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Treatment of Chronic Pain in U.S. Veterans: The Effectiveness of Interdisciplinary Programs

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Treatment of Chronic Pain in U.S. Veterans: The Effectiveness of Interdisciplinary Programs

By

Morgan Compton

Submitted in Partial Fulfillment
of the Requirements for
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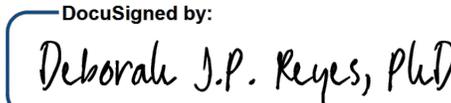
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THESIS SUMMARY

Chronic pain is a prevalent issue amongst US veterans. Experts suggest that interdisciplinary pain treatment is the most effective method of treating chronic pain, specifically due to targeting functioning and quality of life. These programs combine cognitive behavioral therapy and physical therapy by utilizing a variety of exercise and education regimens. The pain department at Columbia VA Health Care System offers both a comprehensive *interdisciplinary* treatment, Outpatient Interdisciplinary Pain Program (OIPP), and a flexible, *multidisciplinary* option (OIPP-Lite) for veterans suffering from chronic pain. The goal of this program is to improve knowledge for coping with chronic pain and to create a better quality of life in regard to both physical and mental health. This study was designed to examine the effectiveness of the programs. Although the *multidisciplinary* program (OIPP-Lite) offers flexibility and is less taxing on veteran and administration resources, preliminary examination would suggest that the interdisciplinary approach (OIPP) offers more effective treatment. Data collection included behavioral health measures, physical therapy measures, knowledge gains, and patient histories to determine changes in the amount of pain-related medical visits. These measures were conducted upon program entry, program completion, and 3- and 6-month follow up appointments. Data was then analyzed by comparing the initial measures between both OIPP and OIPP-Lite and then comparison between post-OIPP measures, 3-month, and 6-month follow ups. Statistical testing was conducted by using a t-test to compare between the separate data groups, leading to the determination that the group composition of initial measures for each program are relatively comparable. Veterans were given the option to participate in either OIPP or OIPP-Lite based on personal preference. For the purpose of this study, 112 participants of both OIPP and OIPP-Lite were analyzed. Due to difference in program duration, there were twice as many OIPP cohorts

compared to OIPP-Lite. Common age groups included the age ranges of 41-65 and 66-85, with 86% of participants being males. The common diagnoses of participants included back, arm/leg, and neck pain, depression, and insomnia. It was hypothesized that an *interdisciplinary* program (OIPP) would produce more effective gains in quality of life and physical gains than a *multidisciplinary* approach (OIPP-Lite). While both see general positive growth in scores, OIPP had larger improvements on average despite having worse initial symptoms. Both programs demonstrated significant increase in veterans' knowledge of pain management and improvements in pain catastrophizing, depression, and the number of pain-related medical visits. Only OIPP revealed significant improvements in sleep hygiene. However, OIPP-Lite utilizes fewer VA resources and is more efficient to offer to participants. Additional information concerning veteran satisfaction is desired to create a conclusive choice between OIPP and OIPP-Lite. It is recommended for VHA to consider continuing both programs to effectively address the needs and preferences of the veterans served.

Table of Contents

Thesis Summary.....	2
Introduction.....	5
Chronic Pain and Veterans.....	6
Chronic Pain and Mental Health.....	6
Multidisciplinary Approach.....	7
Outpatient Interdisciplinary Pain Program.....	10
Research Methods.....	12
Hypothesis.....	13
Results.....	14
Discussion.....	17
Conclusion.....	19
References.....	21
Appendix A: Behavioral Health Tests.....	25
Appendix B: Knowledge Gains.....	26
Appendix C: Functional Tests.....	27
Appendix D: Changes in Pain-Related Medical Visits.....	28
Appendix E: T-Tests.....	29

