



# **Pain Program Treatment Outcomes**



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## Pain Program Treatment Outcomes

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Sierra Tucson has an innovative and growing program for treating patients suffering from chronic pain. Led by Dr. Bennet Davis, Director of the Sierra Tucson Pain Recovery Program and President of the Integrative Pain Center of Arizona, this program combines cutting edge therapeutic and applied neuroscience techniques to decrease patient suffering. This brief report provides information on the outcomes of chronic pain patients who have been treated at Sierra Tucson.

### Assessments of Patients in the Pain Program

Sierra Tucson collects data on patients at several points. The **Comprehensive Psychological Profile (CPP)** is given at entry, to assess pre-treatment symptoms, and at mid-treatment, to assess progress. Data has been collected from 34 patients in the pain program from January 2021 to October 2022. Analysis of this data provides information on **acute treatment response** and baseline symptom severity.

Sierra Tucson also offers all former residents (alumni) free access to the Connect 365 program for one year after discharge. This program offers personal points of contact with coaches, who can help residents set goals and talk through their post-discharge care plans. As part of the program, recovery coaches ask patients to report on their treatment outcomes after discharge. There were 52 responses to this survey from 2017 to 2022. Responses to the **Connect 365** survey allow us to provide data on **post-discharge** treatment outcomes.

Connect 365 data was collected at different points throughout the first year after discharge, based on when recovery coaches were able to reach alumni. In this sample, the post-discharge responses were collected an **average of 3 months after discharge**. The earliest measure was collected at less than 1 month(s) after discharge, and the latest was collected at 9 months after discharge.

## Immediate Treatment Response

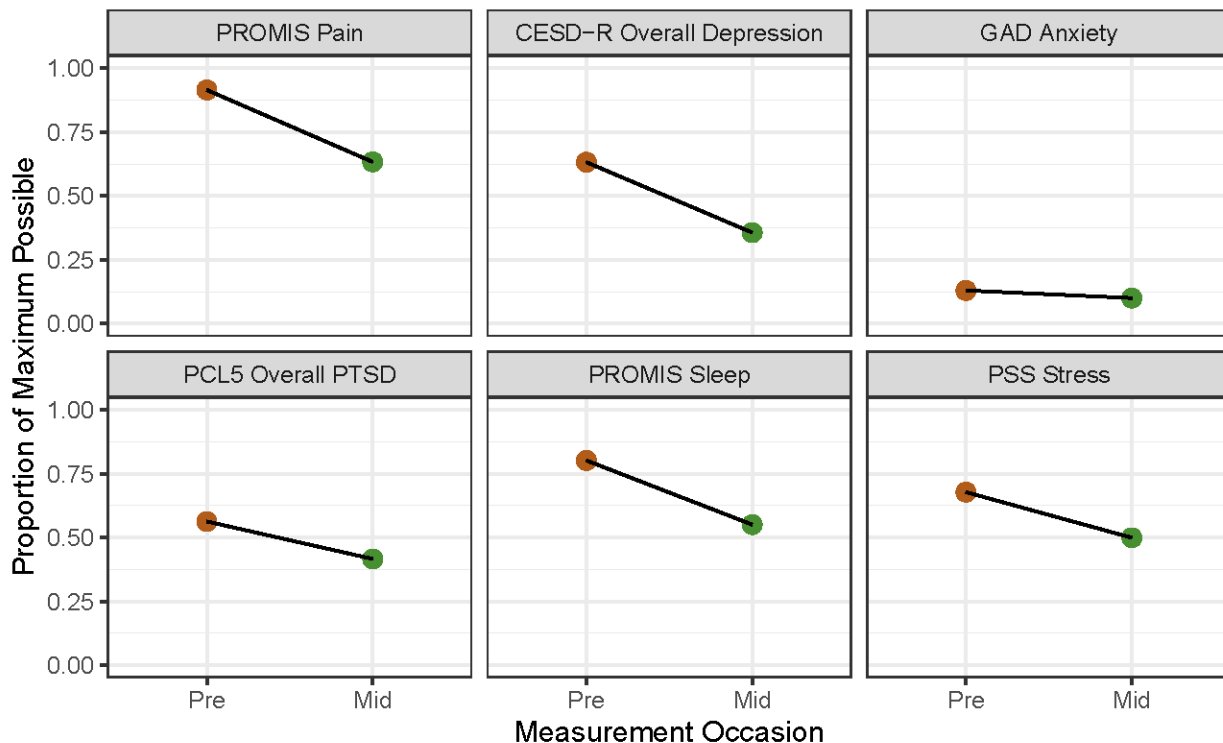
Paired sample t-tests were performed for 19 key outcomes on the CPP. These statistical tests indicate whether the change from pre-treatment to mid-treatment in the assessment is likely to be reliable. When the  $p$ -value is  $< .05$ , the result is said to be statistically significant, and the change is thought to be large enough to reliably generalize to people receiving the treatment in general.

