

A PROSPECTIVE STUDY INVESTIGATING THE CLINICAL AND PUBLIC HEALTH UTILITY OF THE RETREAT RESIDENTIAL PROGRAM

REPORT OF FINDINGS
JANUARY 2026

RECOVERY RESEARCH INSTITUTE
RECOVERYANSWERS.ORG

Prepared for the Retreat Program
By
Recovery Research Institute
Massachusetts General Hospital
Harvard Medical School
January 2026



Recovery Research Institute
Massachusetts General Hospital
Harvard Medical School

Enhancing Recovery Through Science



Contact

John F. Kelly, PhD, ABPP
RRI 151 Merrimac St, 4th Floor, Boston MA 02114
Email: Jkelly11@mgh.harvard.edu
Tel: 617-643-1980



TABLE OF CONTENTS

Executive Summary....9

Report of Findings....11

1. Background and Significance....11

2. Research Design and Methods....11

2.1. Participants, Recruitment, and Study Eligibility....12

2.2. Procedure....13

2.3. Measures....13

2.4. Analysis Plan....13

3. Results....14

3.1. Follow-Up Rates....14

Figure 3.1.1. Consort Diagram of Participant Recruitment and Retention....15

Figure 3.1.2. Retention Study Enrollment and Follow up Numbers....16

Figure 3.1.3. Retention Study Enrollment and Follow up Numbers: Intent to Treat....16

3.2. Comparison of Retention Numbers Across Various Studies....17

Table 3.2. Comparison of Retention Numbers Across Various Studies....17

3.3. Overview of Sample Characteristics and Outcome Results....17

3.4. Summary of Demographic Variables of the Sample at Baseline....17

Table 3.4. Demographic Variables at Baseline....19

3.5. Summary of Clinical Variables at Baseline....28

Table 3.5. Clinical Variables at Baseline....28

3.6. Summary of Prior Treatment Variables at Baseline....29

Table 3.6. Prior Treatment Variables at Baseline....29

3.7. Summary of Lifetime Legal System Involvement at Baseline....30

Table 3.7. Legal System Involvement at Baseline....30

3.8. Retreat Program Outcomes Across Time....31

3.8 Alcohol and Other Drug Related Outcomes Across Time....32

Table 3.8: Alcohol and Other Drug Related Outcomes Across Time....32

3.8 Percent Days Abstinent (PDA) from Alcohol....33

Figure 3.8.1: Percentage Days Abstinent from Alcohol Across Time....33

3.8. 100% Abstinent from Alcohol at each Follow-Up Timepoint....37

Figure 3.8.8: Percentage of Sample 100% Abstinent from Alcohol Across Time....37

3.8. Percent Heavy Drinking Days (PHDD)....38

Figure 3.8.9: Percent Heavy Drinking Days Across Time....38
3.8. Percentage of Days Drunk / High....43
Figure 3.8.16: Percentage of Days Drunk / High over Time....43
3.8. Alcohol and Other Drug Related Consequences....48
Figure 3.8.23: Alcohol and Other Drug Related Consequences Across Time....48
3.8. Remission Status....52
Figure 3.8.29. Remission Status Across Time....52
3.9. Quality of Life and Functioning and Well-Being Related Outcomes Across Time....53
Table 3.9: Quality of Life and Functioning and Well-Being Related Outcomes....54
3.9 Quality of Life....55
Figure 3.9.1: Quality of Life Across Time....55
3.9. Happiness....56
Figure 3.9.2: Happiness Across Time....56
3.9. Self-Esteem....57
Figure 3.9.3: Self-Esteem Across Time....57
3.9 Recovery Capital....58
Figure 3.9.4: Recovery Capital Across Time....58
3.9. Employment Status....59
Figure 3.9.5: Employment Status Across Time....59
3.9. Psychological Distress....60
Figure 3.9.6: Psychological Distress Across Time....60
3.10 Mutual-Help Related Outcomes across Time....61
Table 3.10: Mutal-Help Related Outcomes....62
3.11 Formal Clinical Service Utilization....64
Table 3.11: Formal Clinical Service Utilization....64
3.12 Legal System Involvement....65
Table 3.12: Legal System Involvement....65
3.13 Family Involvement in the Retreat....66
Table 3.13: Family Involvement, Support and Improved Relationships....66
3.14. During-Retreat Program Outcomes....68
Table 3.14: During- Retreat Program Outcomes Across Time....68
3.14 During- Retreat Program Abstinence Self-Efficacy....69
3.14 During Retreat Program Commitment to Sobriety....70
Figure 3.14.2: Commitment to Sobriety from Baseline to end of Retreat Program....70
3.14. During Retreat Program Quality of Life....71

Figure 3.14.3: Quality of life from Baseline to End of Retreat Program....71
3.14. During Retreat Program Self-Esteem....72
Figure 3.14.4: Self-Esteem from Baseline to End of Retreat Program....72
3.14. During Retreat Program Happiness....73
Figure 3.14.5: Happiness from Baseline to End of Retreat Program....73
3.14. During Retreat Program Satisfaction with Life....74
Figure 3.14.6: Satisfaction with Life from Baseline to End of Retreat Program....74
3.14. During Retreat Program Psychological Distress....75
Figure 3.14.7: Psychological Distress from Baseline to End of Retreat Program....75
3.15. Detailed Summary of 12-Step and Non-12-Step Volunteer Service Work, Sober Activity Engagement and Alumni Involvement....76
3.15. Summarization of 12-Step Specific Service Work....76
Table 3.15: Detailed Summarization of 12-Step Specific Service Work....77
3.15. Summarization of Non-12-Step Volunteer Service Work....78
Table 3.15: Detailed Summarization of Non-12-Step Volunteer Service Work....79
3.15. Retreat Sober Activity Engagement and Alumni Association Involvement....80
Table 3.15: Types of Sober Activity Engagement Across Time....80
3.15. Retreat Alumni “APP” and Other Retreat Contact and other Alumni Activities Across Time 80
Table 3.15: Retreat Alumni Activities Across Time....80
4. Discussion and Implications....82
Alcohol and drug outcomes: robust improvement with a notable high-risk subgroup....82
Quality of life, wellbeing, and functioning: improvement beyond symptom reduction....82
Mutual-help engagement: strong alignment with program orientation, with expected tapering....83
Formal service utilization and criminal justice involvement: potential downstream system impacts 84
Family involvement: modest improvements and limited evidence of differential trajectories....84
program implications....84
Limitations and Cautions in Interpretation....86
Future directions....87
Conclusions....87
1. References....88
Appendix 1. Measures....91
Table A.1. Overview of Measures and Administration Times....92
Appendix 2. Unabridged Descriptive Statistics....96

Table A.2. Unabridged Descriptive Statistics.....96
Appendix 3. Comparison of Retreat sample and vista report.....100
Figure A.3.1. Comparison of Happiness Levels in the Retreat Sample with National Averages (Vista Report).....103
Figure A.3.2. Comparison of SUD Severity in the Retreat Sample with National Averages (Vista Report).....104
Figure A.3.3. Comparison of Primary Substance in the Retreat Sample with National Averages (Vista Report).....105
Figure A.3.4. Comparison of Prior Treatments in the Retreat Sample with National Averages (Vista Report).....107
Figure A.3.5. Comparison of Feeling Good Overall in the Retreat Sample with National Averages (Vista Report).....108
Figure A.3.6. Comparison of Arrests the Retreat Sample with National Averages (Vista Report) 109
Appendix 4. Unabridged Service Utilization.....110
Table A.4. Descriptive Statistics of Service Utilization in the Past 90 Days Across Time.....111
Apprendix 5. Dropout.....115
A.5.1. Dropout Predictors.....115
Table A.5.1. Univariate Predictors of Dropout.....116
Table A.5.2. Multivariate Logistic Regression Predicting Dropout.....120
A.5.3. Generalized Estimating Equation (GEE) Models testing for the effects of group condition over time on clinical, public health, functioning, quality of life, and well-being outcomes.....120
Table A.5.4. Interaction Variable Cell Sizes.....121
Table A.5.5. Effect of Retreat Program participation on Percentage Days Abstinent from Alcohol Across Time.....123
Table A.5.6. Effect of Retreat Program participation on 100% Abstinence from Alcohol Across Time123
Table A.5.7. Effect of Retreat Program participation on Percent Heavy Drinking Days Across Time124
Table A.5.8. Effect of Retreat Program participation on Percent Days Drunk / High Across Time 124
Table A.5.9. Effect of Retreat Program participation on Substance Use Consequences Across Time125
Table A.5.10. Effect of Retreat Program participation on Remission Across Time.....125
Table A.5.11. Effect of Retreat Program participation on Quality of Life Across Time.....126
Table A.5.12. Effect of Retreat Program participation on Happiness Across Time.....127
Table A.5.13. Effect of Retreat Program participation on Self-Esteem Across Time.....127
Table A.5.14. Effect of Retreat Program participation on Recovery Capital Across Time.....128

Table A.5.15. Effect of Retreat Program participation on Employment Across Time.....128
Table A.5.16. Effect of Retreat Program participation on Psychological Distress Across Time.129

EXECUTIVE SUMMARY

Background and Significance: Substance use disorders (SUD) confer an enormous clinical and public health burden in the United States. To help address these challenges, there exists a broad array of medically-oriented as well as non-medical outpatient and residential services as well as an increasing number of peer-run community-based services intended to amplify and extend the effects of professional efforts (e.g., mutual-help groups like Alcoholics Anonymous [AA]). Recent evidence suggests that treatment effectiveness and cost-effectiveness in addressing addiction might be enhanced where treatment models effectively combine these professional care programs with proactive facilitated linkage to ongoing community services like AA. The Retreat — a non-clinical supportive-educational, community-based model of residential care located in Wayzata, Minnesota, USA – is one such facility designed explicitly to do this. Although the Retreat is a non-clinical residential program, where participants are referred to as "guests", it is nevertheless designed to address the variety of serious needs that people suffering from severe and chronic SUD experience who are beginning a new recovery attempt but is constructed to do so through a "social recovery" model framework at a fraction of the cost of most other inpatient or residential programs. Despite the program's long-standing existence, however, little is known about its actual impact in helping people with SUD to achieve remission and improve quality of life and functioning. This report describes the rationale, methods, and findings from a rigorous evaluation study of the Retreat conducted by the Recovery Research Institute at the Massachusetts General Hospital, Harvard Medical School, that measured the effects over one-year following Retreat program completion. **Study Design:** A longitudinal, single-group, naturalistic, prospective design was utilized with a sample of consecutively admitted Retreat program guests (N = 206) who entered the program between March 2023 and October 2024 and were assessed using a broad array of psychometrically validated self-report and interview-based measures administered at program entry, mid-stay, end of stay, and quarterly at 3-months and 6-months and again at 12-months following Retreat program entry. There were no exclusion criteria — any Retreat participant was eligible to participate in the evaluation thereby maximizing sample generalizability and representativeness. Descriptive statistics, as well as bivariate and statistically controlled longitudinal inferential modeling analyses were conducted (i.e., Generalized Estimating Equations [GEE]) to estimate the Retreat program's effects across time on the large variety of clinical and functional outcomes of interest. **Study Findings:** Results indicated that the Retreat program tends to be utilized, on average, by mostly White, heterosexual, middle-aged men and women seeking help primarily for alcohol addiction, who are currently employed with moderate income levels and with chronic and complex clinical histories characterized by typically severe psychopathology, including moderate to high psychiatric distress and lifetime rates of psychiatric comorbidity, high levels of prior SUD treatment utilization, and prior legal system involvement. With respect to the participants' response to the services provided during their approximately four week stay at the Retreat on the large variety of intermediate and long-term outcomes measured, participants showed substantial improvements during Retreat Program participation on desired targets (e.g., coping skills/abstinence self-efficacy, decreased psychiatric distress, improved self-esteem) as well very large and clinically meaningful improvements — relative to the 90 days prior to Retreat Program participation — on a variety of pertinent health outcomes including but not limited to percent days abstinent, percent heavy drinking days, other drug use days, heavy use/intoxicated days, alcohol and other drug use consequences, remission status, psychiatric distress, legal system involvement, quality of life and functioning, self-esteem, and subjective happiness, across the year-long follow-up. These benefits were shown to increase substantially from pre- to post-Retreat Program participation and were maintained and

often increased further across follow-up. Results showed also that these strong positive benefits were observed to occur similarly across important sub-groups such as men and women; participants with a primary substance other than alcohol; and those without any family involvement. Less than half of participants reported family involvement in the Retreat. Regardless of family participation, however, over one-third of participants reported feeling supported by their family in their recovery efforts and noted similarly improved family relationships. Finally, given a major intended proximal outcome of the Retreat program is to facilitate active involvement in 12-step community organizations post-discharge, it was noteworthy to observe that average rates of active 12-step involvement (specifically AA) were extremely high initially post-discharge with engagement levels largely persisting across the follow-up period. Post-discharge, participants reported infrequent contact with the Retreat program and infrequent use of the alumni mobile app, rating it moderately effective. **Limitations:** Findings should be considered in the context of two significant limitations: 1. The single-group study design; and, 2. Moderate to high sample attrition rates. In terms of the first limitation, although a strength of the study was the longitudinal within-subjects prospective design, the lack of a no-treatment, or waitlisted treatment, control group, means that it remains unclear the extent to which at least some of these positive changes might have occurred without Retreat participation or through the course of natural recovery. The sudden, stark, and substantial positive changes observed in this study that occurred from pre- to post-discharge, however, give stronger support to a potential causal effect attributable to the Retreat program participation. Also, prior research would suggest that such a large and sudden positive magnitude change in this high complexity, chronicity, and severity, sample, would be unlikely to occur without some kind of intervention. Also, although the lack of an active treatment comparison group precludes any direct comment about the Retreat's effectiveness compared to other programs, a comparison with available data from a large number of similar SUD treatment programs around the USA collected and published by the Vista group revealed that the Retreat does at least as well or substantially better, but some differences in demographic and clinical characteristics between such samples limit firm conclusions in this regard. In terms of the attrition limitation, there was considerable sample loss at follow-ups over time (approximately one-third of participants were not assessed at the 12-month follow-up). This is not at all unusual in longitudinal clinical evaluation studies, but the extent of sample attrition was slightly larger in the current evaluation than in other comparable research studies; furthermore, attrition can affect the accuracy of the observed estimates, typically inflating positive estimates to some degree. That said, the study analyses did screen, and control for, baseline predictors of study attrition (i.e., primary substance and education), as well as other baseline predictors of post-stay outcomes without showing any meaningful attenuation of effects on the estimates or pattern of positive findings observed. **Conclusion:** This first prospective naturalistic evaluation study of a low-cost approximately month-long explicitly 12-step-oriented non-clinical supportive-educational community-based residential care program shows meaningful and substantial improvements across a broad array of alcohol and other drug specific and related outcomes as well as broader indices of functioning and quality of life that persist up to at least one-year post-discharge. Also, in terms of the 12-step-oriented Retreat program meeting its intended proximal outcomes of substantially increasing active community-based 12-step participation following discharge as a means of achieving and sustaining such improvements, the program appears also to meet this target to a high degree. Whereas future evaluations should be conducted with comparison groups and with a focus on minimizing sample attrition, findings here are highly consistent with prior 12-step comparative effectiveness research that suggests strong clinical and public utility as well as potential cost-effectiveness of socially-oriented 12-step residential treatment models, such as the one examined here.



