

Pilot Study

Feasibility and Clinical Utility of Assessing Behavioral and Psychological Risk Factors in Pain Management

Alexis M. Rojas, MS, Phillip R. Worts, PhD, and Gilbert S. Chandler III, MD

From: Tallahassee Orthopedic Clinic, Tallahassee, FL

Address Correspondence:
Gilbert S. Chandler, III, MD
Tallahassee Orthopedic Clinic
2605 Welaunee Blvd
Tallahassee, Florida 32308
E-mail:
Gilbert.Chandleriii@tlhoc.com

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Background: The role of psychological factors influencing chronic pain is well documented, although less is known about the implication and logistics of conducting behavioral and psychological assessments in clinical practice, specifically within pain management.

Objectives: To identify the feasibility and clinical utility of assessing behavioral and psychological risk factors in pain management, as well as documenting the challenges and opportunities of integrating multidisciplinary care into a pain management practice.

Study Design: A convenience sample of pain management patients was prospectively recruited from a private, multispecialty orthopedic clinic in Tallahassee, Florida. All patients reported experiencing chronic pain (i.e., greater than 3 months).

Methods: Patients were approached before their initial clinical interaction at the pain management clinic. Approximately one year following their initial appointment, medical records were reviewed to determine the patients' responses to treatment and subsequent management of their ailments.

Results: Findings from the pilot study suggest that the behavioral and psychological assessments identified much higher rates of depression and suicidal ideations and lower resilience within the sample than in previously published US rates. The median time to complete the consent and battery was 30.2 minutes [interquartile range: 21]. This suggests that a shortened battery appears feasible in a pain management practice and could offer benefit by identifying factors that are known to impact clinical care.

Limitations: This study is limited in sample size, restricting generalizability. The incomplete follow-up survey data and cross-sectional nature of the study are also limitations.

Conclusions: The utility and feasibility of psychological and behavioral health assessments appear to be a critical component of a pain management practice as there is substantial overlap with psychological comorbidities (e.g., depression and anxiety) and chronic pain. Positive affect, such as resilience, may act to confer some protection against the sequelae of chronic pain, and identifying such factors appears vital.

Key words: Chronic pain, biopsychosocial, multidisciplinary, integrated behavioral health, resiliency

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The 2019 Annual Surveillance Report of Drug-Related Risks and Outcomes (1) reported more than 10 million Americans, aged 12 or older, stated opioid misuse in the past year. There were 70,237 drug overdose deaths in the United States in

2017 (2). With chronic pain or painful health conditions impacting over 40% of US adults (3), physicians must find management strategies that are effective and enduring. As highlighted by Chandler et al (4), the identification of psychological and behavioral

health factors involved with chronic pain, as well as the challenges and opportunities of integrating multidisciplinary care into chronic pain management, are key components of optimizing clinical outcomes (5). The Department of Health and Human Services Inter-Agency Task Force Report on Pain Management Best Practices lays out 5 primary approaches to pain management: medication management, restorative therapies, interventional procedures, behavioral health, and complementary and integrative health. Of the 5 approaches, practitioners continue to rely heavily on medication management and interventional procedures for the treatment of pain (6). Such reliance may have contributed to the increase in opioid-related deaths in 2017 (2). The task force called for a push to streamline access to multidisciplinary treatment for pain with an emphasis on the other 3 approaches (i.e., restorative therapies, behavioral health, and complementary and integrative health). Multidisciplinary approaches, including psychosocial interventions, have been recommended in orthopedics specifically, which is a predominant source of patients for pain management physicians. For example, chronic low-back pain patients, who previously underwent spinal fusions (7), reported reduced postoperative pain intensity following the utilization of such strategies.

Given the often-high patient load of orthopedic patients in pain management, it is important to consider the many factors affecting the recovery after an orthopedic procedure. Further, psychological factors (8,9), such as mental health and resiliency, appear to play a significant role in the patients' perceived outcomes. "Resiliency" is defined as an interplay between personality factors (trait-based) and cognitive and affective states that influences the adaptability to respond and rebound following trauma or stress, as highlighted in Chandler et al (4).

