



Mood Treatment Outcomes



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Mood Recovery Program Treatment Outcomes

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Sierra Tucson has an innovative program for treating patients suffering from mood disorders. Led by Chief Medical Officer Dr. Jasleen Chhatwal, the Mood Disorder Treatment Program takes an interdisciplinary approach to treatment, combining experts in several different treatment modalities. The goal of this program is to provide holistic care for the entire person: mind, body, and spirit. This brief report provides information on the outcomes of patients who have been treated at the Sierra Tucson Mood Program.

Assessments of Patients in the Mood Disorder 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 **670 residents** 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. Responses to the **Connect 365** survey allow us to provide data on **post-discharge** treatment outcomes. There were **616 patients** in the Addiction Recovery Program who opted to complete the Connect 365 survey after discharge.

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 5 months after discharge**. The earliest measure was collected at less than 1 month(s) after discharge, and the latest was collected at 14 months after discharge.

Immediate Treatment Response

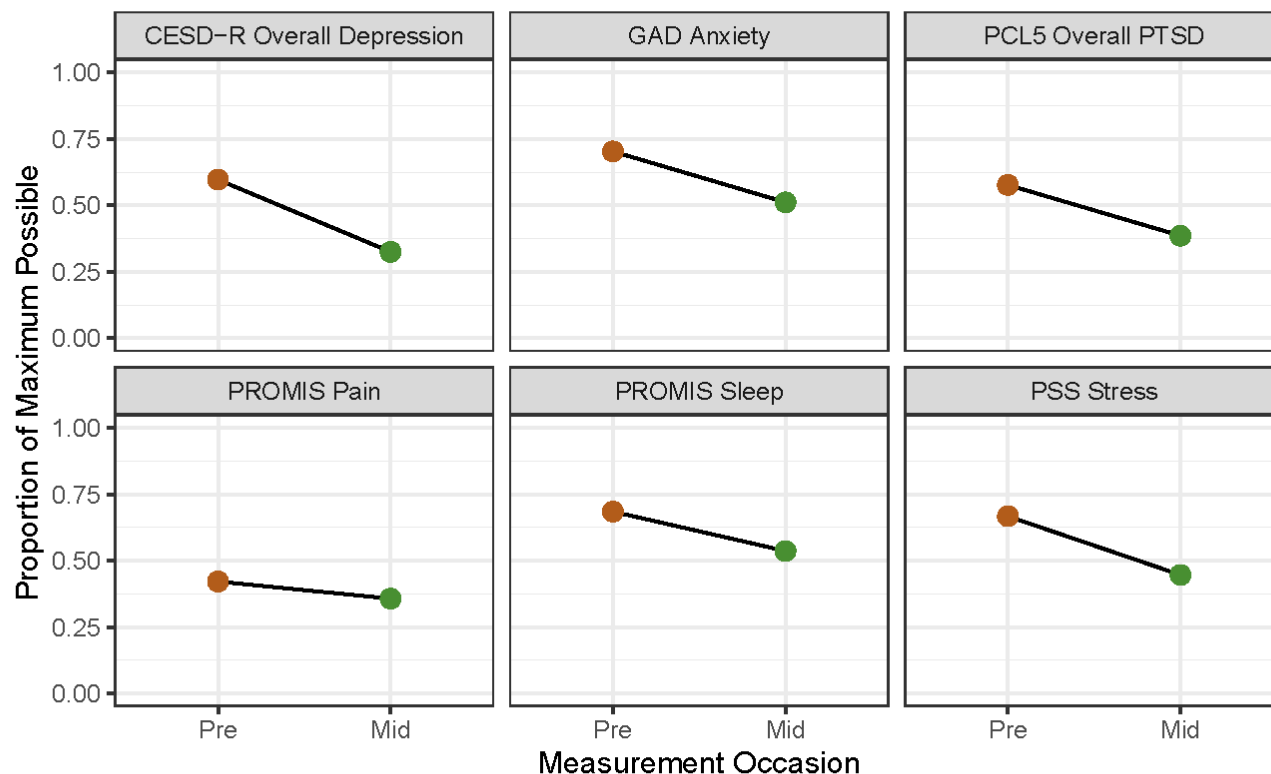
Paired sample t-tests were performed for 19 key outcomes on the CPP. These statistical tests indicate whether the change from pre-treatment to mid-treatment in the assessment is likely to be reliable. When the p -value is $< .05$, the result is said to be statistically significant, and the change is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