### Mental Health Symptoms

Results indicate that over the first two weeks of treatment in the Sierra Tucson Chronic Pain Program there were statistically significant decreases in:

- The degree to which **pain interferes with daily life**: Pre-treatment average: 27.45 Mid-treatment average: 19,  $t(21) = 7$   $p < .001$
- **Overall depression scores**: Pre-treatment average: 50.57 Mid-treatment average: 28.52,  $t(22) = 6$   $p < .001$
- **Overall anxiety scores**: Pre-treatment average: 10.4 Mid-treatment average: 8.02,  $t(21) = 3$   $p = .003$
- Self-reported **sleep disturbances**: Pre-treatment average: 32.05 Mid-treatment average: 22,  $t(21) = 5$   $p < .001$
- Perceived **stress levels**: Pre-treatment average: 27.09 Mid-treatment average: 19.95,  $t(21) = 4$   $p < .001$
- **Overall PTSD Symptoms**: Pre-treatment average: 45 Mid-treatment average: 33.26,  $t(22) = 3$   $p = .007$

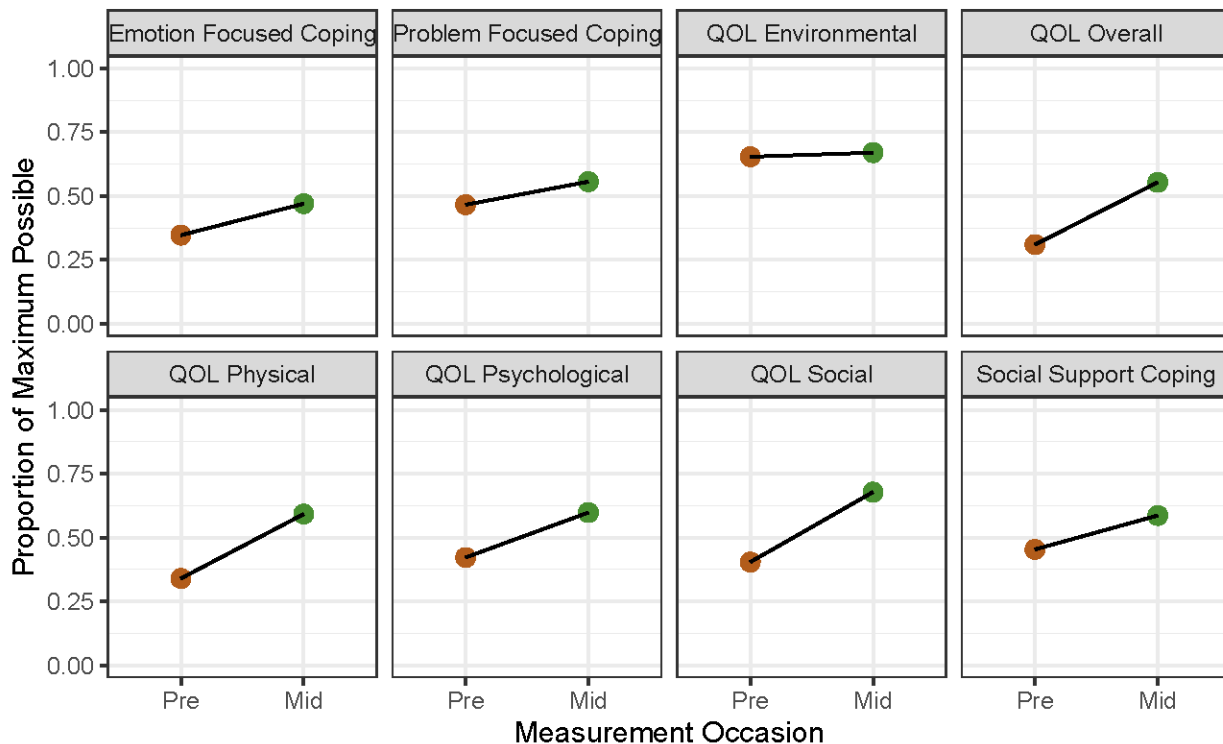
Change over time is plotted below. Note that values have been rescaled so that all measures can only take values from 0 to 1, regardless of the number of questions. This is referred to as a Percentage of Maximum Possible (POMP) score in the methodological literature, and it is commonly used to make better comparisons across different scales.