REPORT OF FINDINGS

1. Background and Significance

Recovery from substance use disorder (SUD) requires individuals to navigate significant challenges related to biobehavioral stress and neuropsychological adjustment, particularly during the early months and years of recovery (Dennis et al., 2005; Kelly et al., 2017; Kelly & Stout; Volkow & Li, 2004). Clinical interventions consisting of evidence-based pharmacologic and psychosocial interventions are often essential early on in the recovery journey but generally confer short term effects that diminish quickly with time. Consequently, psychosocial intervention programs frequently try to facilitate active involvement in some kind of ongoing accessible community-based recovery support service (RSS), such as ubiquitous mutual help organizations (MHOs) as these are shown to enhance and sustain remission rates over the long-term (Kelly et al., 2020; Moos & Moos, 2004). In fact, recent evidence suggests that treatment effectiveness and cost-effectiveness in addressing addiction can be enhanced where treatment models actually combine these professional care programs with proactive facilitated linkage to ongoing ubiquitous community MHO services like Alcoholics Anonymous (AA) intended to help prevent relapse post discharge (Kelly et al, 2020). The Retreat — a non-clinical supportive-educational, community-based model of residential care located in Wayzata, Minnesota, USA – is one such facility designed explicitly to do this. Although the Retreat is a non-clinical residential program, it is nevertheless made to address the variety of needs that people suffering from severe and chronic SUD experience who are beginning a new recovery attempt but is designed to do so through a "social recovery" model framework composed of psychosocially oriented non-medical professional and peer support service use engaged with over the long-term typically at a fraction of the cost of most other inpatient or residential programs.

The Retreat is an approximately 30-day program founded explicitly upon the 12 step principles and practices of AA. It offers a variety of services including but not limited to men's and women's specific programming needs, family recovery supports, and a variety of community in-person and virtual sober living environments. The Retreat program costs approximately $5,000 to $7,000. As such, it represents a substantially lower cost option compared to other residential or inpatient treatment facilities that can often exceed well above $30,000 for the same length of stay (Beetham et al., 2021; King et al., 2024).

While some empirical evidence exists for similar types of residential social recovery model facilities (e.g., Oxford Houses; (Jason et al., 2001), little is known about the impact of this specific type of low-cost non-clinical option for primary residential SUD treatment as it has seldom been evaluated. Consequently, in order to elucidate more clearly the clinical and public health utility of this model, in 2022 the Retreat contracted with Recovery Research Institute (RRI) at the Massachusetts General Hospital (MGH) and Harvard Medical School, in Boston, MA, USA, to conduct the first rigorous prospective year-long naturalistic evaluation of the Retreat program's effects among individuals beginning a new recovery attempt.

2. Research Design and Methods

This was a longitudinal, naturalistic, single-group, study design intended to provide estimates of effects from the Retreat program participation. A multimodal (self-report and interview-based assessment methodology) and multidimensional assessment battery (e.g., demographics, alcohol and other drug use, psychiatric, clinical and treatment history, legal history, quality of life and functioning etc.) was administered at baseline, mid-stay, end of stay, and again at 3-, 6-, and 12-month follow-up. There was a



target study enrollment of approximately two hundred Retreat participants. There were no exclusion criteria in order to increase representativeness and generalizability of findings. The study assessed multiple proximal (i.e., changes in recovery motivation, abstinence self-efficacy, self-esteem, psychiatric distress, post-stay 12-step involvement) as well as myriad long-term post-stay primary and secondary outcomes (e.g., alcohol and other drug use status, SUD consequences, remission status, legal status, psychiatric status, indices of quality of life and functioning changes).

2.1. Participants, Recruitment, and Study Eligibility

Consecutive admissions were enrolled between March 2023 and October 2024. Of the 248 people who were screened, a total of 206 adult participants were enrolled (See Figure 3.1.1 Consort Diagram for flow chart of study recruitment).

To be eligible to participate in this study, individuals had to: be over the age of 18, meet DSM-V criteria for a substance use disorder, have access to a smartphone or computer for follow up assessments, currently participate in The Retreat's residential program in Wayzata, Minnesota, USA, have been at the Retreat residential program for 14 days or less (the goal was to recruit participants and conduct an initial assessment as soon as possible after beginning at the Retreat), be willing to provide their social security number for reimbursement for participants' research assessment time or willing to not receive reimbursement. As of April 16th, 2024, participants who were not willing to provide their social security number to receive Advarra system financial compensation for study participation, were allowed to receive online gift cards (Amazon, Tango) reimbursement (see section below on information about Advarra).

Potential participants were approached as soon as possible after entry into the Retreat's residential program in Wayzata, Minnesota, USA. To maintain study evaluation independence, staff members at the Retreat did not conduct any assessment or evaluations themselves. These were conducted exclusively and externally (virtually) by RRI staff. Retreat staff, however, did inform participants of this study opportunity which was evaluating Retreat effects and provided RRI study contact information to participate in the study. Retreat staff had no other involvement in study administration or evaluation beyond assisting with recruitment. Interested Retreat participants were able to call the study-specific phone line or email the study-specific email address. Individuals were then able to participate in a brief 10–15-minute phone screen with RRI staff, during which willingness to participate and study eligibility criteria were confirmed. If the individual was willing and eligible to participate, the baseline visit was scheduled. Participants were informed that participation was voluntary and completely private, confidential, and independent of their stay at the retreat (i.e., knowledge of their study involvement or collected data would not be shared with Retreat staff). Informed consent was obtained prior to starting the baseline study visit.

Overall, about two-thirds of the sample identified as male (64.08%), and most identified as heterosexual (82.52%) and White (84.47%). The majority of the sample also identified as non-Hispanic ethnicity (86.89%). About half were single (46.6%) and employed (56.31%). Almost three-quarters reported at least some college attendance or more advanced education levels (70.87%). About half had an income of over $40,000 USD (51.46%).



2.2. Procedure

Participants completed a total of six assessments in this study including baseline, mid-stay [at approximately 15 days into the program], end of stay [approximately 30 days], and again at a 3-, 6-, and 12-month follow up. Baseline visits were conducted from March 23, 2023, to October 2, 2024. All assessments were conducted by research coordinators at the RRI over the phone or via Zoom. Each assessment consisted of staff-administered assessments and self-administered surveys, which were completed via REDCap (a secure, encrypted, web-based application designed to support data capture for research studies) at all timepoints. The assessments included basic demographic questions and surveys pertaining to participants' substance use history, psychiatric symptoms, psychosocial functioning, treatment service utilization, quality of life, mental health, recovery motivation/support, and recovery related questions. Participants were permitted to decline to answer any specific questions. The baseline and post-discharge follow-up assessments lasted approximately 2 hours with the during and end of stay assessments lasting only 15-20 minutes.

Participants were compensated $50 for completing the baseline visit and $15, $20, $30, $35 and $50 for completing the mid-stay, end-stay, 3-, 6-, and 12-month follow up visits, respectively. Payments were issued using an approved, outside vendor (Advarra Participant Payments) to make payments via a reloadable credit card-based system. This secure system is similar to a gift card or credit card. Payment for each timepoint was broken up into payment for the staff-administered surveys and self-administered survey. On April 16, 2024, the study was given approval for those who do not want to provide their SSN (SSN is required for federal tax purposes) but did want to be compensated with the option to receive renumeration via Amazon e-gift cards.

The study was conducted in accordance with and approved by the Institutional Review Board (IRB) at the Massachusetts General Hospital. All participants received a fact sheet and provided verbal consent prior to beginning study procedures (i.e., at initial screening).

2.3. Measures

A comprehensive range of constructs were assessed using psychometrically validated self-report or interview-administered instruments, which included a broad array of demographic variables, religion and spirituality, alcohol and other drug use, clinical history and current clinical status, pain, medications, psychiatric diagnoses and clinical diagnostic profiles, mental health, overall functioning, medical care utilization, pain, criminal justice and legal system involvement, recovery capital, quality of life, and engagement with treatment and recovery support services, among others. For detailed information on each instrument used, please refer to Appendix 1.

2.4. Analysis Plan

Collected data describing demographic, clinical, legal, functioning, and social histories as well as treatment and recovery support services usage and public health and clinical outcomes were summarized using descriptive statistics (e.g., means, medians, standard deviations, and percentages, according to data structure). Analyses estimating change over time were modeled using generalized estimating equations



(GEE; (Carey et al., 2012) controlling for predictors of study dropout, and other baseline predictors for each specified outcome model, in order to examine the effects of Retreat program participation unconfounded by prior status on these variables and unbiased by dropout status. R statistical package software (V4.4.1; (R Core Team, 2021) was used for all data management and statistical analyses.

The following section will provide details of the sample size, retention rates and demographic characteristics of the sample.

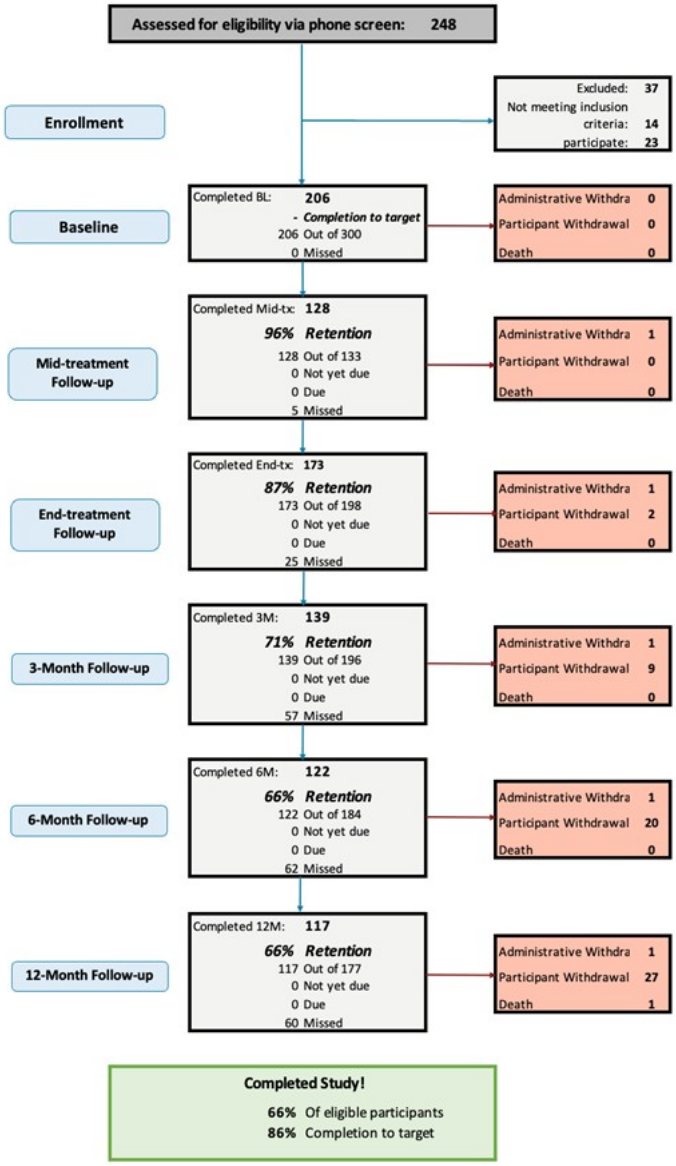
3. RESULTS

3.1. Follow-Up Rates

Figure 3.1.1 shows the flow of participants into and out of the study protocol over time. Figure 3.1.2 shows the "modified intention to treat" sample – the proportion of participants followed up at each time point based on the denominator at each time point after eliminating from the denominator those who had withdrawn from the study or could not be contacted in prior follow-ups or were known to have died. Figure 3.1.3 show the so-called "intention to treat" follow-up rates which are based only on the denominator number enrolled in the study at baseline (i.e., N = 206). This yields a lower follow-up rate at each timepoint as it does not account for withdrawn participants at later follow-ups. For the purposes of this report, we provide estimates based on the former "modified intent to treat" as opposed to the pure "intention to treat" sample given we wanted to make use of any available data at any timepoint regardless of prior timepoint assessment completion. The pros and cons and implications of this are discussed further in the Limitations section below.