Patients' perceived helpfulness and satisfaction of the procedure, which correlates with compliance and clinical outcome of the treatments (e.g., follow through with physical therapy, medication adherence, and lifestyle changes), are important contributions to outcomes (10-13). Unfortunately, regular screening for psychological risk factors related to poor postoperative outcomes may not occur and the physician only becomes aware of the behavior (e.g., suicidal ideation, maladaptive coping skills, fear avoidant behaviors, and substance misuse) after the procedure is performed and recovery becomes problematic. Some patients may require a pain management specialist to intervene

when residual pain or dysfunction persists following a procedure and is not resolved with initial conservative treatment, such as medication, injections, and physical therapy. The integration of screening and subsequent interventions targeting psychological risk factors associated with poor pain outcomes appear vital (14-17).

The accurate and timely identification of these risk factors provide an opportunity to connect patients to appropriate mental health services that could dramatically benefit their recovery trajectory (4). While this screening process presents both opportunities and challenges in the integration of multidisciplinary care in pain management, emerging evidence would suggest these risk factors present frequently, can be detected, and allow for the connection of patients to appropriate care in order to improve clinical outcomes. Such challenges of incorporating psychological and behavioral assessments into pain management may be the lack of training in selecting the appropriate tools to identify critical psychological variables. Other challenges may include managing survey fatigue and establishing protocols for mental and behavioral health staff when a high acuity patient (e.g., endorsement of suicidality) presents to the clinic. One of the greatest barriers, however, may be the time limitations during a busy clinic day to administer, collect, interpret, and follow-up on the assessments. As such, the purpose of this pilot study was to determine the feasibility and clinical utility of incorporating brief psychological and behavioral health assessments into a private pain management practice.

METHODS

Design

A convenience sample of pain management patients were recruited from a private, multi-specialty orthopedic clinic in Tallahassee, Florida. All patients reported experiencing chronic pain (i.e., pain lasting longer than 3 months). Patients were approached prior to their initial clinical interaction at the pain management clinic. Patients 18 years and older that identified as a new patient to the clinic by staff were approached and recruited for the study. Patients were excluded from the study if: they did not speak and read English fluently; were cognitively impaired; were pregnant; were prisoners; were not legally able to make decisions on their own behalf; it was determined that the patient was seeking treatment for an acute (< 3 months) injury; or the patient was seeking consultation for a vertebral

augmentation procedure. Those who provided consent to participate and disclosure authorization were included in the study. Next, patients completed a medical history survey and psychological assessments. The treating clinicians were blinded to the survey responses, except for a positive response to a question related to suicidal ideations, considering the focus of the study was to examine feasibility and encourage authentic responses without concern for the effect of participation on their treatment. If suicidal ideation was endorsed, suicide risk was triaged by a pain management clinician following the completion of the survey while in the clinic. The patients concluded their research visit by being allowed to offer feedback about participating in this study, which was later used to inform future screener selection. The research staff kept a daily log of patient and staff comments to document challenges and opportunities during data collection. Medical records were reviewed to determine patients' responses to treatment and subsequent management of their ailments in the year following their initial appointment. Demographic variables, medical history, employment information, vital signs, pain, functional status, and treatment information were collected during a records review.

Behavioral and Psychological Assessment

A behavioral and psychological battery was administered using a secure and compliant data platform (Qualtrics XM, Provo, UT, United States) on a mobile electronic device (Apple iPad, Cupertino, CA, United States) and completed by research patients prior to the patient's initial clinical evaluation. The constructs examined within these scales include depression, anxiety, helpless/hopelessness, catastrophizing, avoidance behaviors, coping, and resiliency. The behavioral com-

ponent of the battery examined mental health history, substance use/abuse, and physical activity. The psychological component included the 10-Item Connor-Davidson Resilience Scale® (CD-RISC-10) (18), the 49-Item Avoidance Endurance Questionnaire (AEQ), and the 20-Item Center for Epidemiologic Studies Depression Scale (CES-D) (20). Patient-reported estimates of typical moderate- and vigorous-intensity physical activity questions during the last 12 months were structured similarly to the International Physical Activity Questionnaire (21) to calculate total weekly exercise volume.

Clinically Meaningful Scale Thresholds

Quartiles used for the CD-RISC-10 were 0-29, 30-32, 33-36, and 37-40 per scale specifications. A score of ≥ 19 on the CES-D was used at the optimal cutoff for identifying a major depressive disorder (20). The AEQ does not have an established classification/discrimination cutoff; however, reporting greater than a "0" on the question (i.e., "Life is hardly worth living with pain like this.") was considered as positive for reporting suicidal ideations. A change in patient-reported pain from initial visit to follow-up was defined as meeting or exceeding the minimal clinically important difference (MCID; ± 2 points) on an 11-point numeric pain rating scale (Table 1) (22). The Florida State University's Institutional Review Board approved this study.