## Positive Functioning

Results also indicate that patients improved their functioning during the first two weeks of treatment. Statistically significant improvements were seen in:

- **Overall Quality of Life:** Pre-treatment average: 1.55 Mid-treatment average: 2.77,  $t(21) = -6$   $p < .001$
- **Physical Quality of Life:** Pre-treatment average: 1.7 Mid-treatment average: 2.96,  $t(21) = -8$   $p < .001$
- **Psychological Quality of Life:** Pre-treatment average: 2.11 Mid-treatment average: 2.99,  $t(21) = -5$   $p < .001$
- **Social Quality of Life:** Pre-treatment average: 2.02 Mid-treatment average: 3.39,  $t(21) = -8$   $p < .001$
- **Confidence in coping with emotions:** Pre-treatment average: 31.23 Mid-treatment average: 42.32,  $t(21) = -4$   $p < .001$
- **Confidence in coping with problems:** Pre-treatment average: 55.95 Mid-treatment average: 66.77,  $t(21) = -3$   $p = .011$
- **Confidence in being able to rely on social support to cope:** Pre-treatment average: 22.68 Mid-treatment average: 29.32,  $t(21) = -3$   $p = .012$



## Overall Immediate Response

Results of the statistical tests indicate that patients in the Chronic Pain Program had reliable improvements in their chronic pain, as well as several other mental health symptoms, over the first two weeks of treatment. These include symptoms of disorders that can be co-morbid with chronic pain, such as depression and PTSD. Patients in the Chronic Pain Program also reported better quality of life and more confidence in their ability to cope with several different aspects of their lives. Overall, then, there is significant and reliable improvement in psychological functioning among Sierra Tucson chronic pain patients.