INTRODUCTION

Pain can be a debilitating part of life and impacts at least one hundred million Americans (Matthias et al., 2016). Pain can reduce quality of life, interfere with various daily activities, and increase emotional distress (Matthias et al., 2016). Pain typically has an obvious cause, but chronic pain is more difficult to treat as it often lacks a defined origin. Chronic pain is defined as “a psychosomatic disorder with physical, mental, social, and spiritual components,” and is a clear example of the relationship between mind and body (Pjevač et al., 2019). It is a prevalent condition amongst veterans and older adults. This is often due to a decline in health with age as well as the added stress from life events. Veterans are especially prone due to the trauma that comes with active duty and the extraordinary stress on their bodies and minds from military service. An important way to treat chronic pain is to target daily functioning and pain acceptance (Scott et al., 2017). Chronic pain disproportionately affects those who have served or are serving in the military. While chronic pain problems are noted for 26% of the general population, 44% of U.S. military after combat deployment struggle with chronic pain (Toblin et al., 2014). Veterans often report that pain significantly interferes with their quality of life and note dissatisfaction regarding their current pain treatment. In line with the national Opioid Safety Initiative, it is critical to identify non-pharmacological pain treatments that are flexible, efficient, and effective, and that veterans value. The use of multidisciplinary and interdisciplinary treatment programs for chronic pain is highly supported, and one such program is OIPP. This program has been met with increasing success over the last few years as it utilizes a combination of cognitive behavioral therapy, physical therapy, and other disciplines.

CHRONIC PAIN AND VETERANS

Chronic pain is overwhelmingly common amongst veterans, causing them to be considered a vulnerable population for the development and endurance of pain. It is estimated that “66% of veterans report pain, and 9% report severe pain” (Frank et al., 2019). Due to the physical demands of active duty as well as the emotional stress and trauma, chronic pain tends to consume the daily lives of veterans. Pain amongst veterans is also highly related to significant injuries such as posttraumatic stress disorder and traumatic brain injury. The unique combination of stress and injuries that are found amongst veterans create evidence that chronic pain treatment for veterans needs to be specialized at targeting mental health struggles in order to be effective. A review completed by Kerns and Heapy (2016) revealed that veterans who had a positive screen for posttraumatic stress disorder and documented chronic pain were less likely to receive mental health care, which exposed a large issue in the way chronic pain is treated in veterans. Frank et al. (2018) allege that chronic pain remains an important challenge for the Veterans Health Administration (VHA) due to the aging population and consistent growth in the number of veterans with pain related to recent military service.

CHRONIC PAIN AND MENTAL HEALTH

Depression is frequently found in individuals with chronic pain and is also associated with higher levels of pain intensity and disability. Higher prevalence and intensity of pain has a direct correlation with depression and anxiety, which is why it is vital to include in curriculum for chronic pain treatment (Ólason et al., 2018). Since depression is such a large barrier to pain relief, many studies have been done to further explain this correlation. Typically, it must be diagnosed to ensure proper treatment. Elliott, Renier, and Palcher (2003) utilized the SF-36

Health Survey at an interdisciplinary pain management center and found that the survey was able to detect major depression and exhibit a dose-effect relationship between the severity of depression and quality of life in chronic pain patients. Chronic pain patients who were diagnosed with major depressive disorder had significantly worse symptoms concerning their mental composition. Similar studies have revealed that improvements in mental health and depression are significantly correlated to improvements in pain acceptance and pain intensity (Scott et al., 2017).

Thoughts, particularly pain catastrophizing, can play a large role in the pain experience. A recognized, critical component of chronic pain management is pain self-management, which is the “ability to manage the symptoms, treatment, physical, and psychosocial consequences, and life-style changes inherent in living with is a focus on a chronic condition” (Matthias et al., 2016). Cognitive Behavioral Therapy for Chronic Pain (CBT-CP) aims to increase psychological flexibility and the ability to make a conscious effort to move away from negative thinking patterns. This model “assumes that greater levels of acceptance, awareness, and engagement in goal-directed behavior will be associated with better health and functioning (Scott et al., 2017). Utilizing methods of psychological flexibility will decrease pain catastrophizing tendencies and help their daily functioning to improve as they are no longer viewing their pain as a crippling obstacle to daily life.

MULTIDISCIPLINARY APPROACH

Expert guidelines are now recommending “integrated, multimodal, multidisciplinary chronic pain care” that is tailored to each patient’s needs as a treatment for chronic pain (Frank et al.,

2019). This technique allows for all aspects of care to work together for the maximum benefit of the patient. These programs are distinct because their primary goal is to improve functioning rather than eliminate pain (Gagnon et al., 2018). The improvement of daily functioning is the key reason that patients seek help for chronic pain, as it can become crippling and interfere with quality of life. Treatments that promote healthy lifestyles by including exercise, walking, and other structured activity is considered to be important for reducing pain and improving functioning (Kerns & Heapy, 2016). Many programs utilize a variety of physical and occupational therapists in the hope of improving physical function, and when coupled with behavioral therapy, it is shown to be extremely effective (Kurkinsky et al., 2016). The question of the appropriate dosage of these therapeutic treatments has yet to be answered, often depending on patient characteristics.