RESULTS

Thirty patients completed the consent and disclosure forms between May 2018 and July 2018. Of them, 27 patients completed the entire battery, and 24 patients returned to the clinic for follow-up care with their pain management clinician. While the entire sample reported experiencing chronic pain ≥ 3 months, many were unable to provide an exact date or close

Table 1. *Clinical screeners.*

Intake Screeners	Psychological Domain	Normal Range
CES-D	Depression	A score of ≥ 19 on the CES-D was used at the optimal cutoff for identifying major depressive disorder (20).
AEQ	Pain-Related Avoidance and Endurance	The AEQ does not have an established classification/discrimination cutoff; however, reporting greater than a "0" on the question (i.e., "Life is hardly worth living with pain like this.") was considered as positive for reporting suicidal ideations. A change in patient-reported pain from initial visit to follow-up was defined as meeting or exceeding the minimal clinically important difference (MCID; ± 2 points) on an 11-point numeric pain rating scale (19).
CD-RISC-10	Resiliency	Quartiles used for the CD-RISC-10 were 0-29, 30-32, 33-36, and 37-40 per scale specifications (18).

Abbreviations: CES-D, Center for Epidemiologic Studies Depression Scale; AEQ, Avoidance-Endurance Questionnaire; CD-RISC-10, Connor-Davidson Resilience Scale; MCID, minimal clinically important difference.

estimate because there was a substantial gap in time between their injury and the initial pain management visit. Feedback from the research and clinical team are summarized as follows: phone recruitment was highly ineffective; a dedicated “research” room aided with office logistics; electronic data capture provided excellent security and reduced storage needs; patients that displayed slower processing abilities tended to take much longer on the battery; and patients with suicidal ideations were best managed if they stayed in the research room and were triaged before moved to their exam room. Patient feedback about study participation were summarized as follows: uncertainty about cannabidiol considered a recreational drug; a handful of patients became emotional when discussing the history of their injuries and how it impacted their life; several patients who ultimately did not agree to participate or stopped before completing felt that they were not a good candidate for research or that the study was not relevant for them; and even after identifying ourselves as purely members of the research team, several patients insisted on discussing their plan of care or requesting medical advice. Overall, median time for consent and battery completion was 30.2 minutes [interquartile range (IQR): 21].

Men and women were evenly represented in the sample (52%/48%, respectively) with many patients (59%) classified as obese (body mass index [BMI] \geq 30), and the average blood pressure fell within the Stage 1 hypertension classification (Table 2). Specific occupation was not consistently documented in the notes (48% reported); however, over half of the sample (54%) reported an active work status (Table 2).

The prevalence of diagnosed diabetes in the group was 11%. Spine-related injuries comprised most of the sample (81%), and nearly two-thirds of the sample were consuming opioids at the time of their initial visit to the clinic (59%) (Table 3). Furthermore, less than half the sample reported meeting the weekly guidelines for moderate- or vigorous-intensity physical activity (23).

Of the 24 patients that returned for a follow-up visit, only 4 (17%) reported pain improvement meeting or exceeding the MCID threshold (Table 4). Of the 4 patients reporting a previous diagnosis of depression, the CES-D threshold of \geq 19 only identified one. Fifty-six percent of the sample scored in the lower half of resiliency norms, and 19% were considered positive for reporting suicidal ideations on the AEQ. The mean catastrophizing and pain persistence scores mirrored or exceeded chronic pain previously classified as “high

disability/severely limiting” compared to a previous chronic pain cohort (24). “High disability/severely limiting” is defined as 5-6 disability points regardless of characteristic pain intensity on the Chronic Pain Grade system (24).

DISCUSSION

Patient vital signs (Table 2) and medical history (Table 3) portray individuals experiencing pain for at least 3 months, generally spine-related, with several comorbidities, possibly utilizing at least one substance for pain coping, and were generally unresponsive to first-line therapies (e.g., medication management, injections, and physical therapy). Existing research has established the relationship between psychological risk factors, such as depression and anxiety, and chronic pain and their impact on pain-related disability (24-26). Findings from the present study provided evidence that psychological and behavioral health vulnerabilities are present in a pain management practice. Specifically, this sample exhibited more than double the population rates of elevated depression symptoms (19% vs 7.1%) (2,26) and more than triple the population rates of suicidal ideations (19% vs 4.8%) (2,26). Negative pain beliefs (27,28), such as pain catastrophizing, also appear detrimental to pain-related outcomes and were exhibited in the study group. Protective factors, such as resiliency, are being explored as behaviors promoting adaptive pain outcomes.