## Post-Discharge Follow-Up

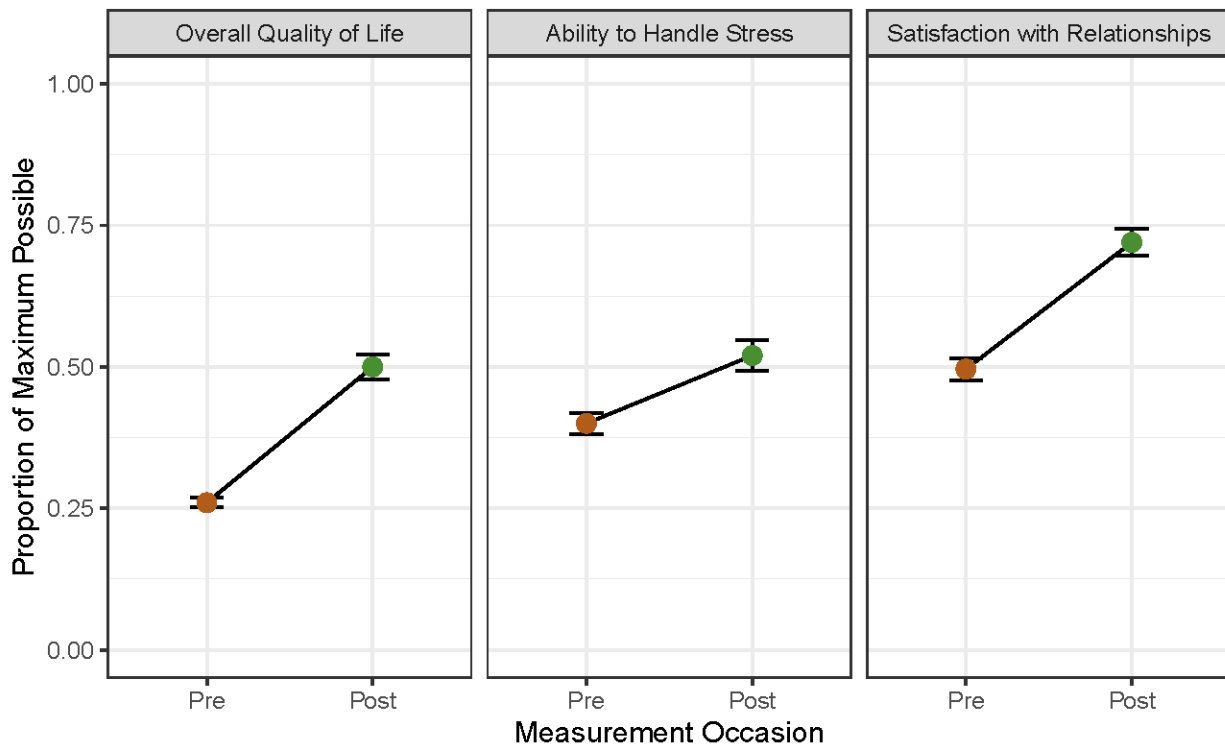
Two types of comparisons were made for individuals post-discharge. There were 10 cases where records from the CPP and Connect 365 post-discharge questionnaire could be matched. This was due to the small number of pain cases assessed by the CPP (34 individuals), and due to the fact that a matching case required that the individual also signed up for the Connect 365 program. Not all individuals opt in to this program, so there were not always cases that could be matched.

As another point of comparison, scores for all chronic pain patients at pre-treatment and post-discharge were estimated, even if the records did not match. The advantage of this approach was that more cases at both pre-treatment and post-treatment could be used. For pre-treatment, all CPP cases were considered, even if they didn't match a Connect 365 record. For post-treatment, data collected from before the CPP was implemented could be considered. The disadvantage of this approach is that change within individuals could not be considered—only differences between the groups.

## Within Person Psychological Functioning

There were increases in patients' overall quality of life, ability to handle stress, and satisfaction with relationships from pre-treatment to post-treatment. Only the increases in overall quality of life and satisfaction with relationships was statistically significant.