Another key aspect of programming for chronic pain treatment is the inclusion of pharmaceutical education. Due to an increasing scrutiny of opioid medication prescribing, the VHA have emphasized nonopioid treatments as a first option for chronic pain. There has been increasing evidence of harms and inadequate evidence of long-term benefit. The VHA began implementing the Opioid Safety Initiative to reduce overdose deaths and improve the safety of opioid prescribing, but it has also resulted in the exacerbation of chronic pain due to patients who have been relying on opioids for extended periods of time (Frank et al., 2018). Over-medicating is a common problem that is seen in many people struggling with chronic pain and the inclusion of pharmaceutical education is key to a successful program, especially in older adults (Darchuk et al., 2010). This is directly tied to behavioral health education, which helps patients learn to cope with pain rather than try to eliminate it entirely.

Behavioral health education and therapy alone is not always helpful in fighting chronic pain, which has led to the use of multidisciplinary programs for this subject. Scott et al. (2017) conducted a study to examine the effectiveness of Acceptance and Commitment Therapy in older adults with chronic pain. The results of this study revealed that behavioral health treatment alone produced small to moderate effect on reported pain, but ultimately had no effect on depression, physical functioning, or medication usage. However, this same study showed that behavioral therapy coupled with exercise produced significant improvements in pain-related stress, disability, and physical performance (Scott et al., 2017). This evidence confirms the importance of combatting chronic pain by introducing a healthier lifestyle. The mental component of any illness is vital but combining this with action and consistency produces the most effective results.

All of these program components are essential for program success, but obtaining these measures accurately is a hurdle for any program assessment. Studies have shown the importance of comprehensively obtaining health measures of patients to accurately assess effectiveness of programs (Gagnon et al., 2018). Utilizing good assessment measures is a key aspect to program evaluation, as it shines a light on the areas of strengths and weaknesses in the program.

Multidisciplinary approaches can take on many forms. Programs that have been called multidisciplinary can range from recognizing the need to make referrals to different providers to having a unified team simultaneously evaluating and addressing treatment needs. For the purpose of this paper, multidisciplinary will be defined as several disciplines sharing a unified treatment goal for the same veteran. In contrast, interdisciplinary will be considered a unified

team made up from several different disciplines that integrate knowledge and methods to create a synthesized approach.

OUTPATIENT INTERDISCIPLINARY PAIN PROGRAM

To combat the frequency of veterans struggling with chronic pain, the Veterans Health Administration (VHA) has implemented a step level care approach to treating chronic pain. The Pain Department within Columbia VA Health Care System (Columbia, SC) developed a Commission on Accreditation of Rehabilitation Facilities (CARF) accredited program that aims to improve quality of life by increasing veteran knowledge for coping with chronic pain. Interdisciplinary programs such as OIPP are considered to be tertiary care reserved for veterans who have been resistant to primary and secondary treatments like physical therapy or other pain interventions. The original OIPP provides a comprehensive interdisciplinary approach for veterans suffering from chronic pain. Criteria for program inclusion includes evidence of moderate to severe non-cancer chronic pain despite secondary-level care, which includes but is not limited to neurology, rheumatology, and pain medication and rehabilitation. Patients are not eligible for the program should they present evidence of active substance abuse, difficulties functioning in a group setting, lack of daily independence, and medical or psychological instability.

OIPP utilizes an *interdisciplinary* approach with a treatment team composed of psychologists, physical therapists, pharmacist, pain medical providers, nurse, social worker, chaplain, and dietitian. Veterans receive comprehensive evaluations from pain specialists in the area of psychology, medical, social work, and physical therapy. If appropriate, additional referrals are

made for occupational therapy and mental health. Veterans attend treatment program three days each week (Tuesday, Wednesday, Thursday) for 6 hours (8:30 am-3:00 pm) for six weeks. Veterans receive CBT-CP, sleep hygiene, pain neuroscience education, guided physical exercise, pharmacy education, nutrition education, chaplain services, battlefield acupuncture, Alpha-Stim treatment, adaptive yoga, and community resources education. Outcome studies for CARF accreditation has demonstrated that OIPP is effective and strongly valued by the veterans. However, the program results in significant time and resource demands on staff and veterans.