When examining the present sample, 56% of the cohort scored in the lower half of resiliency norms, which may indicate less of a protective buffer for their pain-related disability, but any questions regarding the causal relationship between resiliency and chronic pain could not be addressed in this study. These findings align with previous work that found chronic pain patients tend to have lower rates of resiliency when compared to the healthy patients, impacting outcomes as a result (29-31). The sample’s catastrophizing and pain persistence scores mirrored or exceeded chronic pain classified as high disability-severely limiting (19), suggesting that the pilot data were similar to another chronic pain cohort. The combination of low resiliency and elevated depression, anxiety, or catastrophizing may lead to additional barriers that pain management clinicians must overcome when attempting to obtain an optimal treatment outcome as evidenced by only 17% experiencing clinically important improvement in pain intensity at follow-up (Table 4). When behavioral health assessments are not utilized, a patient not

Table 2. Patient demographics and vitals (n = 27).

Age (years)	56.3 ± 18.2
Gender (M/W)	14 / 13
BMI (kg/m ²)	31.7 ± 7.6
Obese BMI	16 (59%)
Systolic Blood Pressure (mmHg)	138.8 ± 19.3
Diastolic Blood Pressure (mmHg)	82.6 ± 10.8
Insurance	
Commercial	14 (52%)
Government	7 (26%)
Worker's Compensation	7 (22%)
Occupation (n = 13)	
Clerical	9 (69%)
Manual Labor	3 (23%)
Mixed Duties	1 (8%)
Work Status (n = 24)	
Active	13 (54%)
Medical Leave	1 (4%)
Disability	2 (8%)
Retired	8 (33%)

mean ± SD; n (% of sample).

Abbreviation: BMI, body mass index.

responding to therapies may be viewed as treatment-resistant, rather than the clinician being able to identify opportunities to offer behavioral or psychological assistance.

The protective benefits of resiliency may be a critical factor in assisting amputees with complex regional pain syndrome and geriatric chronic low-back patients in recovering from their pain through acceptance and adaptation (31,32). These data demonstrated that patients with greater resiliency reported greater quality of life, lower disability, higher psychological functioning, and increased functional performance. The results provide evidence of the widespread effects of resiliency and adaptive functioning in pain. Quantifying patients' resiliency may allow for an earlier intervention to enhance low resiliency and improve overall patient outcomes.

Maladaptive behaviors, such as substance use for coping, specifically tobacco, is common in patients experiencing pain (32,33) and is consistent with the rates of tobacco use reported in the study sample. Conversely, less than half the sample reported meeting the weekly guidelines for moderate- or vigorous-intensity physical activity. A sedentary lifestyle was inversely associated with functional performance in pain and clinical outcomes (33-35). Higher levels of physical activity were

Table 3. Medical history and comorbidities (n = 27).

Diabetes	3 (11%)
Hypertension	13 (48%)
Abnormal Blood Lipids	11 (41%)
Heart Disease	5 (19%)
Chronic Obstructive Pulmonary Disease	4 (15%)
Depression	4 (15%)
Anxiety	6 (22%)
Neurodegenerative Diseases	3 (11%)
Neurological Disease	3 (11%)
Cerebrovascular Disease	8 (30%)
Total Comorbidities	2.2 ± 1.9
Injured Body Part	
Spine	13 (48%)
Upper Extremity	2 (7%)
Lower Extremity	3 (11%)
Spine + Extremity	9 (33%)
Current Opioid Prescription at Initial Visit	16 (59%)
Current Benzodiazepine Prescription at Initial Visit	4 (15%)
Current Tobacco User	5 (19%)
Current Alcohol User	11 (41%)
Current Recreational Drug User	7 (26%)*
Current User of at Least One of the Above Substances	24 (89%)
Moderate Physical Activity Per Week	120 [311]
Met HHS Guidelines for Moderate-Intensity	13 (48%)
Vigorous Physical Activity Per Week	20 [120]
Met HHS Guidelines for Vigorous-Intensity	10 (37%)

mean ± SD; n (% of sample); median [IQR].