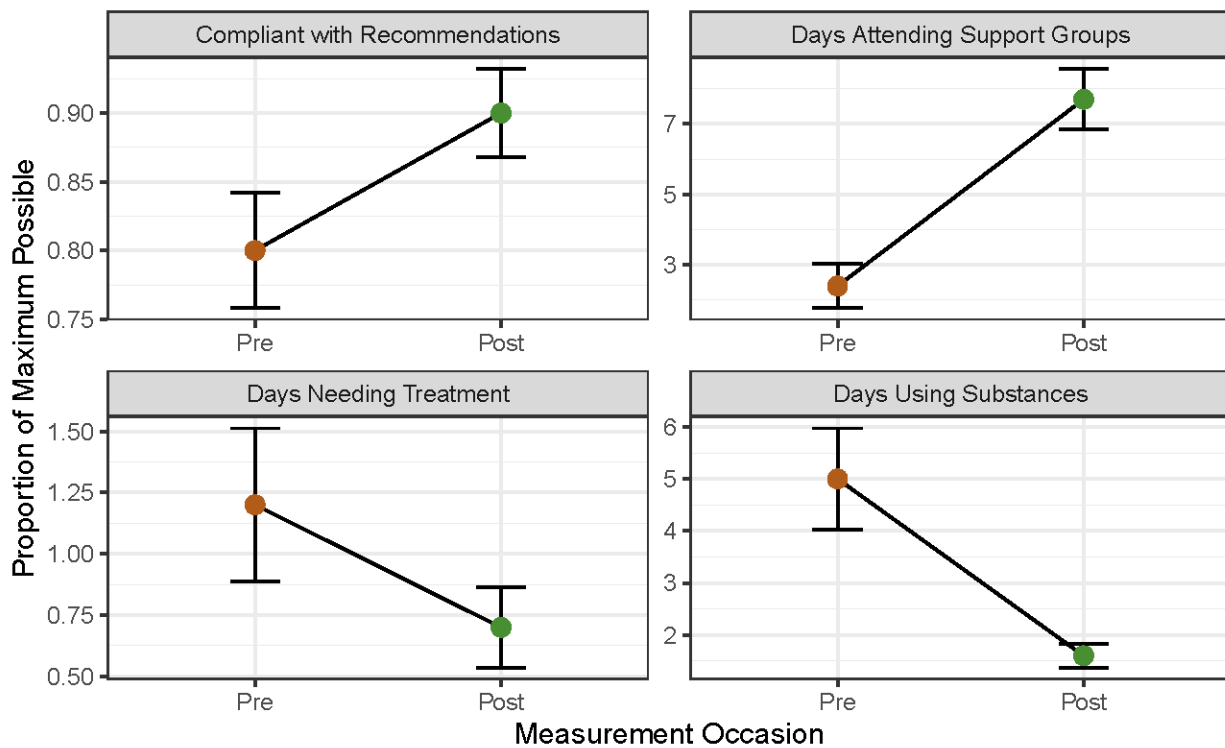
- **Overall Quality of Life:** Pre-treatment average: 1.3 Post-treatment average: 2.5,  $t(9) = -3$   $p = 0.022$
- **Ability to Handle Stress:** Pre-treatment average: 2 Post-treatment average: 2.6,  $t(9) = -1$   $p = 0.239$
- **Satisfaction with Relationships:** Pre-treatment average: 2.48 Post-treatment average: 3.6,  $t(9) = -3$   $p = 0.007$



## Within Person Objective Outcome Measures

There were improvements in several objective measures of functioning, but none of these reached statistical significance. Note that this is likely due to the small sample of matched records. From pre-treatment to post-treatment, the following changes were recorded:

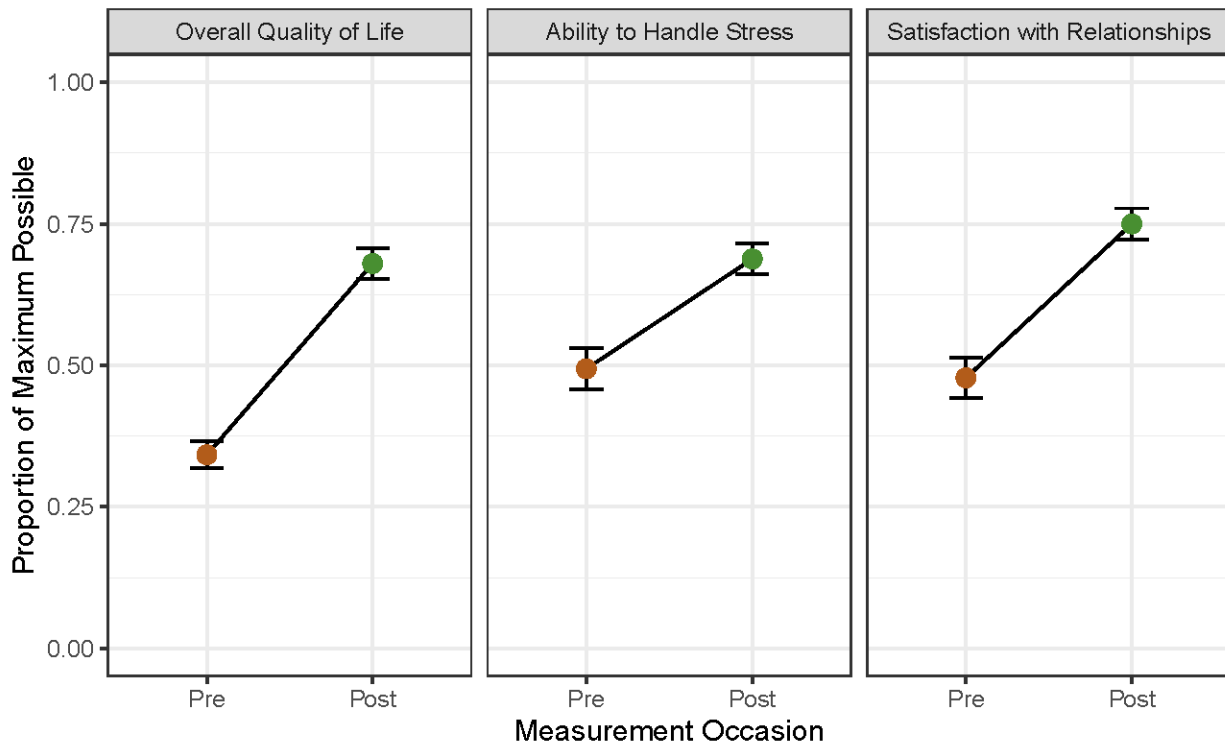
- **Number of Days Using Substances of Abuse (out of 30):** Pre-treatment average: 5 Post-treatment average: 1.6,  $t(9) = 1$   $p = 0.277$
- **Number of Days Needing Treatment at a Hospital or ER (out of 30):** Pre-treatment average: 1.2 Post-treatment average: 0.7,  $t(9) = 1$   $p = 0.363$
- **Proportion of Patients Compliant with Treatment Recommendations:** Pre-treatment average: 0.8 Post-treatment average: 0.9,  $t(9) = -1$   $p = 0.591$
- **Number of Days Attending Voluntary Support Groups:** Pre-treatment average: 2.4 Post-treatment average: 7.7,  $t(9) = -2$   $p = 0.152$