Mental Health Symptoms

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

- **Overall depression scores:** Pre-treatment average: 47.76 Mid-treatment average: 26, $t(390) = 25$, $p < .001$
- **Overall anxiety scores:** Pre-treatment average: 9.14 Mid-treatment average: 6.65, $t(382) = 15$, $p < .001$
- **Overall PTSD Symptoms:** Pre-treatment average: 46.16 Mid-treatment average: 30.86, $t(390) = 18$, $p < .001$
- The degree to which **pain interferes with daily life:** Pre-treatment average: 12.63 Mid-treatment average: 10.7, $t(386) = 6$, $p < .001$
- Self-reported **sleep disturbances:** Pre-treatment average: 27.37 Mid-treatment average: 21.44, $t(386) = 13$, $p < .001$
- Perceived **stress levels:** Pre-treatment average: 26.68 Mid-treatment average: 17.84, $t(386) = 21$, $p < .001$

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.

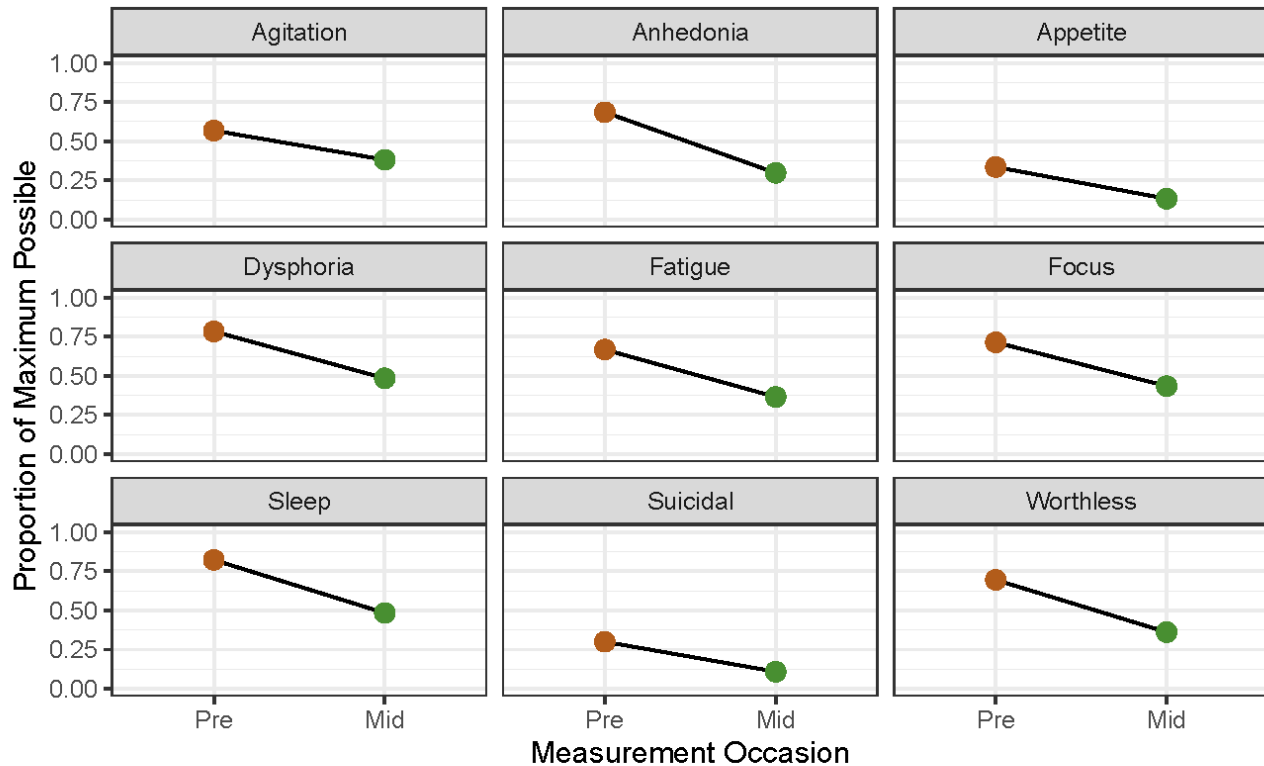


Specific Depression Symptoms

There are nine core symptoms of depression in the DSM-V. The overall depression score accounts for all of these symptoms. However, the depression instrument we use to measure outcomes can also be used to assess each symptom separately. Analysis indicates that there were statistically significant decreases in all symptoms.