FIGURE 3.1.1. CONSORT DIAGRAM OF PARTICIPANT RECRUITMENT AND RETENTION



Retention percentages are based on the proportion of the originally enrolled participants (i.e., N = 206) who successfully completed their assessment at each timepoint who had not previously withdrawn (either voluntarily or administratively by study PI) or known to have died by that timepoint. For example, at the 6- and 12-month follow-ups in the CONSORT diagram above, one third of participants could not be contacted.

FIGURE 3.1.2. RETENTION STUDY ENROLLMENT AND FOLLOW UP NUMBERS

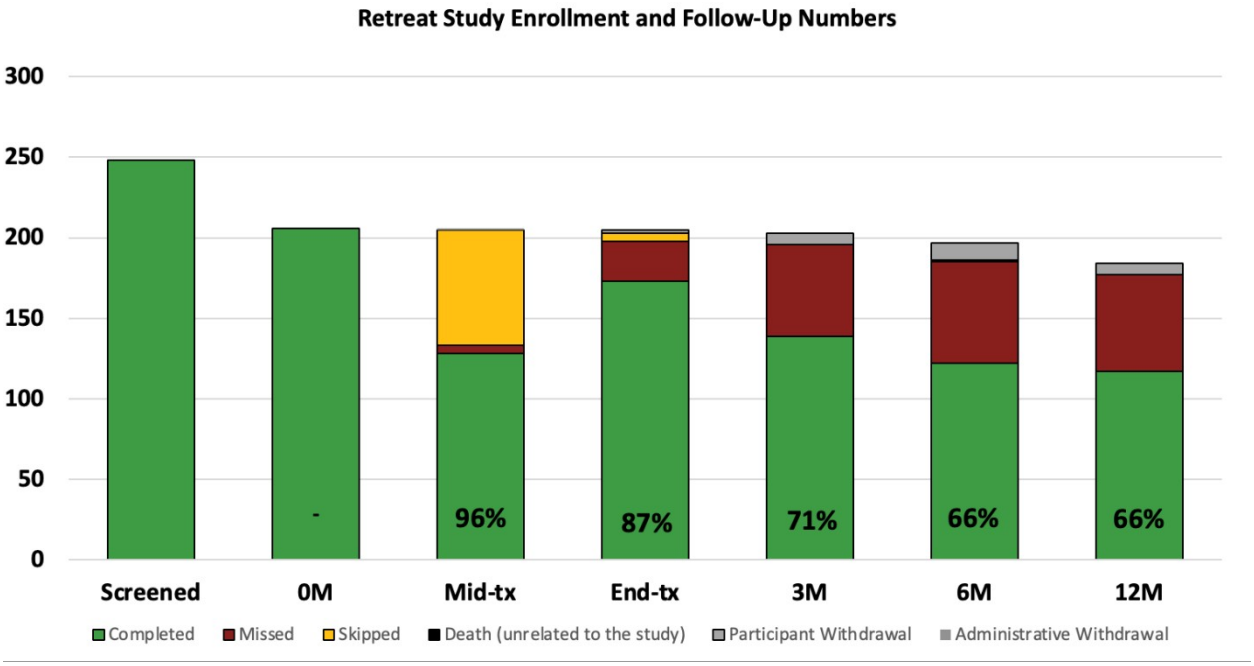
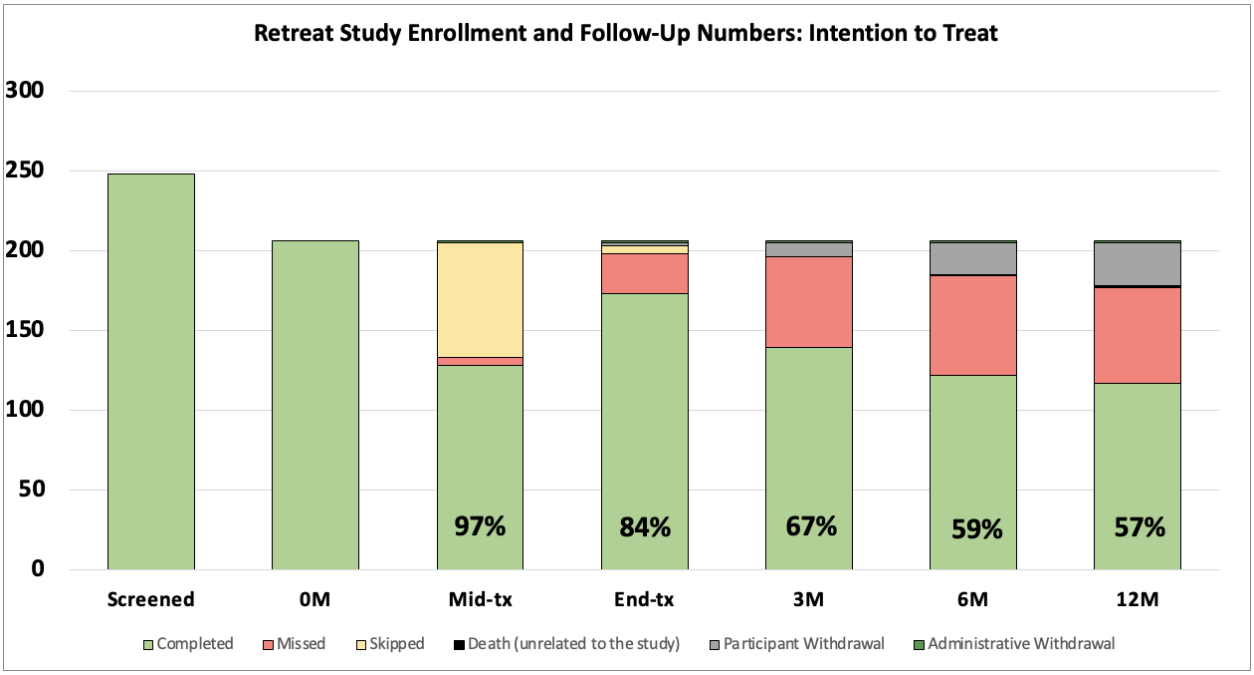


FIGURE 3.1.3. RETENTION STUDY ENROLLMENT AND FOLLOW UP NUMBERS: INTENT TO TREAT



3.2. Comparison of Retention Numbers Across Various Studies

To determine if the retention rates in the Retreat study were comparable to similar longitudinal research projects, we compared retention rates to several of the RRI's prior evaluating the adult SUD recovery process (e.g., studies of adults with SUD starting a new recovery attempt utilizing combinations of treatment and/or MHOs). Comparisons were made between this Retreat study and four other data study sources: a study examining the utility of AA and SMART Recovery MHO organizations; a study of Peer Recovery Support Centers (PRSC); a study of the Phoenix Multisport program; and a published study report by the Vista group that included demographic and clinical descriptive details and myriad outcomes. The SMART/AA study is a longitudinal study investigating the efficacy of the SMART Recovery MHO (Kelly et al., 2023). The PRSC study is a longitudinal study investigating the efficacy of Peer Recovery Support Centers. The Pheonix is a longitudinal study investigating the efficacy of the Phoenix recovery program.

Table 3.2 presents comparisons of retention numbers across national averages and different research studies. Although the Retreat study has higher retention numbers than the VISTA report, retention in the Retreat is generally lower than comparable longitudinal research studies.

Table 3.2. Comparison of Retention Numbers Across Various Studies

Study	3 Month	6 Month	12 Month
Retreat	71%	66%	66%
SMART/AA	88%	85%	82%
PRSC	72%	72%	73%
Phoenix	85%	81%	N/A
Vista	N/A	46%	44%

N/A denotes study did not collect data at the specified timepoint.

3.3. Overview of Sample Characteristics and Outcome Results

In the following sections we summarize the following baseline and pre-Retreat entry characteristics: 1. Demographic characteristics of the sample; 2. Clinical, prior treatment, and legal involvement sample characteristics. In the subsequent sections we summarize the SUD related, as well as quality of life and functioning and well-being outcomes and formal services usage and mutual-help participation outcomes as well as criminal justice outcomes and family involvement outcomes over the follow-up period. In the final sections, we summarize the details of 12-step specific service work participation, as well as other volunteer participation, and Retreat alumni participation.



3.4. Summary of Demographic Variables of the Sample at Baseline

Table 3.4 summarizes the baseline demographic variables in the sample. The sample was approximately 44 years of age, 64% identified as male, 63% were assigned male sex at birth, over 83% identified as heterosexual, over 84% identified as White, and about 4% identified as Hispanic. Approximately 71% of the sample report attending some college or more. Over half of participants reported earning $45,000 USD a year or more. Approximately 56% of the sample were employed and approximately 45% of the sample reported being in a relationship. Also see Figures 4.1 - Figures 4.12 below for graphic illustration of these variables' distributions.

Table 3.4. Demographic Variables at Baseline

		% N
Sample Size (n)		206
Age M (SD)		43.95 (13)
Gender		
	Female	28.16% (58)
	Male	64.08% (132)
	Missing	7.77% (16)
Sex Assigned at Birth		
	Female	26.70% (55)
	Male	62.62% (129)
	Missing	10.68% (22)
Sexual Orientation		
	Heterosexual or Straight	82.52% (170)
	Other / Decline to Answer	17.48% (36)
Race		
	White	84.47% (174)
	Other	5.83% (12)
	Missing	9.71% (20)
Ethnicity		
	Hispanic	3.88% (8)
	Not Hispanic	86.89% (179)
	Missing	9.22% (19)

Education		
	Less than or equal to High School	10.68% (22)
	Some College or More	70.87% (146)
	Missing	18.45% (38)
Income		
	Less than $15,000	9.22% (19)
	15K to 45K	22.33% (46)
	45K or More	51.46% (106)
	Decline to Answer / Missing	16.99% (35)
Employed		
	No	27.18% (56)
	Yes	56.31% (116)
	Missing	16.5% (34)
Relationship Status		
	In a relationship	45.15% (93)
	Single	46.60% (96)
	Missing	8.25% (17)

Sexual Orientation “Other” response option includes Asexual, Homosexual gay or Lesbian, Bisexual, Pansexual, Not sure, Prefer not to answer, Missing,
Race “Other” response option includes American Indian or Alaska native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, and Multiracial
Relationship Status “In a relationship” response option includes In a relationship but not living together, In a relationship and living together, Engaged, Married; “single” response option includes Married but separated, Single.