## Group Level Psychological Functioning

There were statistically significant differences in all measures of psychological functioning, with people reporting better functioning after discharge.

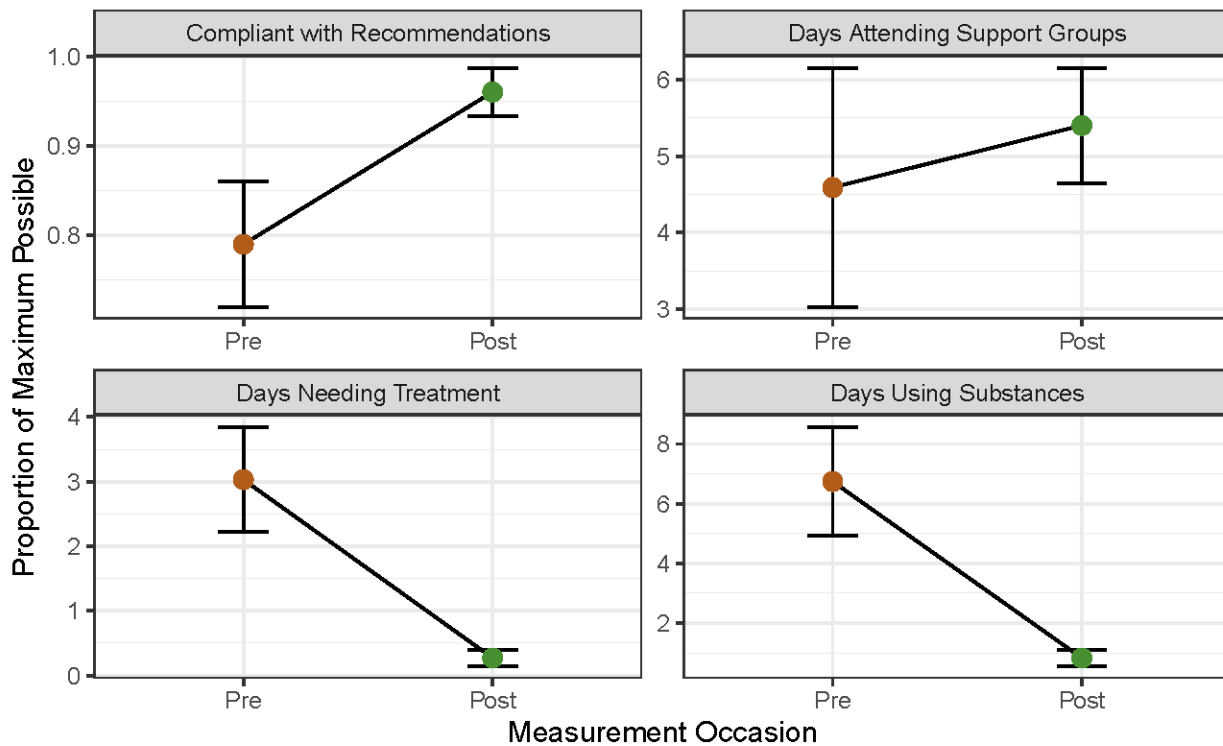
- **Overall Quality of Life:** Pre-treatment average: 1.71 Post-treatment average: 3.4,  $t(82.9988474668032) = -9 p < .001$
- **Ability to Handle Stress:** Pre-treatment average: 2.47 Post-treatment average: 3.44,  $t(67.0513262864816) = -4 p < .001$
- **Satisfaction with Relationships:** Pre-treatment average: 2.39 Post-treatment average: 3.75,  $t(67.9094762382996) = -6 p < .001$