The largest decreases were seen in anhedonia, difficulty sleeping, feeling worthless, and fatigue. Diminishment of these symptoms indicates that residents are gaining more energy and re-engaging with life during their first two weeks at Sierra Tucson. Note also that feelings related to suicide and self-harm declined to almost zero among residents during their first two weeks.

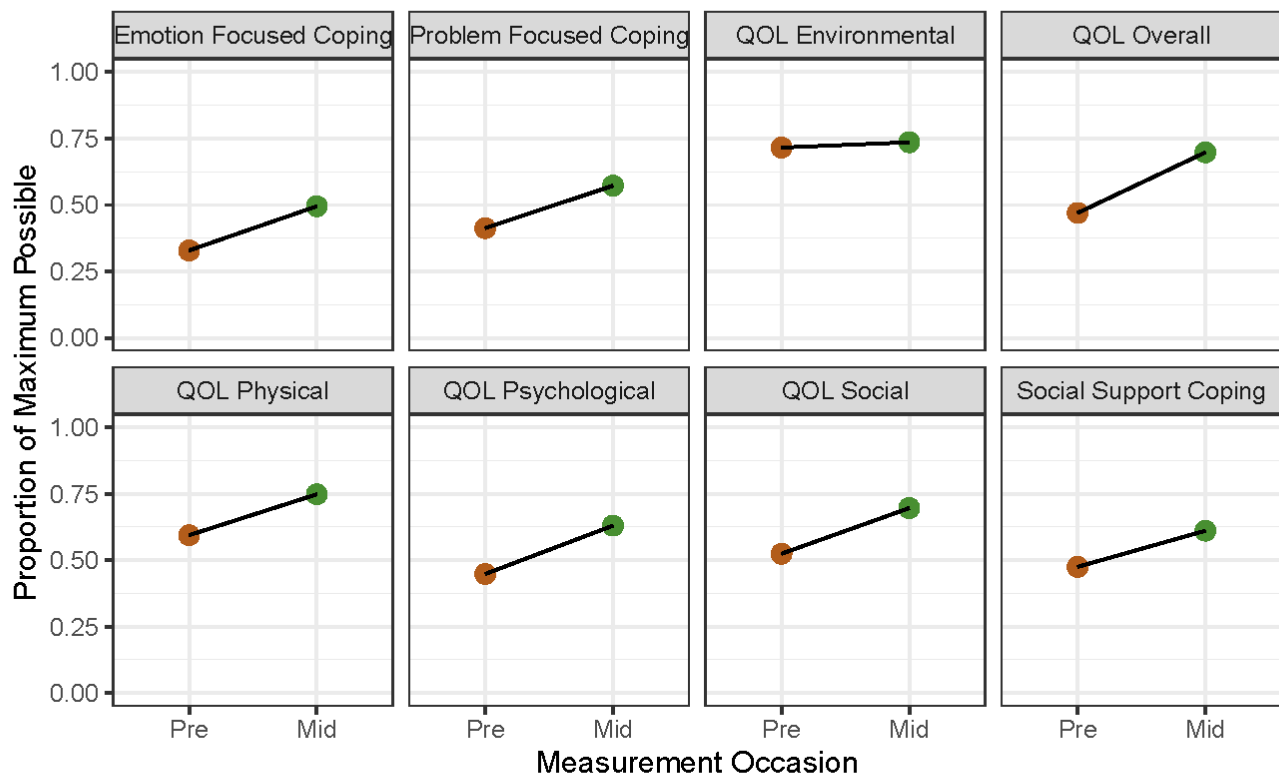
- **Agitation:** Pre-treatment average: 4.54 Mid-treatment average: 3.05, $t(386) = 12, p < .001$
- **Anhedonia:** Pre-treatment average: 5.48 Mid-treatment average: 2.38, $t(386) = 23, p < .001$
- **Appetite:** Pre-treatment average: 2.68 Mid-treatment average: 1.06, $t(386) = 13, p < .001$
- **Dysphoria:** Pre-treatment average: 9.4 Mid-treatment average: 5.81, $t(386) = 20, p < .001$
- **Fatigue:** Pre-treatment average: 5.34 Mid-treatment average: 2.92, $t(386) = 18, p < .001$
- **Focus:** Pre-treatment average: 5.71 Mid-treatment average: 3.47, $t(386) = 17, p < .001$
- **Sleep:** Pre-treatment average: 6.58 Mid-treatment average: 3.87, $t(386) = 16, p < .001$
- **Suicidality:** Pre-treatment average: 2.4 Mid-treatment average: 0.87, $t(386) = 13, p < .001$
- **Worthless:** Pre-treatment average: 5.56 Mid-treatment average: 2.89, $t(386) = 20, p < .001$



