed data on patient progress in both engagement in self-management as well as improvement in pain and interference.

Methods

To evaluate outcomes of the PPP in clinical settings, a case

series of 25 patients with chronic pain were evaluated in the clinical setting. PPP was implemented in three phases that included shared decision-making at each health care visit including:

1. Initial patient-centered focused clinical evaluation with transformative care treatment planning,
2. PPP implementation with assessment and telehealth coaching,
3. And Follow-up visits including preventive medicine counseling.

Standard treatment was also implemented including preventive medicine counseling, office visits, physical therapy, and protective splint.

Results

(Table 1) shows the pre- and post- data was collected on engagement in the PPP program and validated scales of pain severity, personal impact, life interference, and prior health care use. In addition, data was collected for the mean number of medications, number of opioid pills prescribed, healthcare visits, healthcare use, and healthcare costs. The PPP program was also reimbursed by health plans as preventive services to prevent chronic pain and addiction.

Table 1: Impacts of Pain Prevention Program from Electronic Health Records (n=25) with mean age 32.7 years, 70% female). Patients had a mean of 3.3 modules viewed and 5.7 Coach visits.

Measure	Mean Pre-status1	Mean Post-status2
#1 Pain Severity Score (0-10)	6.5	3.3
#2 Pain Severity Score (0-10)	5.8	2.9
Interference in Life (0-10) ³	5.7	2.6
# of Medications taken	5.8	1.5
# of opioid pills prescribed per month (n=8 patients with opioids)	10.0	6.0
Healthcare visits during 3-month period ⁴	9.8	3.6
Healthcare use (# of different treatments & tests used in past) ⁵	9.4	N/A
Healthcare cost for pain condition	\$32,220 ⁶	\$3,110 ⁷

¹At initial evaluation.

²During 3 months follow-ups after pain program including PPP training, physical therapy, splint, and medication.

³How much has it interfered with daily activities (0-none to 10-extreme)?.

⁴Number of different medications taken at intake versus in the past month.

⁵Healthcare use of includes the number of different treatments and tests that the patient had undergone excluding office visits.

⁶Prior cost of healthcare is based on the mean costs for treatments and tests estimated at \$3,540 per provider or tests seen prior to enrolling in the program. This is comparable to costs for chronic pain patients in several studies including Park et al Pain Practice, 2016 and Gaskin and Richard, The Institute of Medicine. National Academies Press; 2011.

⁷Post-status includes the mean total cost of pain prevention program with, coaching, preventive counseling, splint, office visits, and physical therapy.

Discussion

This case series found that self-management strategies can be helpful in reversing pain cycles, chronic pain, and substance use disorders, and social impacts. Systematic reviews of studies evaluating each component of the PPP program including healthy habits, pauses, calming, coaching, and on-line training has demonstrated clear positive outcomes [60-83]. For example, reviews of social support and health coaching show that they can improve functional recovery from chronic pain [60-64]. Systematic reviews of randomized clinical trials of web-based cognitive behavioral therapy, exercise, and lifestyle changes show significant improvement with chronic pain [65-76]. Systematic reviews of mindfulness-based stress reduction demonstrate a significant impact in reducing chronic pain [23-26], as did systematic reviews of meditation and relaxation training [77-84]. By integrating these strategies within the PPP e-health training platform, it can better engage, empower, and educate patients in understanding the pain cycles set up from a combination of risk factors and then learning the skills of long-term self-management of them while implementing protective actions to relieve chronic pain [80-102].

Chronic Care Model (CCM). The PPP program is also based

on the Chronic Care Model by integrating patient-centered self-management with evidence-based treatment [53-58]. The CCM has documented evidence of its efficacy for many chronic conditions in more than 100 healthcare organizations [53-58]. The PPP program uses each of the 12 principles of implementing evidence-based self-management as part of routine patient care [53] including: 1) brief targeted assessment, 2) evidence-based information to guide shared decision-making, 3) use of a nonjudgmental approach, (4) collaborative priority and goal setting, 5) collaborative problem solving, (6) self-management support by diverse providers including health coaches, 7) self-management interventions delivered by diverse formats, 8) patient self-efficacy measured and trained, 9) active follow-up, reminders, and reinforcement, 10) guideline-based case management for selected patients, 11) linkages to social support and community programs, and 12) multi-faceted interventions. These can be implemented in three phases for improved shared decision-making at each health care visit: 1) enhanced pre-visit assessment, 2) a focused clinical encounter, and 3) expanded post-visit options. These can be reimbursed by health plans and are part of the teaching curriculum for transformative care training program for health professionals and health coaches (Table 2).