*Marijuana was the only recreational drug reported by patients.

also associated with less depressive symptoms and disability in adults (35,36). Exercise programming, patient education, and cognitive behavioral therapy strategies for patients experiencing chronic pain may reduce maladaptive behaviors and improve positive lifestyle choices which could directly influence clinical outcomes.

Limitations

While we carefully considered weaknesses during the research design, the study was not without limitations. The sample size of 27 means the preliminary findings from our pilot study may not be generalizable. Further, some of the patients that declined or did not finish the surveys may have exhibited higher or lower rates of behavioral or psychological distress. The AEQ provided a wide array of behavioral constructs to examine, but may have limited clinical use for treatment

Table 4. *Clinical variables and battery scoring (n = 27).*

Change in Pain Reporting From Initial to Follow-up	0 [2]
Met or Exceeded MCID for Improvement	4 (17%)
CES-D	14 [13]
≥ 19	5 (19%)
CD-RISC-10	31 [13]
1st Quartile	10 (37%)
2nd Quartile	5 (19%)
3rd Quartile	4 (15%)
4th Quartile	8 (30%)
AEQ	
Anxiety/Depression	1.76 ± 1.16
Positive Mood	3.82 ± 1.34
Help/Hopelessness	1.84 ± 1.30
Catastrophizing	0.97 ± 1.24
Thought Suppression	2.64 ± 1.57
Avoidance Social	
Mild Pain	1.55 ± 1.45
Severe Pain	2.43 ± 1.73
Avoidance Physical	
Mild Pain	2.88 ± 1.40
Severe Pain	3.95 ± 1.50
Humor/Distraction	
Mild Pain	3.05 ± 1.22
Severe Pain	2.41 ± 0.98
Pain Persistence	
Mild Pain	3.54 ± 0.83
Severe Pain	3.54 ± 0.81
Behavioral Endurance	
Mild Pain	3.40 ± 0.81
Severe Pain	3.16 ± 0.79
Positive for Suicidal Ideations	5 (19%)

mean ± SD; n (% of sample); median [IQR].

Abbreviations: MCID, minimal clinically important difference; CES-D, Centers for Epidemiologic Studies Depression Scale; CD-RISC-10, Connor-Davidson Resilience Scale; AEQ, Avoidance Endurance Questionnaire; Suicidal Ideations, Question 11, "0" for "Life is hardly worth living with pain like this."

algorithms. The CES-D provides a continuous scoring range of depression, but does not offer varying degrees of severity. The present study has identified a sizeable subset of patients with behavioral or psychological vulnerabilities, but does not guarantee the efficacy of interventions likely prescribed after recognition occurs. Positive findings from a randomized controlled

trial specific to chronic pain would provide additional support for the need to utilize behavioral and psychological assessments. Further, due to the cross-sectional design, it cannot be determined if the physical disabilities lead to a behavioral and psychological sequelae or the reciprocal.

CONCLUSIONS/CLINICAL IMPLICATIONS

Given the complexities that surround the treatment of chronic pain, pain management clinicians and the overall health care system should consider a biopsychosocial approach to conceptualize and treat the pain patient (36,37). In moving toward a more integrated treatment approach to pain, the screening and identification of psychological risk factors in pain patients will likely promote innovative strategies to address the many challenges providers face when attempting to manage such identified risk factors. Patient buy-in and motivation, communication of psychoeducation and treatment expectations, barriers accessing specialized mental and behavioral health treatments (e.g., transportation, insurance, geographical restrictions, etc.), and referral follow-up support are critical (37,38). Although challenges exist in the implementation of a biopsychosocial approach to pain, strategies, such as patient navigation and interdisciplinary clinically minded leadership, may reduce the barriers to implementation and should be further explored.

Each physician should carefully select assessments that they believe will offer the greatest value for their team. Balancing survey fatigue, robustness of data, scoring, cutoffs, and treatment recommendations may require some trial and error. The refinement of each individual assessment battery will allow for broader utility and feasibility among staff and providers, ultimately driving change in care plans. The results from the pilot influenced changes at the study site, which led to expanded access to behavioral health staff, including the addition of 3 behavioral health team members, and led to a follow-up observational study with more widely used screeners. Such implementation provides an example of utility and implementation.

Ultimately, if pain management providers and the health care system as a whole disregard the role of behavioral and psychological factors in patient care, they would be doing a disservice to their patients and be missing an opportunity for better fiscal stewardship of resources.

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