Since a significant number of veterans were not able to engage in OIPP due to concerns about the extensive time commitment (18 hours per week), OIPP-Lite was developed to provide similar treatment with a more flexible time demands. OIPP-Lite utilizes the same program inclusion and exclusion criteria. Participants also receive similar evaluations from psychology, medical, social work, and physical therapy. Veterans engage in treatment (CBT-CP, pain neuroscience education, guided physical therapy, and Alpha Stim) during a weekly 3-hour program (Mondays 12:30 pm to 3:30 pm) for twelve weeks. During the social work assessment, an individualized treatment plan is established. Based on the veterans needs and/or requests, referrals are made to occupational therapy, mental health, pharmacy, dietitian, Tai Chi, Adaptive Yoga, Battlefield Acupuncture, and/or chaplain services. Veterans are advised by a physical therapist to develop a home exercise program. OIPP-Lite offers customized treatment to fit the needs and time demands of the veterans who participate.

Although both programs utilize the same psychology and physical therapy staff, treatment delivery is very different. OIPP provides *interdisciplinary* services in which veterans receive

significant (18 hours per week) support and guidance in making cognitive and behavioral shifts. Veterans report that they highly value the staff and peer support received in this program. In contrast, OIPP-Lite utilizes a *multidisciplinary* approach that can be flexible to veteran and staff time demands. This program provides support for a longer period (12 weeks vs 6 weeks) but requires more veteran independence for implementing behavioral changes.

Numerous post-care treatment options are provided for veterans who graduate both OIPP and OIPP-Lite. These options include the OIPP support group, a mindfulness group, sleep hygiene, Acceptance and Commitment Therapy for chronic pain, biofeedback, Tai Chi and / or adaptive yoga. Each patient has a discharge appointment and follow-up appointments at three and six months after completing either OIPP or OIPP-Lite. During the follow up appointments, the follow-up data is collected, and a treatment plan is adjusted to meet the veterans' needs.

RESEARCH METHODS

Veterans referred to Columbia VA Health Care System's pain department for behavioral health interventions were screened for possible inclusion in OIPP or OIPP-Lite. All participants engaged in evaluations from a psychologist, medical doctor, physical therapist and social worker to identify treatment needs and to determine if they met the above described inclusion criteria. Veterans were given the option to participate in either OIPP or OIPP-Lite based on personal preference. Due to difference in program duration, there were twice as many OIPP cohorts than OIPP-Lite. There was a total of 112 participants that completed the OIPP ($n=75$) and the OIPP-Lite ($n=37$) programs with at least 80% attendance. The most common age groups were 41-65 and 66-85, each 63% and 31% respectively. The participants were predominantly male (86%)

that were either African American (65%) or Caucasian (34%). The most common pain areas were back (88%), arm/leg (64%), and neck (36%). Depression and insomnia were the most common mental health problems, with 65% and 67% of veterans diagnosed respectively.

Behavioral health and functional assessments were collected at four time periods: intake, program completion, 3-months post completion, and 6-month post completion. Behavioral health measures include: Beck Anxiety Inventory (BAI), Pain Catastrophizing Scale (PCS), Insomnia Severity Index (ISI), and the Patient Health Questionnaire-9 (PHQ-9). Functional measures included: 6-Minute Walk Test, Timed Up and Go Test, and Tinetti Balance Assessment. Knowledge assessments were given at the beginning and end of each cohort. Finally, a review of the chart system was conducted to determine the number of pain-related medical visits that occurred for the 6 months prior to treatment and the 6 months after completion of OIPP or OIPP-Lite. The changes in scores over time are analyzed with a two-tailed, paired t-test to evaluate significance.

HYPOTHESIS

It was hypothesized that an *interdisciplinary* program (OIPP) would provide the veterans better gains in quality of life (depression, sleep, anxiety, and pain catastrophizing) and in physical gains (endurance, balance) than a *multidisciplinary* approach (OIPP-Lite). Confirmation of this hypothesis would be aiding to justify the resource commitment to the comprehensive OIPP program for both veterans and for VHA. On the other hand, if veterans are able to obtain similar results from both programs, VHA may want to consider utilize their resources to increase access to the OIPP-Lite programs.