FIGURE 3.4.1. DISTRIBUTION OF AGE

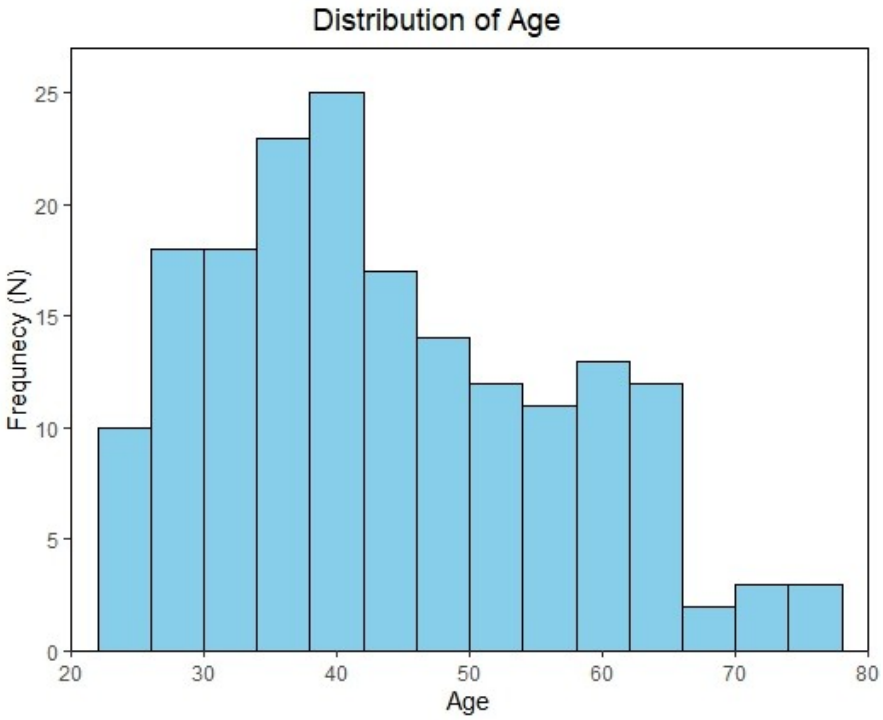


FIGURE 3.4.2 AGE

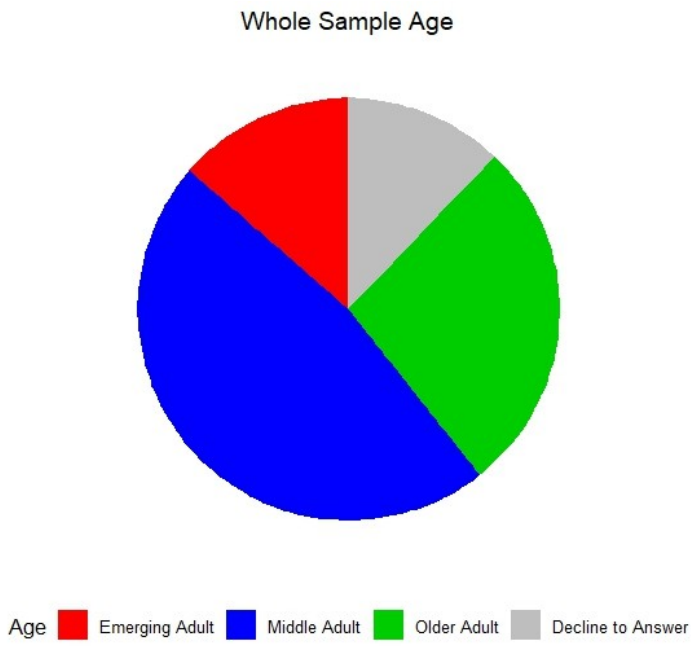


FIGURE 3.4.3. GENDER IDENTITY

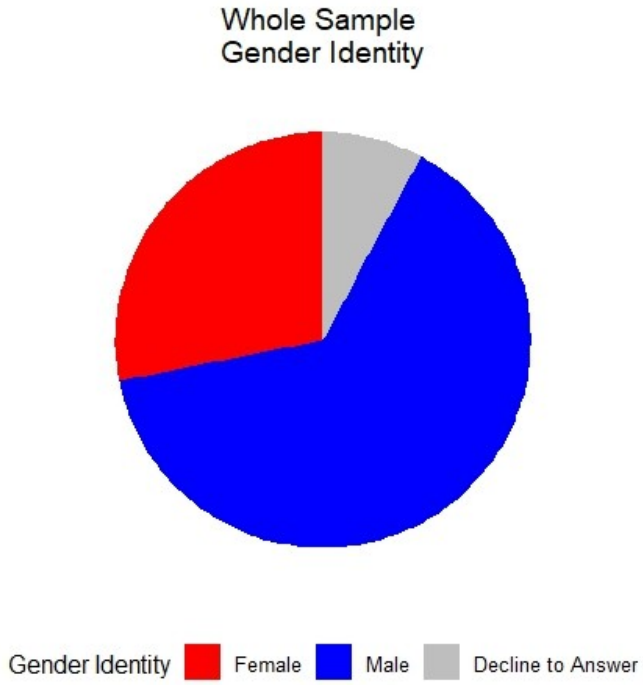


FIGURE 3.4.4. SEX ASSIGNED AT BIRTH

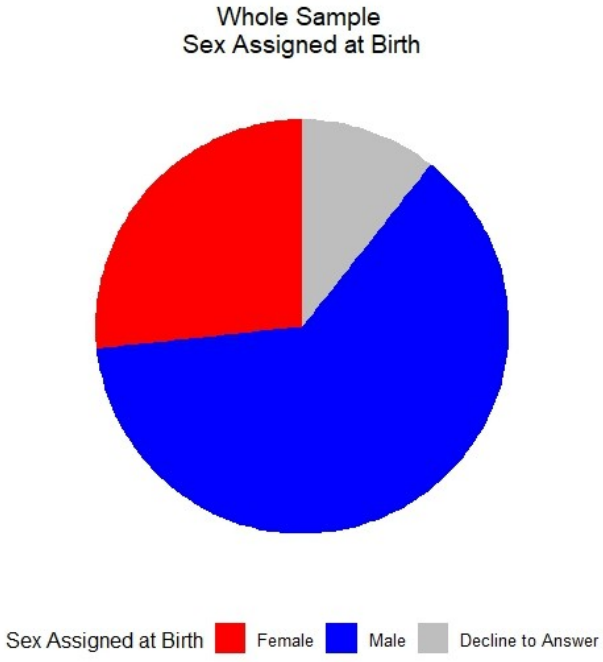


FIGURE 3.4.5. RACE

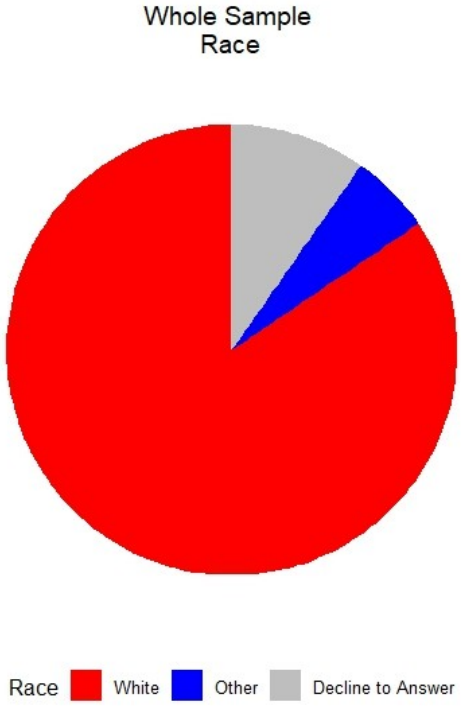


FIGURE 3.4.6. ETHNICITY

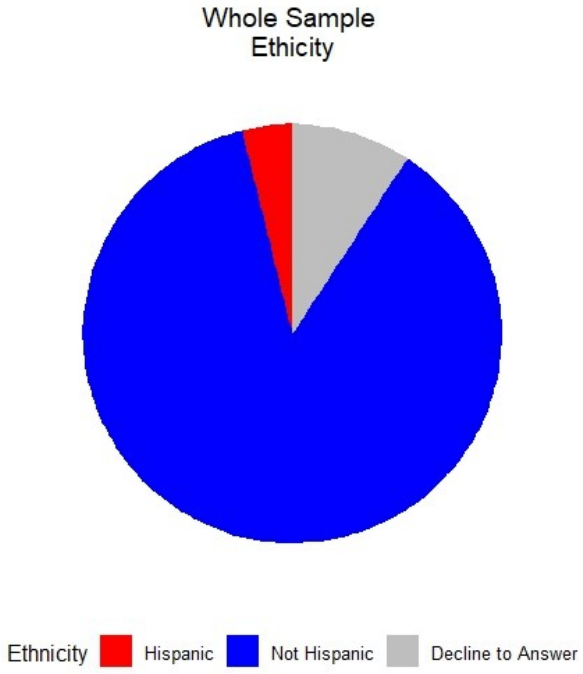


FIGURE 3.4.7. SEXUAL ORIENTATION

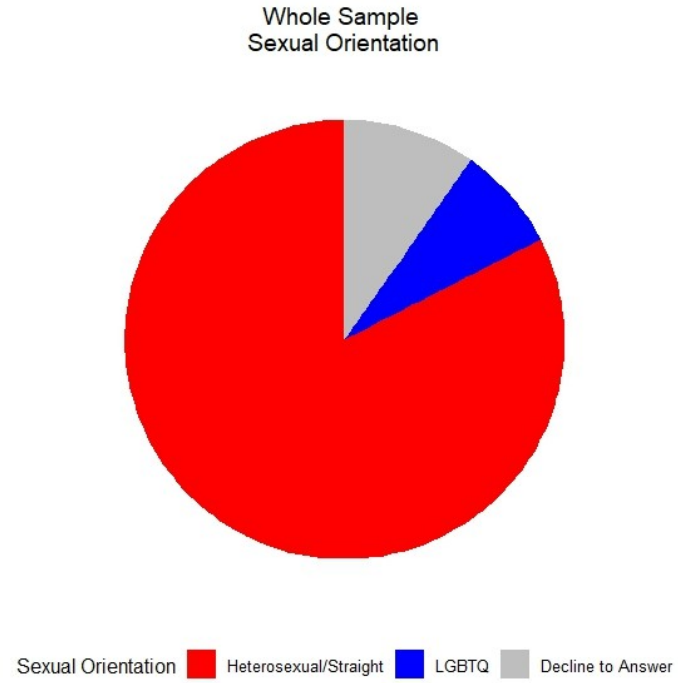


FIGURE 3.4.8. EDUCATION

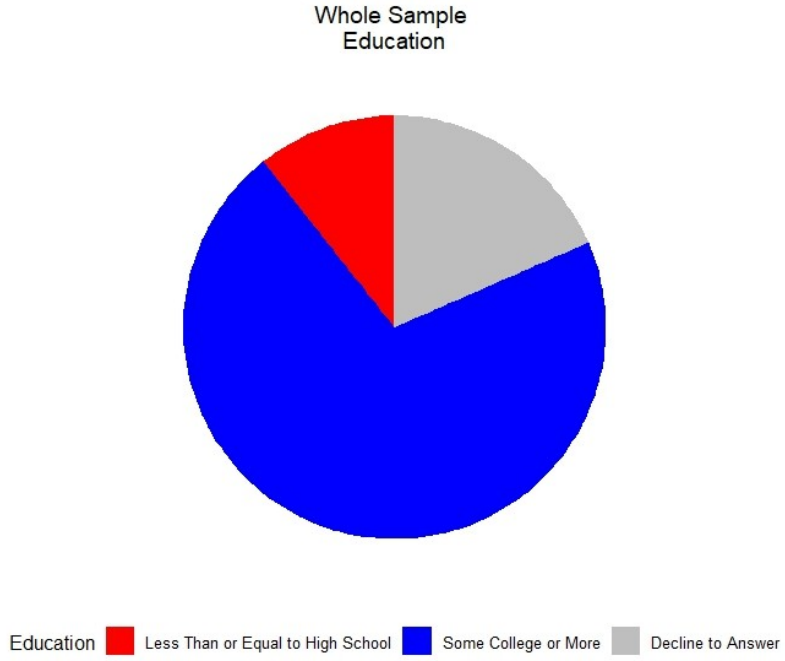


FIGURE 3.4.9. INCOME LEVEL

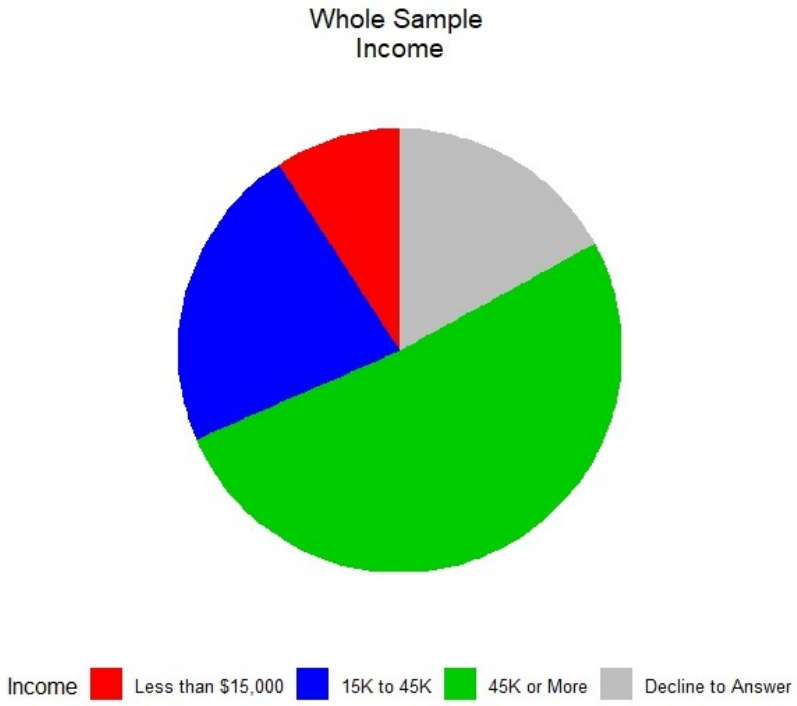

Whole Sample
Income
Income
Less than $15,000
15K to 45K
45K or More
Decline to Answer