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: 2.35 Mid-treatment average: 3.49, $t(386) = -24, p < .001$
- **Physical Quality of Life:** Pre-treatment average: 2.97 Mid-treatment average: 3.74, $t(386) = -22, p < .001$
- **Psychological Quality of Life:** Pre-treatment average: 2.24 Mid-treatment average: 3.15, $t(386) = -24, p < .001$
- **Social Quality of Life:** Pre-treatment average: 2.62 Mid-treatment average: 3.48, $t(386) = -17, p < .001$
- Confidence in **coping with emotions:** Pre-treatment average: 29.6 Mid-treatment average: 44.56, $t(386) = -15, p < .001$
- Confidence in **coping with problems:** Pre-treatment average: 49.53 Mid-treatment average: 68.73, $t(386) = -16, p < .001$
- Confidence in being able to **rely on social support to cope:** Pre-treatment average: 23.74 Mid-treatment average: 30.54, $t(386) = -12, p < .001$



Overall Immediate Response

Results of the statistical tests indicate that patients in the Mood Disorder Program had reliable improvements in depression and anxiety symptoms over the first two weeks of treatment. Reductions were also seen in symptoms that can be co-morbid with mood disorders, such as PTSD and self-reported stress. Patients in the Mood Disorder 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 mood disorder patients.