RESULTS

At the time of this review, 67 veterans had completed OIPP and 23 veterans had completed OIPP-Lite. Data was able to be gathered for 47 OIPP graduates and 13 OIPP graduates at the 3-month follow up. Further attrition was noted at the 6-month follow up with data being gathered for only 38 OIPP and 8 OIPP-Lite graduates. Please note that low numbers in the 3-month and 6-month follow up measures increases the changes of variance impacting descriptive scores.

Participants who began OIPP and OIPP-Lite started with comparable anxiety issues. Both groups had about 68% of the group with moderate to severe anxiety. The OIPP graduates had significant improvements in anxiety compared to the OIPP-Lite group at the graduation.

Improvements in anxiety scores for the OIPP group did not remain at the 6-month follow up.

Furthermore, there were not significant changes in anxiety between groups at the 3-month and 6-month follow ups (see Appendix A).

The OIPP participants started the program with significant more pain catastrophizing thoughts ($t=0.45$) as demonstrated with higher scores the PCS. At program graduation, 3-month follow up, and 6-month follow up, the OIPP veterans had larger improvements in pain catastrophizing (8.9, 4.7 and 6.6 point reduction, respectively) as compared to the OIPP-Lite graduates (2.5, 2.4, and -2.8 point reduction, respectively). These differences were not clinically significant between the groups (see Appendix E). This was likely due to high variance and low numbers.

In regard to depression, both the OIPP and OIPP-Lite group started with similar depression levels. Both the OIPP and OIPP-Lite graduates made improvements on the Patient Health

Questionnaire-9 Depression scales at the program completion (4.09 and 2.38 points, respectively), at the 3-month follow up (2.05 and 2.25 points, respectively) and 6-month follow up (1.59 and 1.25 points, respectively) as seen in Appendix A. The OIPP graduates had clinically larger improvements for the program completion ($t=0.00$) and 6-month follow-up appointment ($t=0.02$) compared to the OIPP-Lite graduates.

Veterans in both groups started with similar sleeping problems. As seen in Appendix A, OIPP graduates made improvements on the Insomnia Severity Index scores with larger improvements noted at the program completion (3.28 vs. -0.15 points), at the 3 months follow up (0.84 vs. 0.25 points) and the 6-month follow up (2.63 vs. -0.50 points). Group differences were not significant most likely due to high variance and low numbers.

Veterans were able to make significant knowledge gains regarding their understanding of pain. Assessment tests were given in the knowledge of information related to Cognitive Behavioral Therapy for Chronic Pain (CBT-CP) and the Neurophysics of Pain Questionnaire, Revised (NPQR). Both OIPP and OIPP-Lite veterans started with comparable knowledge in CBT-CP (28% and 47%, respectively) and NPQR (56% and 61%, respectively). As well, both OIPP and OIPP-Lite graduates made significant gains on the CBT-CP (36% and 42%, respectively) and the NPQR assessment (24% and 25%, respectively). The gains for the veterans were comparable in both programs (see Appendix B).

In regard to function, the OIPP group started with significantly more balance problems than the OIPP-Lite participants. High fall risk classification was noted for 26% of OIPP and 22% of

OIPP-Lite participants. The percentage of veterans being at a high fall risk dropped for both the OIPP and OIPP-Lite graduates at graduation (3% and 8% respectively), at the 3 month follow up appointment (0% and 0%, respectively) and at the 6 month follow up appointment (6% and 7%, respectively). In comparison to the OIPP-Lite, the OIPP group had a clinically high change in balance scores at the program completion ($t=0.43$), at the 3-month follow-up ($t=0.01$) and at the 6-month follow up ($t=0.01$). The groups were not significantly different regarding their function on the 6-Minute Walk or the Timed Up and Go assessments at the initial evaluation.

The OIPP graduates had consistent improvement on the Timed Up and Go assessment at graduation (2.16 sec) at the 3-month follow up (3.46 sec) and at the 6-month follow (2.63 sec). The OIPP-Lite group demonstrated improvement at graduation (3.73 sec) and at the 3-month follow up (2.32 sec) but did not have improvement at the 6-month follow up (-1.28 sec). Due to the low numbers and large variance, the changes in scores were not significantly different for the groups at any time point (see Appendix E). Concerning assessments of endurance, both groups started with similar 6-Minute Walk test scores. In comparison to OIPP-Lite, OIPP graduates had larger improvements in endurance at graduation (224 feet vs. 45 feet) at the 3-month assessment (240 feet vs. 95 feet) and at the 6-month follow up (200 feet vs. 1.33 feet). The difference was clinically significant for the OIPP group at the completion ($t=0.04$) and at the 3-month follow up ($t=0.03$).