FIGURE 3.4.10. EMPLOYMENT STATUS

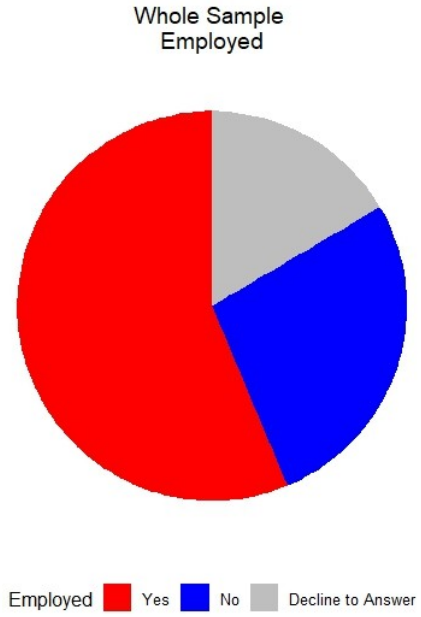


FIGURE 3.4.11. RELATIONSHIP STATUS

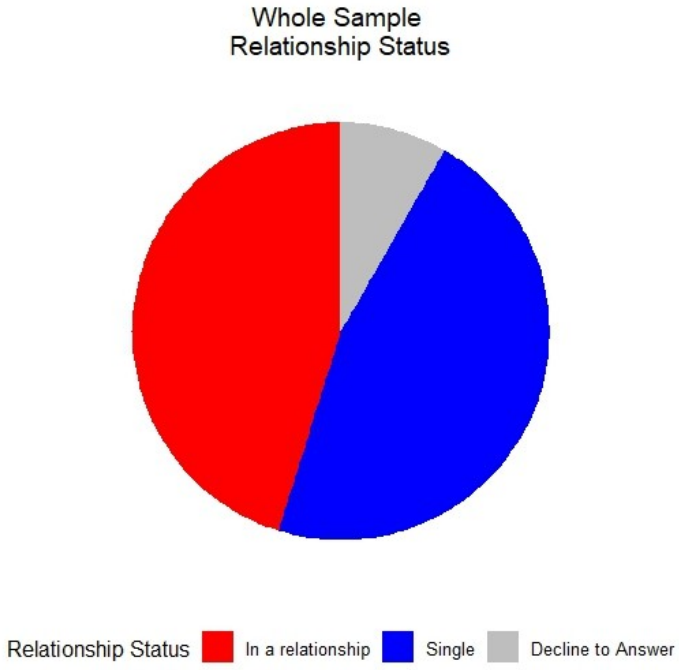
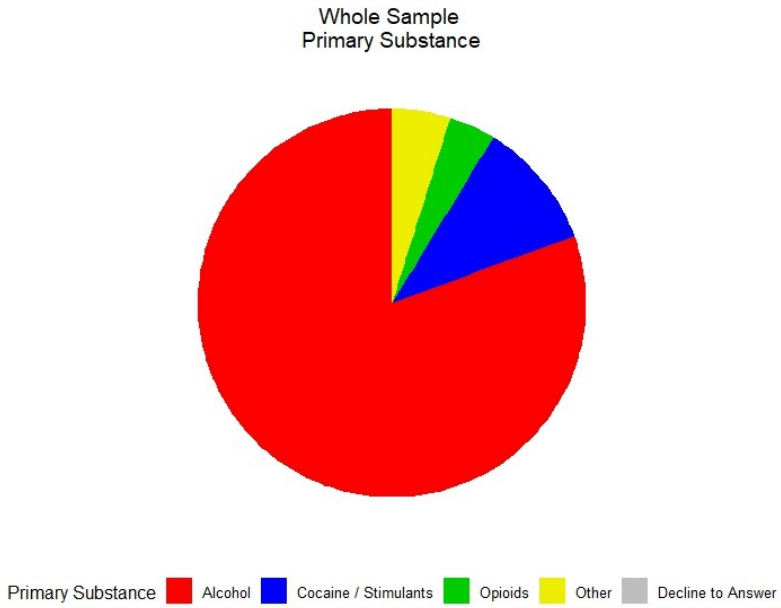


FIGURE 3.4.12. PRIMARY SUBSTANCE


Whole Sample
Primary Substance
Primary Substance
Alcohol
Cocaine / Stimulants
Opioids
Other
Decline to Answer

3.5. Summary of Clinical Variables at Baseline

In terms of clinical variables, for primary substance, about 81% of the sample reported alcohol as their primary substance. Approximately 11% of the sample reported cocaine or other stimulants (e.g., amphetamine, methamphetamine) as their primary substance. Approximately 4% of participants reported opioids as their primary substance while approximately 5% reported other drugs (i.e., marijuana, benzodiazepines, inhalants, other) as their primary substance. As expected nearly everyone at study entry into the Retreat program met active criteria for an SUD with only approximately 3% of the sample meeting criteria for past 90-day remission for their primary drug at study entry. The sample on average met for "severe" SUD according the Diagnostic and Statistical Manual of Mental Disorders (5th Edition) criteria, meeting an average of 9 (SD = 2.54) of the 11 SUD criteria symptoms. Psychiatric distress was in the moderate-high range (M = 11.22, SD = 5.1; Kessler et al., 2002), and approximately 69% of the sample reported a lifetime mental health diagnosis given by a qualified professional (see Table 3.5).

Table 3.5. Clinical Variables at Baseline

	% (N)
Primary Substance	
Alcohol	80.58% (166)
Cocaine / Stimulants	10.68% (22)
Opioids	3.88% (8)
Other	4.85% (10)
% in Remission (baseline)	
In Remission	3.40% (7)
Not in Remission	96.60% (199)
Primary Substance Diagnostic Symptoms (range 0-11) M (SD)	9.00 (2.54)
Psychological Distress M (SD)	11.22 (5.10)
% Lifetime Mental Health Diagnoses	
No	31.07% (64)
Yes	68.93% (142)

Primary substance "Other" response composed of Marijuana, Benzodiazepines, Inhalants and Other substances

3.6. Summary of Prior Treatment Variables at Baseline

As shown in Table 3.6, in terms of prior treatment, approximately 62% of participants reported some outpatient treatment in their lifetime with an average of 1 treatment. Approximately 68% of the sample reported some prior detoxification treatments in their lifetime with an average of approximately 3 treatments. Approximately 69% of participants reported some inpatient treatment throughout their lifetime with an average of 3 treatments. With respect to sober living environments, approximately 35% of the sample reported some lifetime use of sober living environments with an average of 1 treatment. Overall, the proportion of the sample reporting some kind of SUD treatment (inpatient, outpatient, detox) in the past 90 days prior to entering this Retreat evaluation study was approximately 60%.

Table 3.6. Prior Treatment Variables at Baseline

	M (SD)	% (N)
Lifetime Sober Living Environment [R]	0.83 (1.77)	35.44% (73)
Past 90 Day Sober Living Environment Treatments [R]	0.59 (6.34)	9.22% (19)
Lifetime Outpatient Treatments [R]	1.38 (1.71)	62.14% (128)
Past 90 Day Outpatient Treatments [R]	0.11 (0.33)	10.68% (22)
Lifetime Detox Treatments [R]	2.84 (5.32)	67.96% (140)
Past 90 Day Treatments [R]	0.67 (0.90)	49.51% (102)
Lifetime Inpatient Treatments [R]	2.66 (3.38)	68.93% (142)
Past 90 Day Inpatient Treatments [R]	0.35 (2.33)	16.50% (34)
% SUD service in past 90 days % (N) [T]		
Yes		60.19% (124)
No		39.81% (82)
% SUD service in lifetime % (N) [R]		
Yes		88.83% (183)
No		11.17% (23)

[T] denotes determined via timeline followback, [R] denotes determined via recovery support services / treatment (RSSTX) redcap instrument.

3.7. Summary of Lifetime Legal System Involvement at Baseline

As shown in Table 3.7, prior legal system involvement in the sample was high with approximately 60% of the sample reporting at least one arrest during their lifetime with approximately 2 arrests on average. Of note, 17% of the sample declined to answer if they were arrested during their lifetime suggesting that the percentage of individuals who were arrested in their lifetime could vary considerably from what is estimated below and could be higher.

Table 3.7. Legal System Involvement at Baseline

	% (N)
Lifetime Arrests (% Yes)	
Yes	59.71% (123)
No	23.30% (48)
Decline to Answer	16.99% (35)
Lifetime Number of Arrests M (SD)	2.31 (3.04)

The following section will detail changes in various outcomes (e.g., clinical, recovery, psychosocial, etc.,) across the course of the study to evaluate the effectiveness of the Retreat program.

3.8. Retreat Program Outcomes Across Time

Below we describe the array of outcome results across time by different construct groups (e.g., SUD related, quality of life related etc.). Detailed tables are shown as well as figures of each outcome of interest. In order to conduct longitudinal inferential statistically controlled models of the effect of Retreat program participation on the array of outcomes over time, we conducted a rigorous screening for baseline predictors of study dropout as well as baseline predictors of the outcome variables in each model. Those variables that were significant were retained as control variables in each model and are describe in detail in Appendix 5 along with the results from the statistical modeling procedures. Below, we present the figures only.

The following section will focus specifically on evaluating changes in substance use outcomes (e.g., abstinence, heavy drinking days, substance use consequences, etc.,) across the course of the study.



3.8 Alcohol and Other Drug Related Outcomes Across Time

As shown in the table below, there were significant general improvements over the year-long follow-up period. We observed substantial increases in PDA from baseline (M = 50.70, SD = 33.44) to 12-month follow up (M = 96.89, SD = 8.75). Drinks Per Day decreased from baseline (M = 9.40, SD = 7.33) to 12-month follow up (M = 0.44, SD = 1.08). Percent Heavy Drinking Days decreased from baseline (M = 46.75, SD = 34.33) to 12-month follow up (M = 2.28, SD = 7.03).

Overall, 28.64% (n = 59) of the sample were abstinent at every timepoint (i.e., 3-month, 6-month, 12-month follow up) across the study while in contrast 5.34% (n = 11) of the sample used substances to some extent at every timepoint across the study. There was 12.62% (n = 26%) of the sample who engaged in inconsistent patterns of abstinence and non-abstinence, alternating between engaging and not engaging in substance use, across 3-month, 6-month, and 12-month follow up.

Other Substance PDA increased from baseline (M = 65.69, SD = 41.74) to 12-month follow up (M = 93.03, SD = 21.15). Substance Use Consequences decreased from baseline (M = 32.48, SD = 9.34) to 12-month follow up (M = 9.54, SD = 13.26). Of note, among individuals who continued to drink, drinks per drinking day remained consistently high from baseline (M = 18.48, SD = 6.09) to 12-month follow up (M = 17.36, SD = 7.94).

Table 3.8: Alcohol and Other Drug Related Outcomes Across Time

	Baseline	3 Months	6 Months	12 Months
	M (SD)	**M (SD)**	**M (SD)**	**M (SD)**
Alcohol PDA	50.70 (33.44)	97.19 (8.20)	95.47 (13.65)	96.89 (8.75)
Drinks Per Day	9.40 (7.33)	0.51 (1.70)	0.60 (1.79)	0.44 (1.08)
Drinks Per Drinking Day[1]	18.48 (6.09)	18.34 (7.18)	17.92 (7.95)	17.36 (7.94)
Percent Heavy Drinking Days	46.75 (34.33)	2.63 (8.10)	2.93 (9.21)	2.28 (7.03)
Other Substance PDA	65.69 (41.74)	96.95 (14.28)	94.52 (18.08)	93.03 (21.15)
Substance Use Consequences	32.48 (9.34)	14.34 (14.45)	10.17 (13.35)	9.54 (13.26)
Drinking Goal[2]	4.60 (0.68)	-	-	4.44 (0.87)
% SUD Interference Days	47.60 (36.49)	3.03 (11.66)	2.10 (7.96)	3.49 (14.37)
% Days Drunk / High	47.89 (36.21)	2.33 (8.30)	4.03 (14.35)	3.55 (14.31)
	% (N)	**% (N)**	**% (N)**	**% (N)**
% In Remission (**% Yes**)	3.40% (7)	75.54% (105)	73.77% (91)	82.76% (96)
100% PDA **(% Yes**)	4.37% (9)	74.82% (104)	73.98% (91)	76.07% (89)

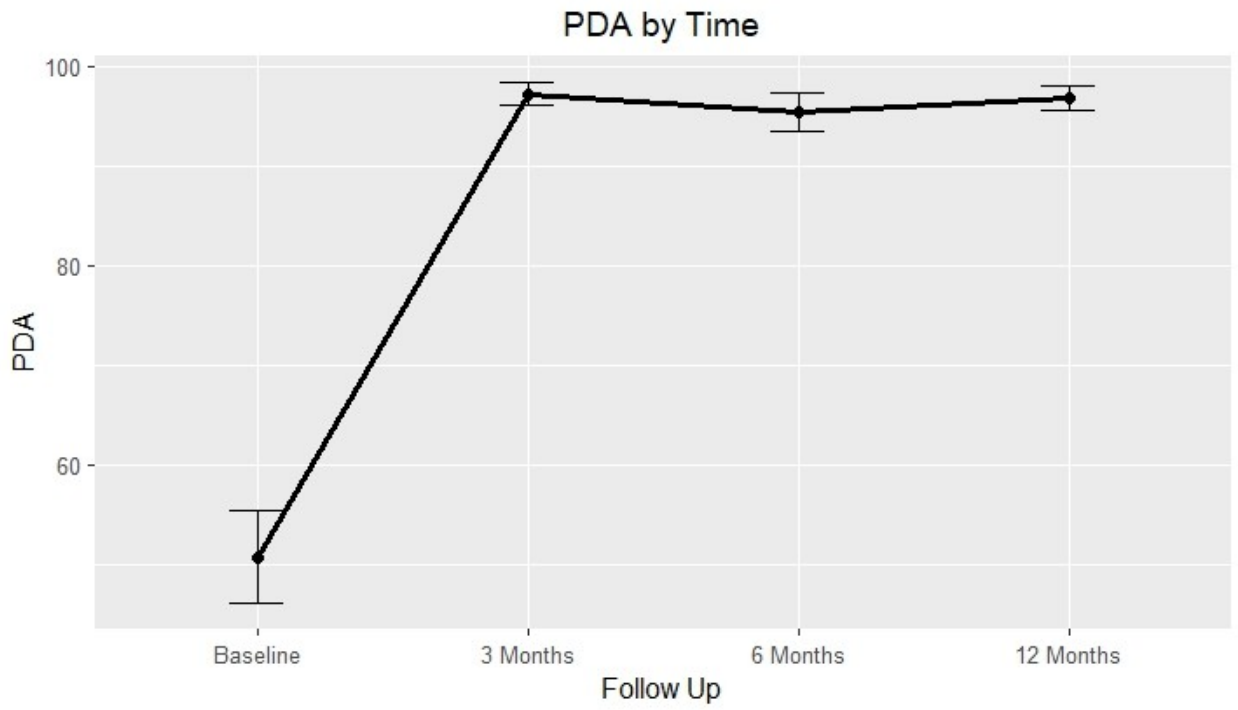
1 = Drinks per drinking day is the average number of drinks an individual consumed on a given day only in which the participant engaged in drinking and therefore excludes individuals who were 100% abstinent at a given timepoint. The participants with less than 100% PDA at each timepoint were: 197 at baseline, 35 at 3-month follow up, 32 at 6-month follow up, 28 at 12-month follow up. In contrast, **drinks per day** is the average number of drinks an individual consumed on a given day including those days where a participant was abstinent (i.e., 0 drinks).