Post-Discharge Follow-Up

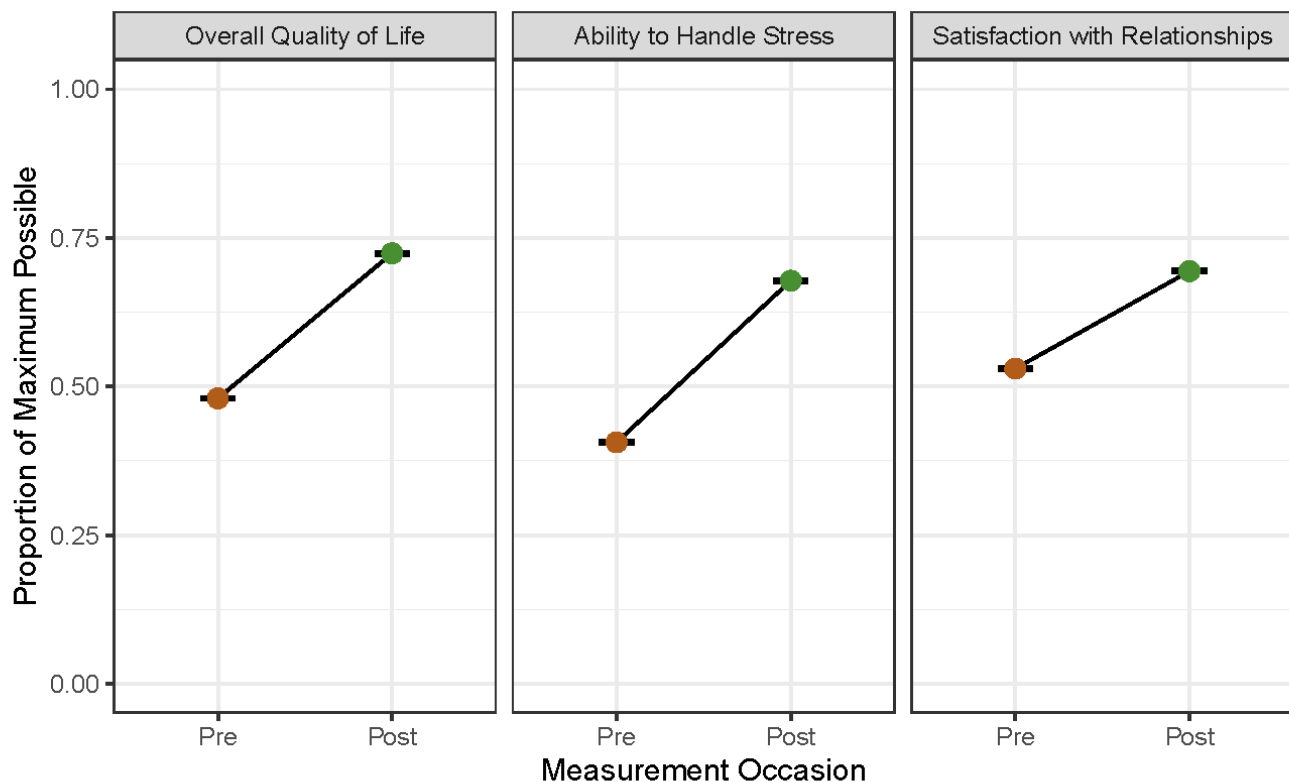
Two types of comparisons were made for individuals post-discharge. There were **72 cases** where records from the CPP and Connect 365 post-discharge questionnaire could be matched. This was due to the fact that matching a case required that the individual agreed to participate in the CPP and also signed 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 mood disorder 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 statistically significant increases in patients' overall quality of life, ability to handle stress, and satisfaction with relationships from pre-treatment to post-treatment. All of these changes represented a shift from below-average functioning (i.e., below the median) to above-average functioning (i.e., above the median).

- **Overall Quality of Life:** Pre-treatment average: 2.4 Post-treatment average: 3.62, $t(71) = -8$, $p < .001$
- **Ability to Handle Stress:** Pre-treatment average: 2.03 Post-treatment average: 3.39, $t(71) = -9$, $p < .001$
- **Satisfaction with Relationships:** Pre-treatment average: 2.65 Post-treatment average: 3.47, $t(71) = -6$, $p < .001$