Chart records were examined to determine if OIPP had a positive impact on reducing the number of hospital visit veterans make regarding their pain complaints. For each graduate, pain-related medical visits were examined for the 6 months prior to and the 6 months following OIPP or

OIPP-Lite graduation. OIPP graduates had an average of 3.29 fewer hospital visits in the 6 months following graduation. OIPP-Lite graduates had an average reduction of 1.22 fewer visits. Due to the low numbers and high variance, this difference was not clinically significant (see Appendix D).

DISCUSSION

Due to complications gathering data, there were low numbers of sample sizes amongst OIPP and OIPP-Lite. OIPP-Lite had approximately 50% less program graduates when compared to OIPP, and even smaller percentages at the 3-month and 6-month follow up appointments. Many factors potentially played a role in this. Due to the shorter nature of OIPP compared to OIPP-Lite, it is easier to have more graduating participants simply from time requirements. Furthermore, the COVID-19 pandemic prevented up-to-date data being added to the database between the months of March 2020 through May 2020. This impacted the number of 3-month and 6-month follow up appointments that occurred during this time period being analyzed. Statistical testing was used to even the gap between the two groups, but the sheer number of subjects could be problematic. Furthermore, OIPP-12 is a newer program and therefore has not had as much time as OIPP-6 to improve techniques to be as effective as possible.

Overall, OIPP appears to produce more effective behavioral health and physical therapy than OIPP-Lite, due to larger average changes in scores over the same courses of time. Both groups had initial group measures that were not statistically different in measures except for PCS scores and Tinetti scores (see Appendix E). The general deciding factor concerning the choice between OIPP and OIPP-Lite is the time commitment. Typically, veterans who opt for OIPP-Lite cannot

commit to three full days of instruction each week due to being active (i.e. employed or family responsibilities) or lack of transportation. Higher veteran activity indicates a greater likelihood of having less severe behavioral and physical health measures, since they can maintain higher daily functioning. Most likely, the social support and consistent daily instruction allows patients to more effectively learn the material and practice it under supervised conditions, since OIPP-Lite relies more heavily on the veteran's initiative to continue techniques throughout the week on their own. The additional activities and instruction allow veterans to have daily help at enacting lifestyle changes in a fun way, as well as make strong relationships with other patients to create support that continues after just six weeks. All of the additional program activities and instruction are included in OIPP, while they remain optional for OIPP-Lite. While functional change appears to show greater improvements in OIPP, the knowledge gains for both OIPP and OIPP-Lite are comparable, as seen in Appendix B, despite having different amount of program graduates.

Statistical tests were used to determine whether the differences between behavioral health and physical therapy measurements were statistically significant when compared between OIPP-6 and OIPP-12. As seen in Appendix E, two-tailed paired t-tests were used and 0.05 was the selected p-value for significance. Behavioral health measures were not as significantly different as physical therapy measures. The tests revealed that post-OIPP measurement changes were significantly different for both BAI and PHQ-9 measures, and the difference of 6-month follow-up measures was significant for PHQ-9. Since BAI measures were revealed to be more extreme in OIPP-Lite graduates, we can determine that OIPP is more effective in addressing anxiety symptoms. The PHQ-9 scores for both OIPP and OIPP-Lite revealed similar trends, but the

greater decrease seen in OIPP allows us to determine that OIPP is also more effective at addressing depression symptoms. The t-tests showed that significant differences between OIPP-6 and OIPP-12 existed in cervical rotation and Tinetti balance measures at post-OIPP, 3-month, and 6-month follow-up measures. Significant differences were also present for the 6-minute walking test at post-OIPP and 3-month follow-up measures. Due to these results, we can use the descriptions above to determine that there is statistically significant evidence that OIPP-6 is more productive over the course of time than OIPP-12 concerning physical therapy measures.