2= Drinking Goal: 1=Controlled use. 2=Temporary abstinence; 3=Occasional use when urges felt strong; 4=Total abstinence but realize a slip is possible; 5=Total abstinence/never use again. Variable not collected at 3-month or 6-month follow up

3.8 Percent Days Abstinent (PDA) from Alcohol

As shown in the table above and figure below, there was a significant increase in PDA across the duration of the study, increasing from 50.70 (SD = 33.44) at baseline to 96.89 (SD = 89.75) at 12-month follow up. This trend continued after controlling for both predictors of dropout and other predictors of PDA. For full details on statistical modeling, see Appendix 5.

FIGURE 3.8.1: PERCENTAGE DAYS ABSTINENT FROM ALCOHOL ACROSS TIME



As shown in figures below, there is a potential interaction of primary substance whereby individuals who use alcohol have lower PDA at baseline compared to individuals who use other substances (e.g., cocaine, marijuana, opioids, etc.,). There were no differences in the trajectory of PDA by age, gender, or family involvement.

FIGURE 3.8.2: PERCENTAGE DAYS ABSTINENT FROM ALCOHOL BY AGE ACROSS TIME

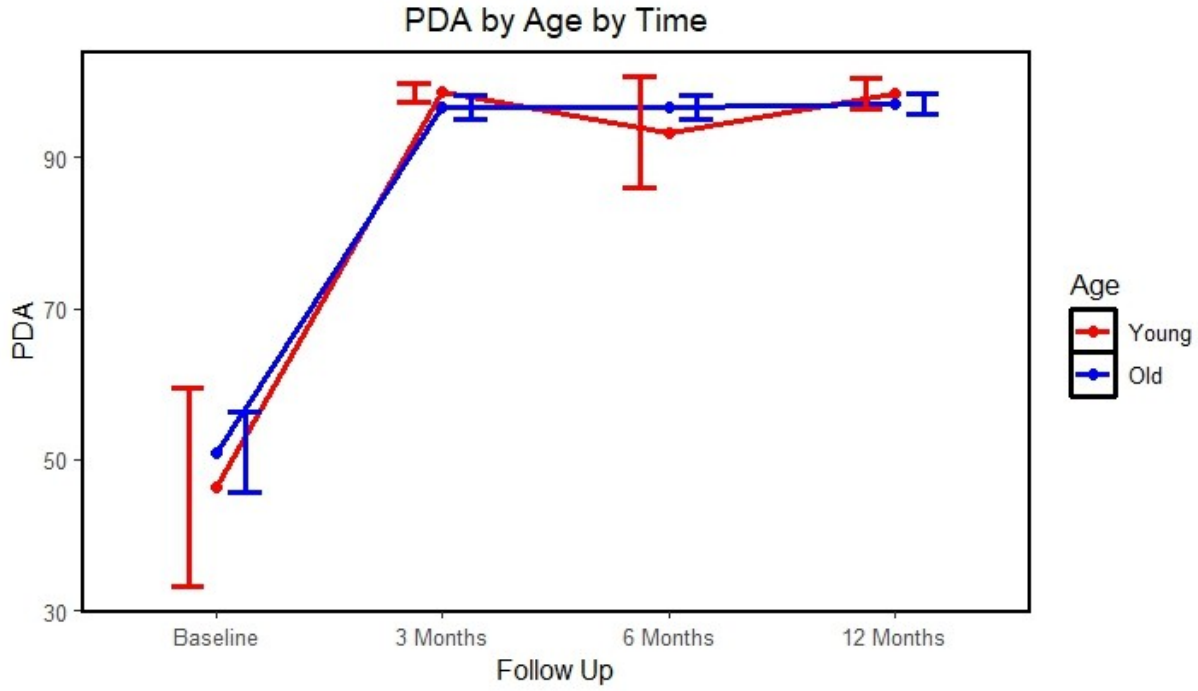


FIGURE 3.8.3: PERCENTAGE DAYS ABSTINENT FROM ALCOHOL BY AGE ACROSS TIME

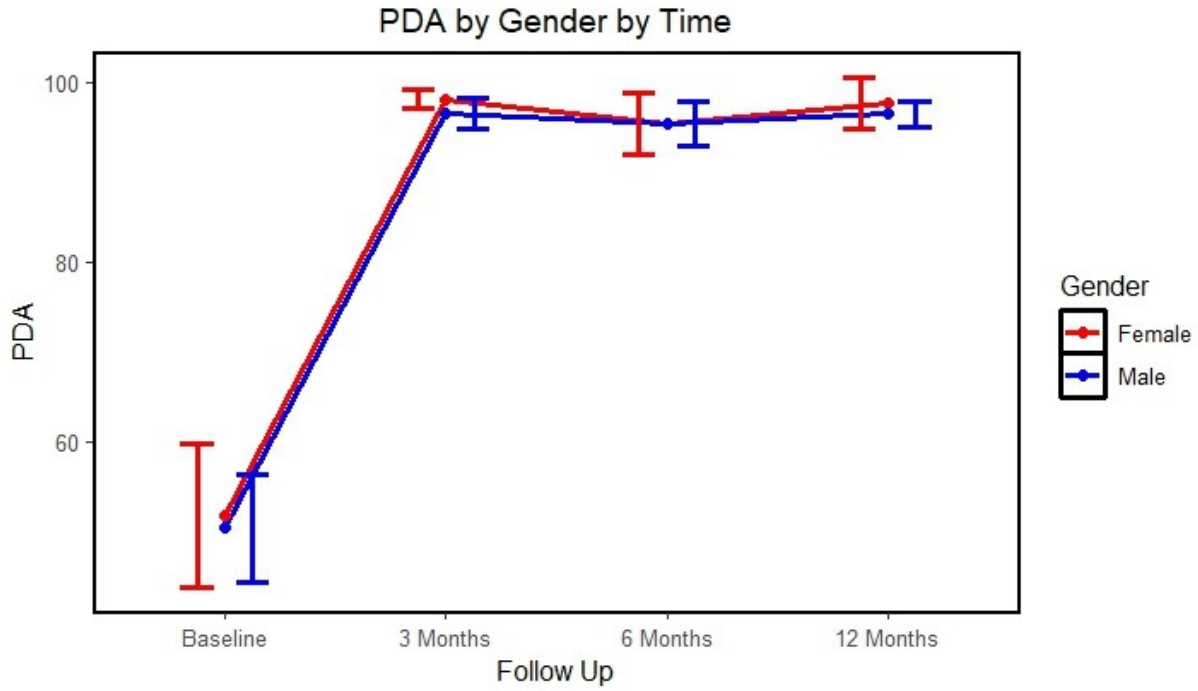


FIGURE 3.8.4: PERCENTAGE DAYS ABSTINENT FROM ALCOHOL BY PRIMARY SUBSTANCE ACROSS TIME

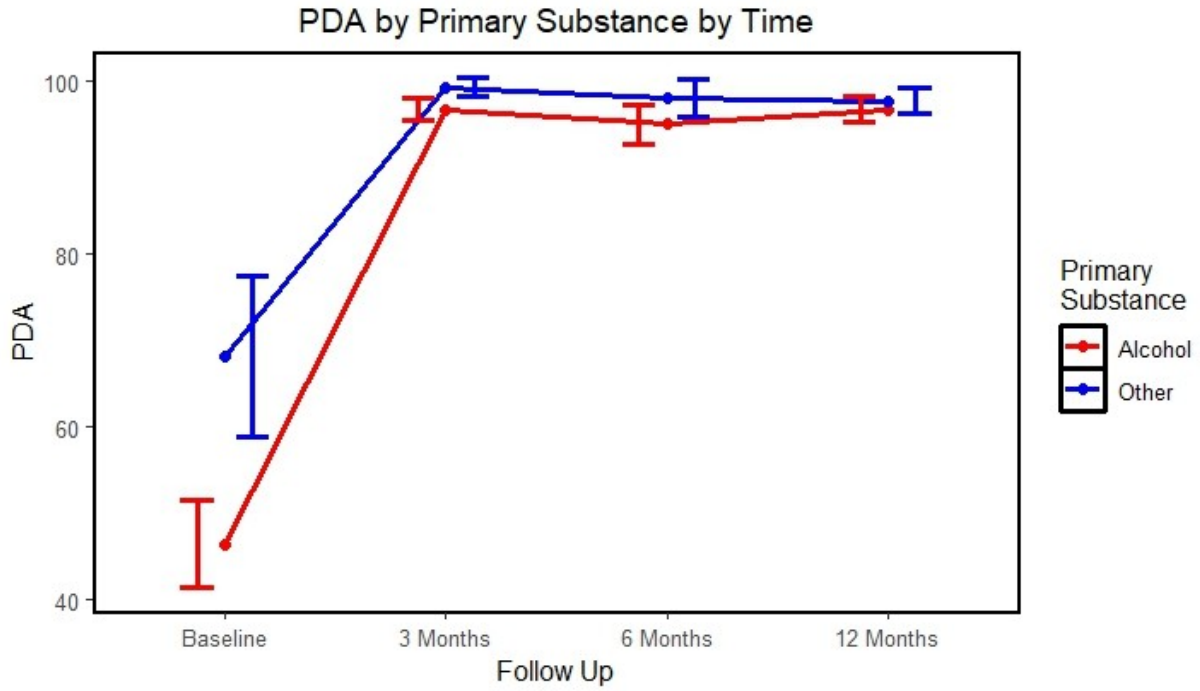


FIGURE 3.8.5: PERCENTAGE DAYS ABSTINENT FROM ALCOHOL BY FAMILY PARTICIPATION IN THE RETREAT ACROSS TIME

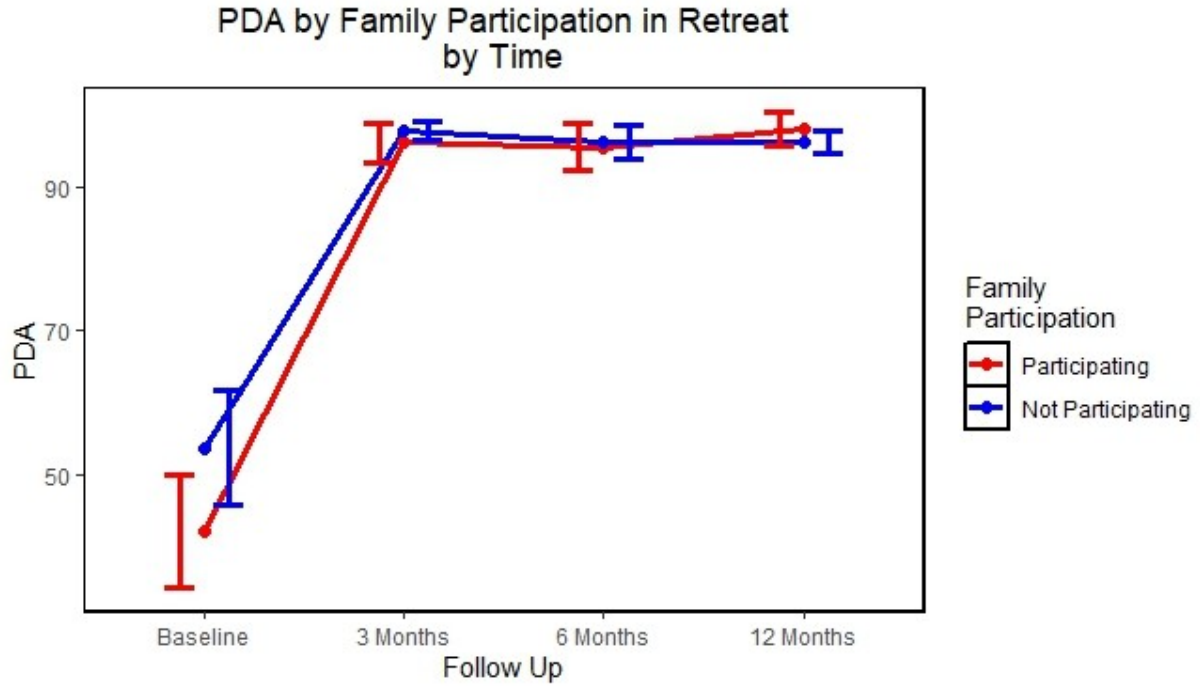


FIGURE 3.8.6: PERCENTAGE DAYS ABSTINENT FROM ALCOHOL BY FAMILY SUPPORT ACROSS TIME