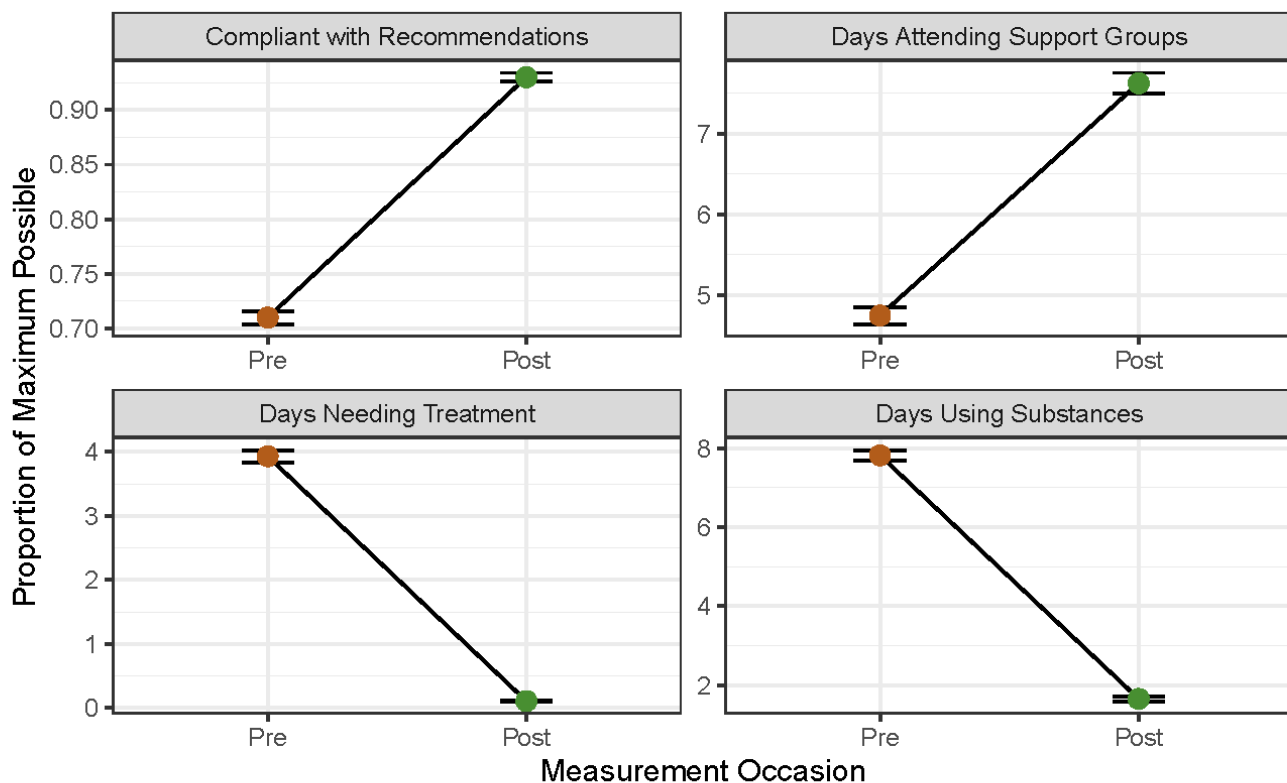
Within Person Objective Outcome Measures

There were statistically significant improvements in several objective measures of functioning, including number of days using substances of abuse, number of days requiring treatment at a hospital or ER, the proportion of patients compliant with their treatment recommendations, and the number of days individuals attended voluntary support groups.

Particularly interesting is the decline in days needing treatment at a hospital or ER. Before treatment, mood disorder patients needed this kind of medical treatment an average of 4 days a month, and after treatment they did not need it even a single day.

From pre-treatment to post-treatment, the following changes were recorded:

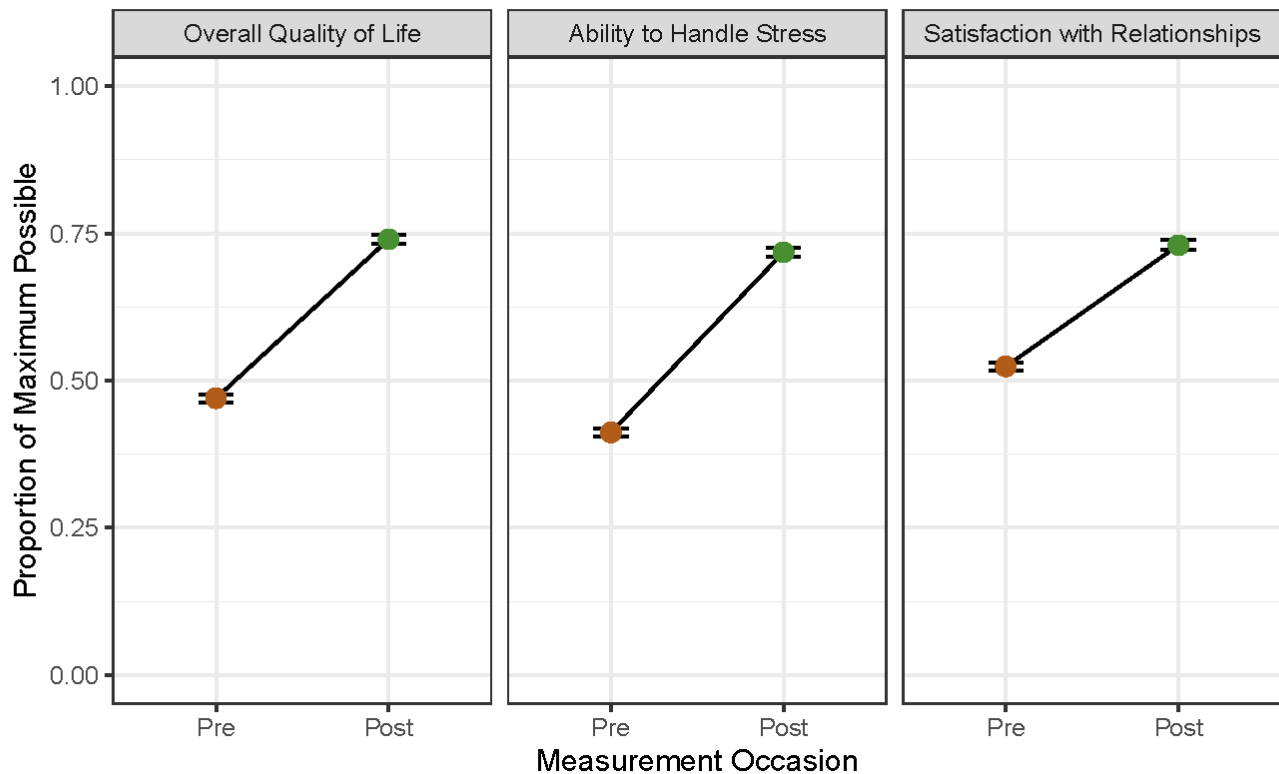
- **Number of Days Using Substances of Abuse (out of 30):** Pre-treatment average: 7.82 Post-treatment average: 1.65, $t(71) = 6, p < .001$
- **Number of Days Needing Treatment at a Hospital or ER (out of 30):** Pre-treatment average: 3.93 Post-treatment average: 0.11, $t(70) = 5, p < .001$
- **Proportion of Patients Compliant with Treatment Recommendations:** Pre-treatment average: 0.71 Post-treatment average: 0.93, $t(71) = -4, p < .001$
- **Number of Days Attending Voluntary Support Groups:** Pre-treatment average: 4.75 Post-treatment average: 7.62, $t(70) = -2, p = .015$