## Group Level Objective Outcome Measures

There were statistically significant differences in three objective measures of functioning: number of days using alcohol or other substance of abuse, number of days needing treatment at a hospital or ER in the last month, and proportion of people compliant with treatment recommendations. There was a small difference in the number of days attending voluntary support groups, but it was not large enough to reach statistical significance.

- **Number of Days Using Substances of Abuse (out of 30):** Pre-treatment average: 6.74 Post-treatment average: 0.83,  $t(34.5401690149318) = 3$   $p = .003$
- **Number of Days Needing Treatment at a Hospital or ER (out of 30):** Pre-treatment average: 3.03 Post-treatment average: 0.27,  $t(34.673550527841) = 3$   $p = .002$
- **Proportion of Patients Compliant with Treatment Recommendations:** Pre-treatment average: 0.79 Post-treatment average: 0.96,  $t(42.7740224431011) = -2$   $p = .032$
- **Number of Days Attending Voluntary Support Groups:** Pre-treatment average: 4.59 Post-treatment average: 5.4,  $t(48.4012081217551) = 0$   $p = .64$





## Conclusions

The different analyses of data from chronic pain patients at Sierra Tucson all point to the same conclusions: the Sierra Tucson Chronic Pain program improves outcomes. Specifically:

- There are significant improvements in self-reported pain interference with daily life after the first two weeks of treatment
- There are significant improvements in several comorbid symptoms after the first two weeks of treatment
- Quality of life improves significantly after the first two weeks of treatment, and remains significantly higher after discharge
- Several indicators of positive psychological functioning, such as having supportive relationships, improve over the first two weeks of treatment and remain significantly higher from baseline after discharge
- There were improvements in several objective indicators of functioning, such as using fewer substances of abuse, needing less medical treatments, and being more compliant with treatment recommendations. However, these changes were not statistically significant in all analyses, suggesting more observations are needed before we can be confident that they are reliable.

## **Methodological Notes**

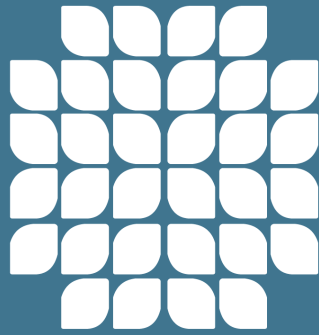
### **Immediate Treatment Response**

As part of the Comprehensive Psychological Profile (CPP) given at pre-treatment and mid-treatment, the following measures were used:

1. PROMIS Pain Interference (PIQ 6b)
2. Center for Disease Epidemiological Depression Scale-Revised (CESD-R)
3. Anxiety (GAD-Q-IV)
4. The PROMIS Sleep Questionnaire
5. Perceived Stress Scale (PSS)
6. Post-Traumatic Stress Disorder Checklist (PCL-5)
7. World Health Organization, Brief Quality of Life survey (WHOQOL-BREF)
8. Coping Self-Efficacy survey (CSE)

### **Post-Discharge Treatment Response**

At both pre-treatment and post-discharge, several questions from the Substance Abuse and Mental Health Services Administration (SAMHSA) National Outcome Measures (NOM) scale were assessed. These questions are the source of data for the pre-treatment to post-discharge comparisons.



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