Table 2: Self-Management Tools to help understand pain and how each of the 7 realms of our lives can help relieve and prevent chronic pain and addiction.

1 st Level of tools to understand pain, our mindset, and initial self-care	
Understanding pain and how to relieve and prevent the root causes of chronic pain	Understand the big picture of pain, risk factors, protective actions, pain-relieving treatments, the cycles that cause chronic pain and the importance of self-management
Immediate Self-Care starts with the most important actions to relieve pain	The importance of beginning an action plan that HEALS: Heat/cold/massage, Exercise, Analgesics, Lifestyle, Strain/stress reduced. HEALS is targeted to the common pain locations including jaw/face, headache, neck pain, shoulder pain, back/spine pain.
Mind-set starts with how our thoughts & attitudes determine how we recover	The importance of optimism, self-efficacy, realistic expectations, coping, resilience and a positive mind-set in improving pain
2 nd Level of tools to encourage healing of pain conditions with essential ongoing self-management skills	
Training Tools	Protective Factors
Body includes our physical structures and their function	The importance of stretching, strengthening, fitness, conditioning, balanced relaxed posture in reducing strain and pain
Lifestyle includes our daily behaviors and habits	The importance of pain-free diet, restful sleep, steady active pacing, and limiting substance use in reducing pain
Emotions are our feelings both positive and negative	The importance of joy, happiness, calm, courage, gratitude, forgiveness, empathy, self-acceptance in feeling good each day
3 rd Level of tools to achieve long-term recovery, relief, and health by addressing long-term factors that cause stress and injury	
Spirit includes our motivation, purpose, direction and energy	The importance of motivation from life purpose, self-compassion, hopes and dreams, and grit and determination to achieve long-term health
Social life includes our relationships at home and work	The importance of love and belonging, social support, work well-being, and relieving social stressors in preventing future health issues
Environment includes the safety of the world we interact with	The importance of preventing injury with safe living, safe driving, infection-free, pollution-free, and risk-free health care

PPP Supports Change with Telehealth Coaching [103-105]. Health coaching is relationship-centered, client-driven process designed to facilitate and empower a client to achieve self-determined goals related to health and overall well-being. While

client goals may be informed by or suggested by others, such as an individual's physician or other health provider, the selection of the goal and exploration where one is in relationship to the goal is up to the client. Telehealth Coaching is an integral part of

the Pain Prevention Program. Telehealth Coaches within PPP are nationally certified health professionals who are well-trained to review risk assessments and provide self-management training to patients with pain conditions to facilitate their knowledge and skills necessary for self-management. The process incorporates the needs, goals and life experiences of the patients and is guided by evidence-based interventions for the target condition. Systematic reviews of social support and health coaching show they improve functional recovery from chronic pain [35-43].

Individuals may be just beginning to consider a change, may be exploring aspects of preparing for a change, or may be ready to implement actual actions. Health coaching is provided in a safe and consistent space to support positive change in health and well-being. Clients can explore their thoughts, emotions, and actions, in a way that allows them to recognize the power of their own choices to impact their wellness. Health Coaching is a methodology that differs from health education or counseling or therapy, though it can work well in combination with those other practices. Health Coaches assume that people have strong intrinsic resources and strengths, can access the self-motivation needed to function autonomously and competently, and are able to realize positive change within a safe and confidential alliance, where they are inspired, respected, and supported. By applying clearly defined knowledge and skills, they support individuals or groups in mobilizing their internal strengths and external resources to achieve sustainable changes in beliefs or behaviors. Health Coaching has the potential to help individuals, families, and groups achieve improved health and wellbeing by:

- a) **Setting goals:** While a person's goals may be informed by the condition, such as to reduce the pain, or suggested by others, such as a health professional or the on-line training such as to do exercise, the health coach will help with selection of the goal and exploration where one is relationship to the goal is up to the client.
- b) **Practice grounding and calming:** The first step in coaching is to help a person be grounded in the moment to practice calming.
- c) **Facilitating Change:** Individuals may be just beginning to consider a change, may be exploring aspects of preparing for a change, or may be ready to implement actual actions. In a safe, consistent, non-judgmental, and supportive space, clients can explore their thoughts, emotions, and actions, in a way that allows them to recognize the power of their own choices to impact their wellness.
- d) **Empowering people.** Health coaches assume that people have strong intrinsic resources and strengths and can access the self-motivation and energy needed to accomplish their goals.
- e) **Engaging responsibly.** Health coaches assume that people will function autonomously and competently and are able to realize positive change within a safe and confidential alliance with the health coach. The coach relationship is one of inspiration, respect, and non-judgmental support.

f) **Achieving goals.** By applying clearly defined knowledge and skills, the health coach can support individuals or groups in mobilizing their internal strengths and external resources to achieve sustainable changes in thoughts, emotions, and behaviors to achieve their goal of improved health and wellbeing.

Case Study

The experiences of Jessica, a 28 year-old patient, can help explain why the average cost per year for each pain patient is about \$12,000 instead of about \$3,000 for non-pain patients and how the PPP program can help reduce this social impact. Jessica has had many pain conditions including hip pain, back pain, hand wrist pain, neck and shoulder pain, migraine headaches and temporomandibular pain for many years. Recently, she was verbally abused at work because of her poor performance, which lead to post-traumatic stress, anxiety, depression, and more pain. In addition, her work position in a medical center call center forced her into poor posture with repetitive strain from talking, clenching her teeth, and looking up all day. The pain kept her up at night and her resultant fatigue, high caffeine use, and tensing caused more pain and headaches. When the pain flared, she went to the urgent care to help her control the pain. Her physician prescribed anti-anxiety, anti-depressants, and opioid pain medications for years which she often over-used with many daytime side effects.

Because of the persistent pain and anxiety, she requested a 3-month medical leave to recover from the pain and stress at work. She also was seen by a pain specialist, orthopedic surgeon, behavioral therapist, physical therapist, and occupational therapist. Surgery was going to be the next step if she did not recover. She had many pain cycles that were sustaining her pain from risk factors in each realm of her life. Then, she went through the 6-month pain prevention program supported by her health coach to understand the big picture of what lifestyle factors was causing her physical pain condition to persist. By becoming empowered and engaged in her own health, she was able to maintain her healthy habits (exercise, posture, diet, sleep), pauses (mindfulness), and calming practice (relaxation) each day. She reduced her healthcare and treatments because she became confident in self-managing her own pain and was able shift to protective actions that help her maintain positive emotions, thoughts, relationships, motivation, and behaviors. This helped her get back into the workforce with a job that she enjoyed and did not cause repetitive strain. She is also much happier with better relationships and a brighter future.

Patients have made many positive comments about the use of PPP as part of routine care for pain conditions. Some of the comments include:

"PPP was the most valuable part of my treatment plan and taught me many self-management strategies that do regularly to relieve and prevent my pain" –Kathy, age 38 years.

"PPP has provided me confidence that I can self-manage my pain with some simple strategies and avoid the ongoing treatments and medications for pain that I have used for years. Monica, age 24 year.

“PPP is incredibly helpful. I expect that in 10 years every doctor in the country will be using PPP as part of their treatment for pain.”
–Zoe, age 62.

Conclusion

As noted, chronic pain is the big elephant in the room of health care. It is the top reason to seek care, the #1 cause of disability and addiction, and the primary driver of healthcare utilization, costing more than cancer, heart disease, and diabetes. More than half of the individuals seeking care for pain conditions at 1 month still have pain 5 years later despite treatment due to lack of training patients in reducing the many lifestyle risk factors that lead to delayed recovery and chronic pain due to lack of patient self-management training. [5-9] They cite the lack of reimbursement, adequate time, and skills as reasons why the critical task of self-management training rarely occurs in the health care system. Yet, there is ample evidence to demonstrate that patient-centered approaches such as Cognitive Behavioral Therapy (CBT), therapeutic exercise, and mindfulness-based stress reduction can activate and empower patients in reducing risk factors for chronic pain and implementing protective actions to improve pain long-term [17-40].

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