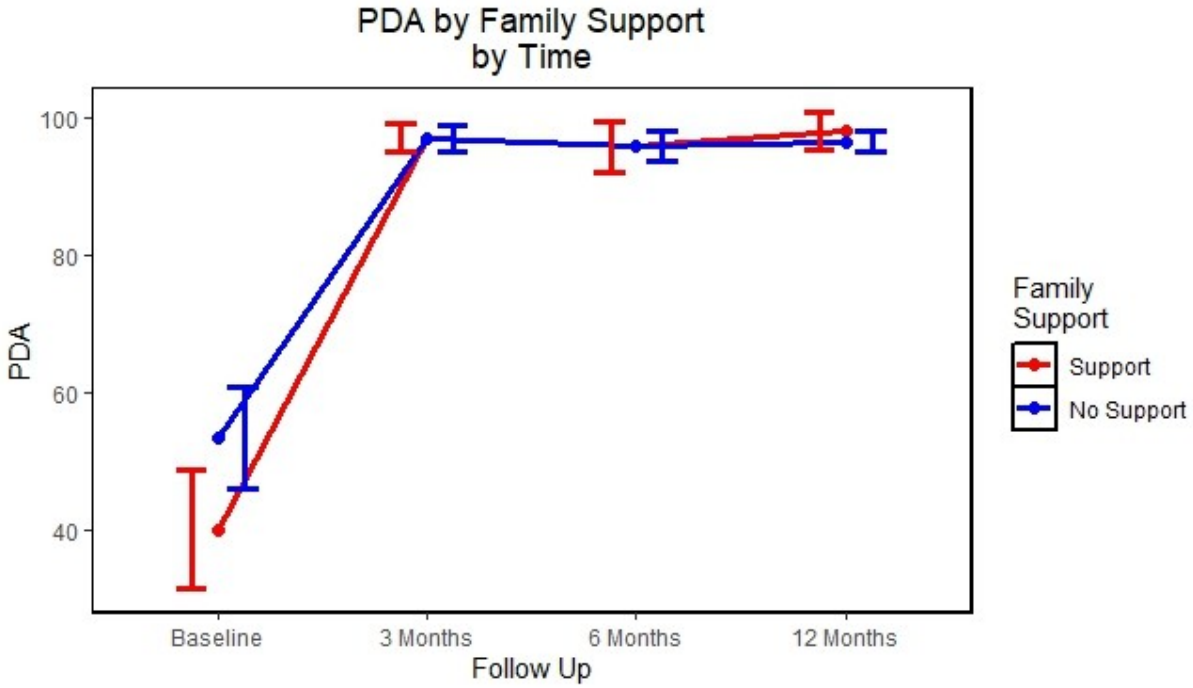
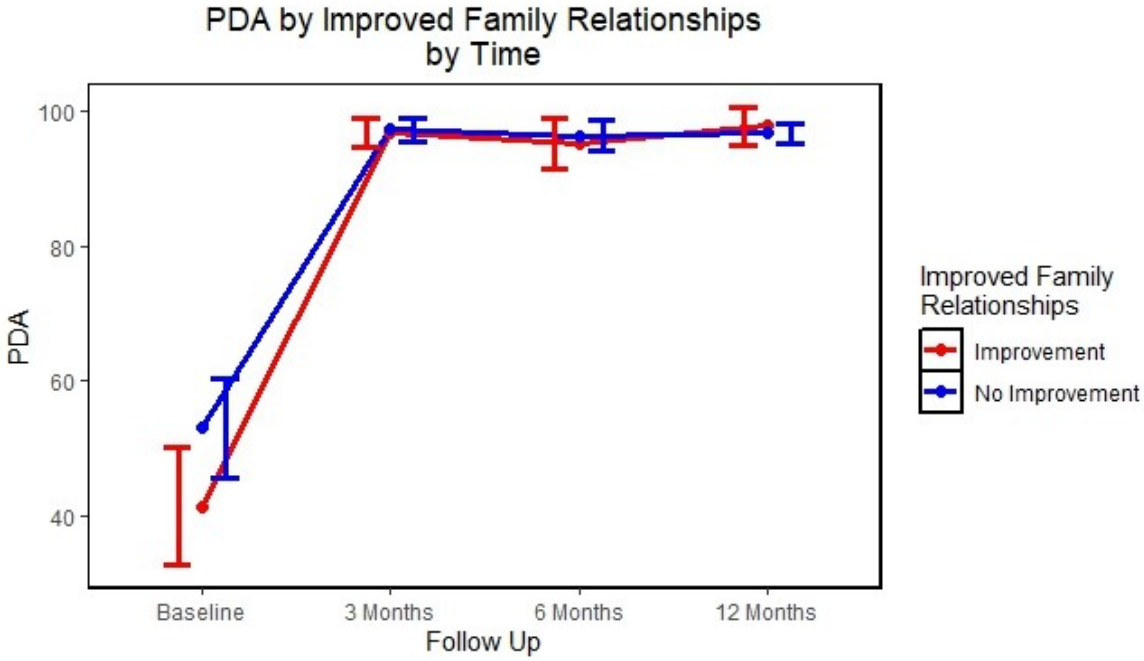


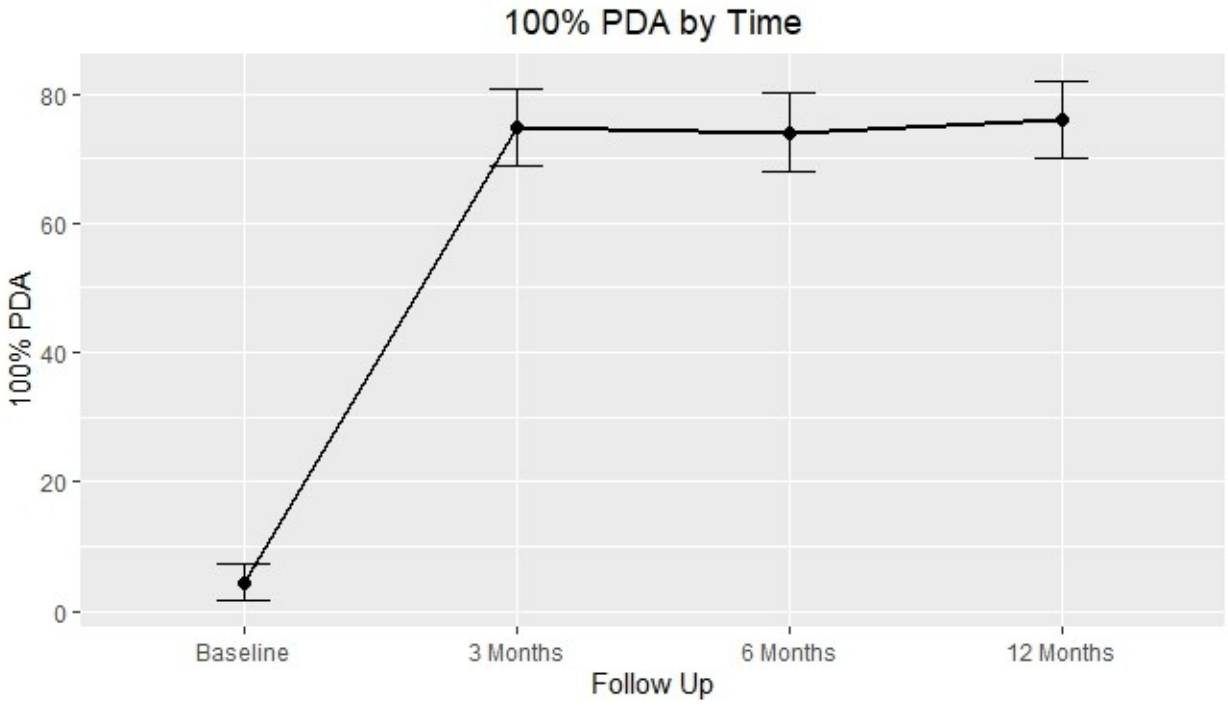
FIGURE 3.8.7: PERCENTAGE DAYS ABSTINENT FROM ALCOHOL BY IMPROVED FAMILY RELATIONSHIPS ACROSS TIME



3.8. 100% Abstinent from Alcohol at each Follow-Up Timepoint

As shown in the table above and figure below there was a significant increase in the percentage of the sample who achieved 100% abstinence across the duration of the study, increasing from 4.37% (N = 9) at baseline to 76.07% (N = 89) by 12-month follow up. This trend continued after controlling for predictors of dropout and other predictors of abstinence. For full details on statistical modeling, see Appendix 5.

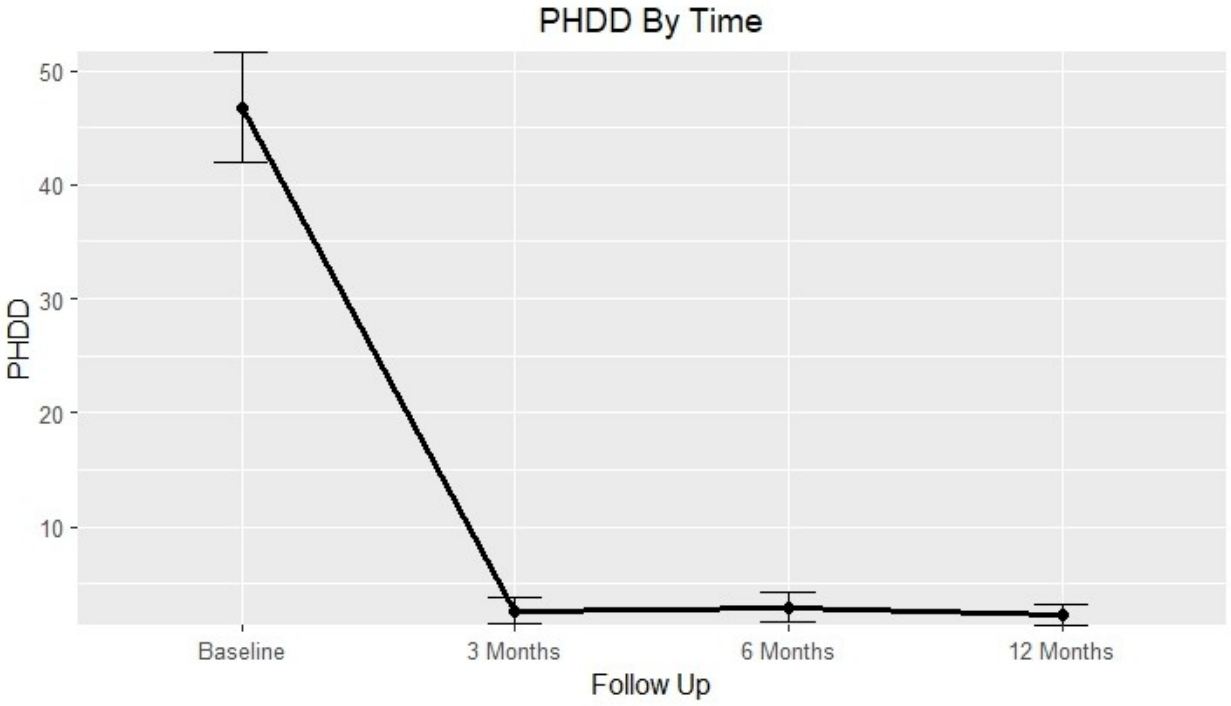
Figure 3.8.8: Percentage of Sample 100% Abstinent from Alcohol Across Time



3.8. Percent Heavy Drinking Days (PHDD)

As shown in the table above and figure below there was a significant decrease in PHDD across the duration of the study, decreasing from 46.75% (SD = 34.33) at baseline to 2.28% (SD = 7.03) by 12-month follow up. This trend continued after controlling for predictors of dropout and other predictors of PHDD. For full details on statistical modeling, see Appendix 5.

Figure 3.8.9: Percent Heavy Drinking Days Across Time



As shown in the figures below, there is a potential interaction of primary substance whereby individuals who drink alcohol have a higher percentage of heavy drinking days at baseline compared to individuals who use other substances (e.g., cocaine, marijuana, opioids, etc.,). There are no observed differences in the trajectory of PHDD by age, gender, or family involvement.