CONCLUSION

Due to issues with data collection, there is currently insufficient numbers to draw conclusive opinions regarding the hypothesis. In particular, the low numbers for the OIPP-Lite 3-month and 6-month follow up appointments mixed with high variance makes interpretation questionable. Initial review would suggest that both OIPP and OIPP-Lite programs are effective in helping veterans learn to cope with chronic pain. Both programs demonstrated the ability to increase veteran's knowledge regarding pain management. Veterans made functional improvements in endurance and balance. Improvements noted for both groups included a reduction in pain catastrophizing and depression. Sleep improvement was noted for OIPP, but not OIPP-Lite. This is not surprising as sleep hygiene is integrated into OIPP and optional for OIPP-Lite. Both interventions positively reduced the number of pain-related hospital visits. Preliminary results would support that the *interdisciplinary* approach (OIPP) is more effective than the *multidisciplinary* approach (OIPP-Lite). Despite the fact that OIPP started with veterans with more pain catastrophizing and balance problems, this group had larger improvements in balance and endurance as well as more significant improvements in depression scores at program

completion and the 6-month follow up. With limited resources to meet the multitude of veteran needs, it is important to continue to investigate the effectiveness and efficiency of our chronic pain programs. It is recommended to continue to gather data to increase confidence in these findings. Moreover, additional information on veteran satisfaction with the program may help inform program planning. Although OIPP may be more effective, VHA may need to consider continuing to offer both programs in order to meet veteran needs and preferences.

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APPENDIX A: BEHAVIORAL HEALTH TESTS

Beck Anxiety Inventory Classification						
	Min	Mild	Minimal / Mild	Mod	Severe	Moderate / Severe
<i>Initial</i>						
OIPP (n=75)	9%	22%	31%	35%	33%	68%
OIPP-Lite (n=37)	20%	12%	32%	27%	41%	68%
<i>Program Completion</i>						
OIPP (n=67)	13%	33%	36%	24%	30%	64%
OIPP-Lite (n=23)	7%	31%	38%	8%	54%	62%
<i>3-Month Follow Up</i>						
OIPP (n=47)	11%	30%	41%	34%	25%	59%
OIPP-Lite (n=13)	0%	25%	25%	25%	50%	75%
<i>6-Month Follow Up</i>						
OIPP (n=38)	8%	18%	28%	40%	34%	74%
OIPP-Lite (n=8)	0%	25%	25%	75%	0%	75%
Scores reflect severity of anxiety. Lower scores are desirable.						

Pain Catastrophizing Scale Average Decrease			
	Initial vs. End	Initial vs. 3 Months	Initial vs. 6 Months
OIPP	8.85	4.69	6.58
OIPP-Lite	2.54	2.38	-2.75
PCS scores reflect severity of pain catastrophizing symptoms. Lower scores and a high average decrease are desirable.			

Insomnia Severity Index Average Decrease			
	Initial vs. End	Initial vs. 3 Months	Initial vs. 6 Months
OIPP	3.28	0.84	2.63
OIPP-Lite	-0.15	0.25	-0.50
ISI scores reflect severity of insomnia symptoms. Lower scores and a high average decrease are desirable.			

Patient Health Questionnaire-9 Average Decrease			
	Initial vs. End	Initial vs. 3 Months	Initial vs. 6 Months
OIPP	4.09	2.06	1.59
OIPP-Lite	2.38	2.25	1.25
PHQ-9 scores reflect severity of depression symptoms. Lower scores and a high average decrease are desirable.			

APPENDIX B: KNOWLEDGE GAINS

Knowledge Gains				
	Program	Pre	Post	Group Mean Improvement
CBT-CP	OIPP (<i>n</i> =75)	48%	84%	36%
	OIPP-Lite (<i>n</i> =37)	47%	89%	42%
NPQR	OIPP (<i>n</i> =75)	56%	80%	24%
	OIPP-Lite (<i>n</i> =37)	61%	86%	25%
<p>Knowledge scores represent the percentage of questions answered correctly. Higher scores are desirable.</p>				

APPENDIX C: FUNCTIONAL TESTS

6-Minute Walk Test Average Increase (m)			
	Initial vs. End	Initial vs. 3 Months	Initial vs. 6 Months
OIPP	244.01	240.98	199.84
OIPP-Lite	45.00	95.55	1.33
6-Minute Walk Test scores reflect the distance veterans are able to walk within the 6-minute time frame. Higher scores reflect an ability to walk farther, and a high average increase is desirable.			