Group Level Psychological Functioning

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

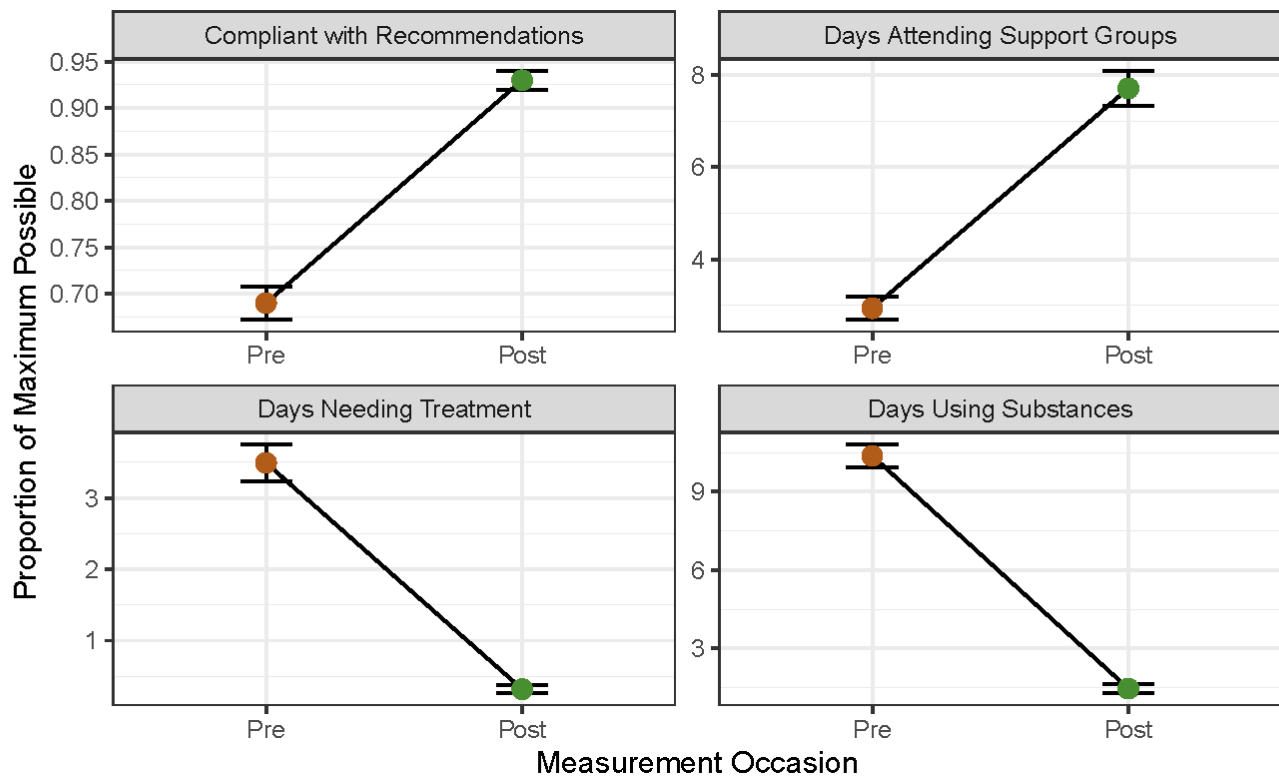
- **Overall Quality of Life:** Pre-treatment average: 2.35 Post-treatment average: 3.7, $t(1262.52906940489) = -26, p < .001$
- **Ability to Handle Stress:** Pre-treatment average: 2.06 Post-treatment average: 3.59, $t(1268.83176566659) = -30, p < .001$
- **Satisfaction with Relationships:** Pre-treatment average: 2.62 Post-treatment average: 3.65, $t(1220.84135525273) = -19, p < .001$



Group Level Objective Outcome Measures

There were statistically significant improvements in all objective measures of functioning. Results are provided below:

- **Number of Days Using Substances of Abuse (out of 30):** Pre-treatment average: 10.37 Post-treatment average: 1.47, $t(914.390465036817) = 19, p < .001$
- **Number of Days Needing Treatment at a Hospital or ER (out of 30):** Pre-treatment average: 3.49 Post-treatment average: 0.32, $t(743.089360448915) = 12, p < .001$
- **Proportion of Patients Compliant with Treatment Recommendations:** Pre-treatment average: 0.69 Post-treatment average: 0.93, $t(1045.10747161236) = -12, p < .001$
- **Number of Days Attending Voluntary Support Groups:** Pre-treatment average: 2.94 Post-treatment average: 7.71, $t(1079.12327421577) = -11, p < .001$



Conclusions

The different analyses of data from mood disorder patients at Sierra Tucson all point to the same conclusions: the Sierra Tucson Mood Disorder Program improves outcomes. Specifically:

- There are significant improvements in depression and anxiety symptoms after the first two weeks of treatment
- Early declines in specific depression symptoms are largest for anhedonia and other symptoms related to being disengaged and unable to experience pleasure
- There are significant improvements in several related symptoms after the first two weeks of treatment, such as trauma-related symptoms and stress
- 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 feeling able to handle stress, 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 fewer days of medical treatment, being more compliant with treatment recommendations, and attending more voluntary support groups.

Methodological Notes

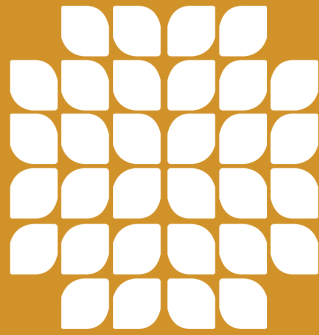
Immediate Treatment Response

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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