Timed Up and Go Test Average Decrease (s)			
	Initial vs. End	Initial vs. 3 Months	Initial vs. 6 Months
OIPP	2.16	3.46	2.63
OIPP-Lite	3.73	2.32	-1.28
TUG scores reflect the amount of time it takes for the veterans to stand up and begin to walk. Lower scores reflect a better ability to begin movement, and a high average decrease is desirable.			

OIPP: Tinetti Balance Assessment				
	Initial <i>(n=75)</i>	Post-OIPP <i>(n=66)</i>	3 Months <i>(n=42)</i>	6 Months <i>(n=9)</i>
Low Fall Risk	25%	55%	55%	25%
Moderate Fall Risk	49%	42%	45%	29%
High Fall Risk	26%	3%	0%	6%
Tinetti scores reflect the ability of the veteran to effectively balance. Higher scores reflect a better ability and a lower risk of falling. Scores reflecting a lower fall risk are desirable.				

OIPP-Lite: Tinetti Balance Assessment				
	Initial <i>(n=37)</i>	Post-OIPP <i>(n=24)</i>	3 Months <i>(n=11)</i>	6 Months <i>(n=9)</i>
Low Fall Risk	30%	69%	64%	50%
Moderate Fall Risk	48%	23%	36%	43%
High Fall Risk	22%	8%	0%	7%
Tinetti scores reflect the ability of the veteran to effectively balance. Higher scores reflect a better ability and a lower risk of falling. Scores reflecting a lower fall risk are desirable.				

APPENDIX D: CHANGES IN PAIN-RELATED MEDICAL VISITS

Average Decreases in Medical Visits for 6 Months Before and After Cohort			
Program	Emergency Room	Primary Care	Total Medical Visit
OIPP	0.24	3.13	3.29
OIPP-Lite	0.67	0.56	1.22
Measures the difference between post and pre-OIPP using the averages of all patients.			

Group Comparison for Change in Medical Visits			
	Emergency Room	Primary Care	Total Medical Visit
t-Value	0.2008	0.2582	0.4393
Two-tailed paired t-test of measurement differences between OIPP and OIPP-Lite initial medical visit values. P-value = 0.05.			

APPENDIX E: T-TESTS

Comparison between Initial Group Measures							
	BAI	PCS	ISI	PHQ-9	6 MIN	TUG	TINETTI
T-Value	0.2828	0.0448	0.2935	0.1835	0.4630	0.0617	0.0065
Two-tailed paired t-test of measurement differences between OIPP and OIPP-Lite initial measures. P-value = 0.05.							

Behavioral Health Measures				
	BAI	PCS	ISI	PHQ-9
<i>Initial vs. End</i>				
OIPP Average Change	4.49	8.85	3.28	4.09
OIPP-Lite Average Change	0.92	2.54	-0.15	2.38
T-Value	0.0002	0.2863	0.0863	0.0008
<i>Initial vs. 3 Months</i>				
OIPP Average Change	3.64	4.69	0.84	2.06
OIPP-Lite Average Change	2.38	2.38	0.25	2.25
T-Value	0.3714	0.3688	0.2665	0.4802
<i>Initial vs. 6 Months</i>				
OIPP Average Change	0.78	6.58	2.63	1.59
OIPP-Lite Average Change	-5.75	-2.75	-0.50	1.25
T-Value	0.2301	0.1036	0.2667	0.0216
Two-tailed paired t-test of measurement differences between OIPP and OIPP-Lite initial measures. P-value = 0.05.				

Functional Measurements			
	6-Minute Walk Test	Timed Up and Go	Tinetti Balance
<i>Initial vs. End</i>			
OIPP Average Change	244.01	2.16	4.39
OIPP-Lite Average Change	45.00	3.73	2.23
T-Value	0.0351	0.0298	0.1245
<i>Initial vs. 3 Months</i>			
OIPP Average Change	240.98	3.46	5.20
OIPP-Lite Average Change	95.55	2.32	1.79
T-Value	0.0932	0.2017	0.2456
<i>Initial vs. 6 Months</i>			
OIPP Average Change	199.84	2.63	4.81
OIPP-Lite Average Change	1.33	-1.28	0.79
T-Value	0.0434	0.0138	0.0079
Two-tailed paired t-test of measurement differences between OIPP and OIPP-Lite initial measures. P-value = 0.05.			