FIGURE 3.8.10: PERCENT HEAVY DRINKING DAYS BY AGE ACROSS TIME

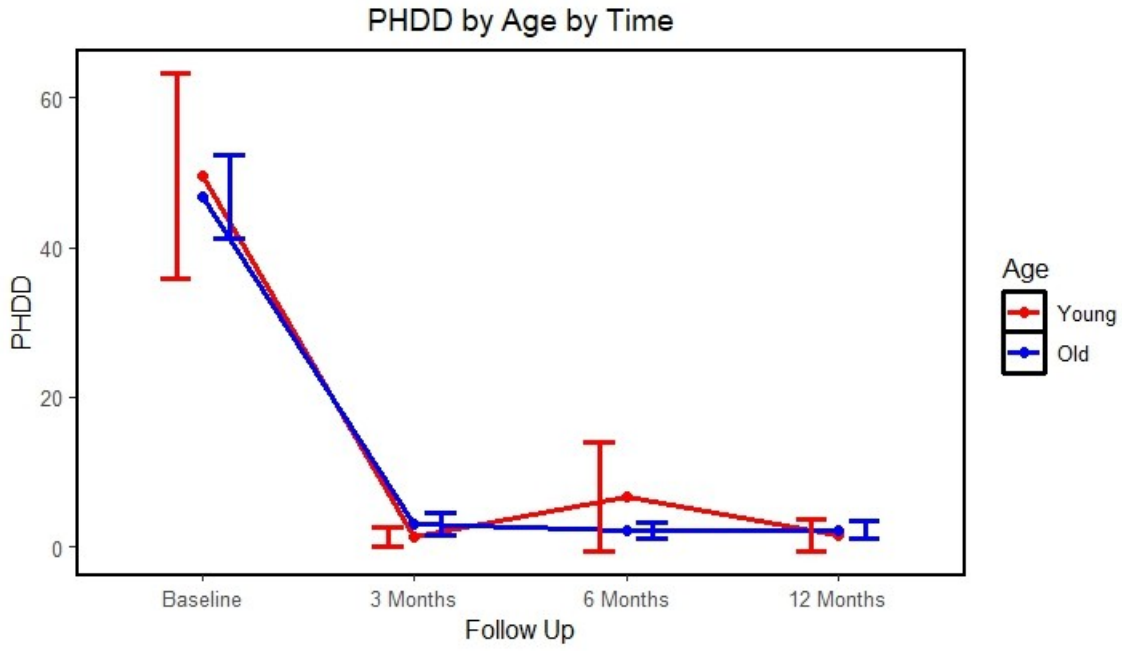


FIGURE 3.8.11: PERCENT HEAVY DRINKING DAYS BY GENDER ACROSS TIME

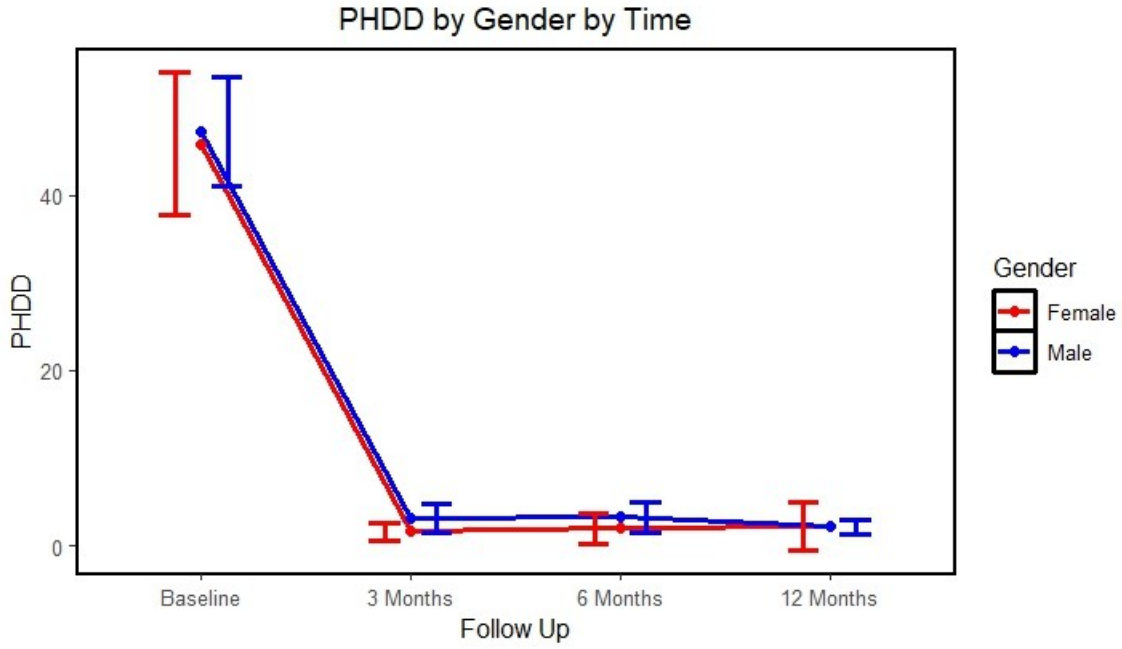


FIGURE 3.8.12: PERCENT HEAVING DRINKING DAYS BY PRIMARY SUBSTANCE ACROSS TIME

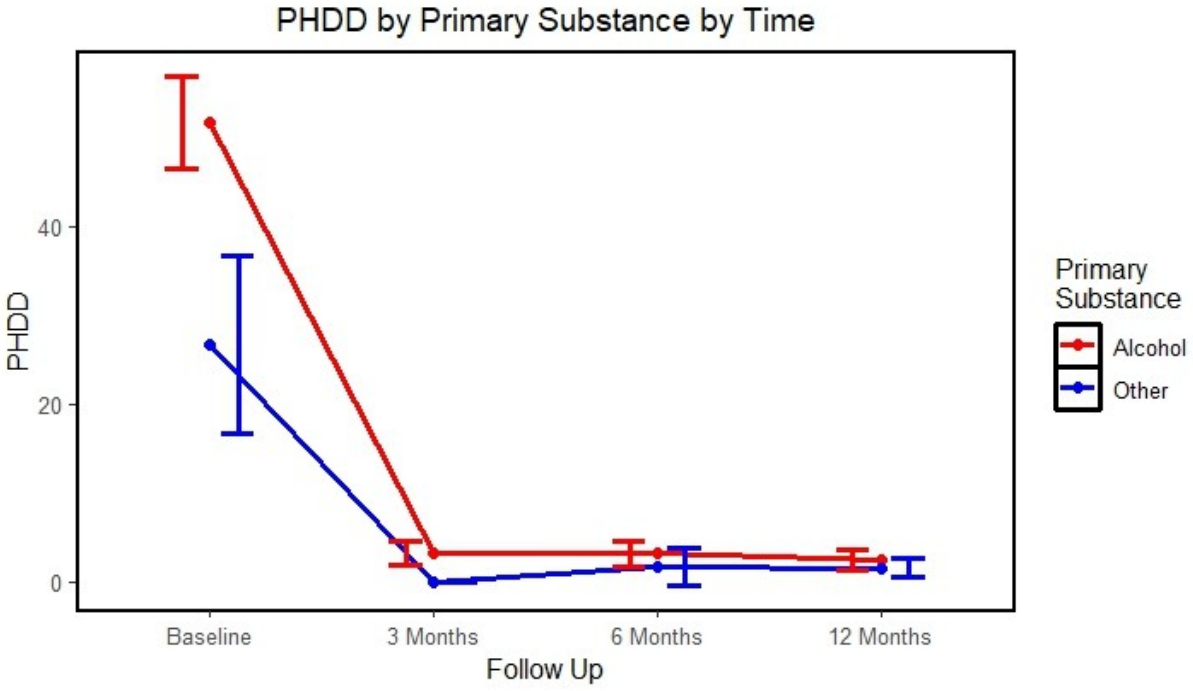


FIGURE 3.8.13: PERCENT HEAVY DRINKING DAYS BY FAMILY PARTICIPATION IN RETREAT ACROSS TIME

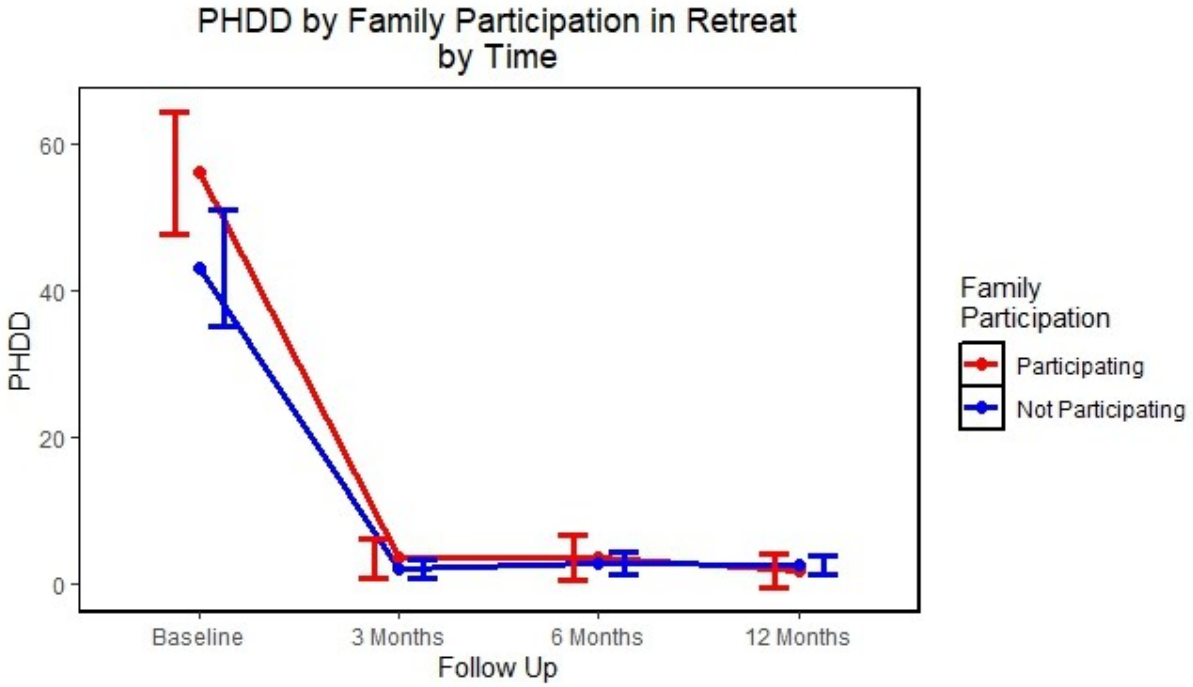


FIGURE 3.8.14: PERCENT HEAVY DRINKING DAYS BY FAMILY SUPPORT ACROSS TIME

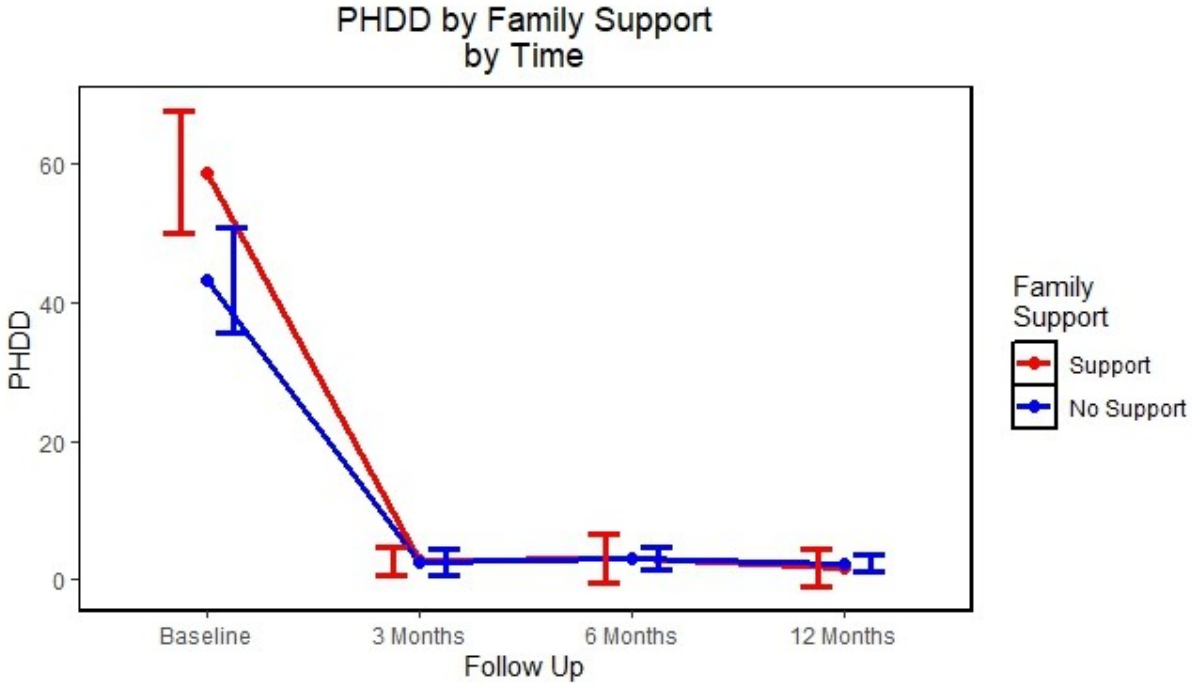
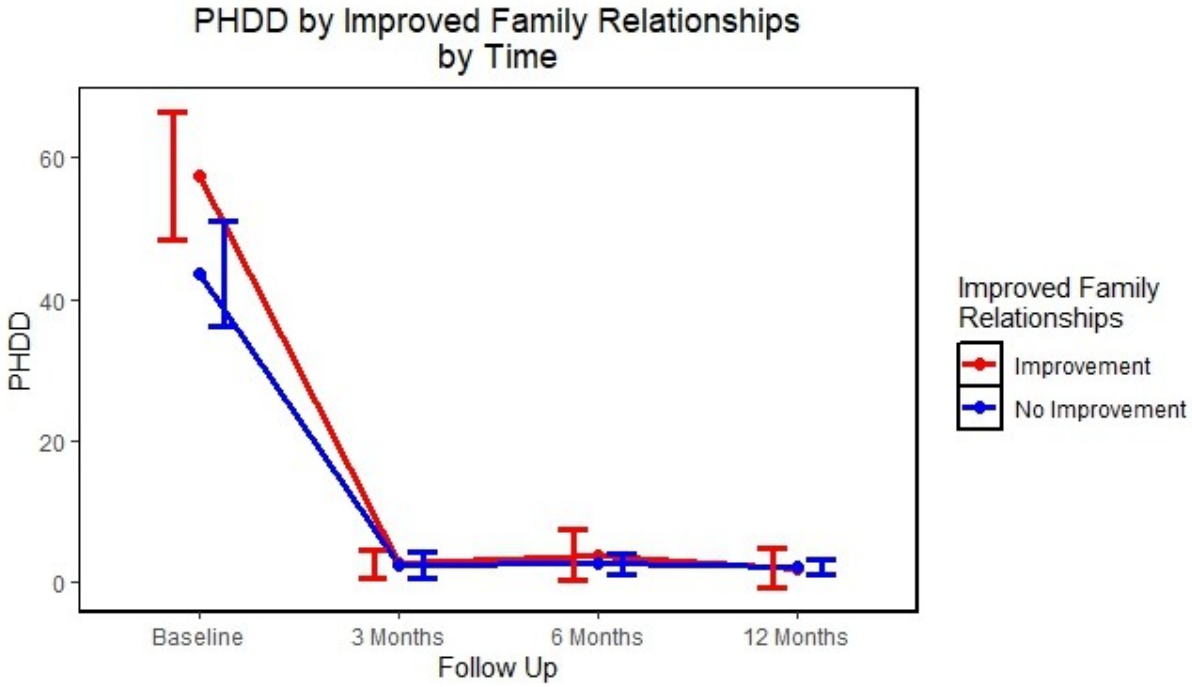


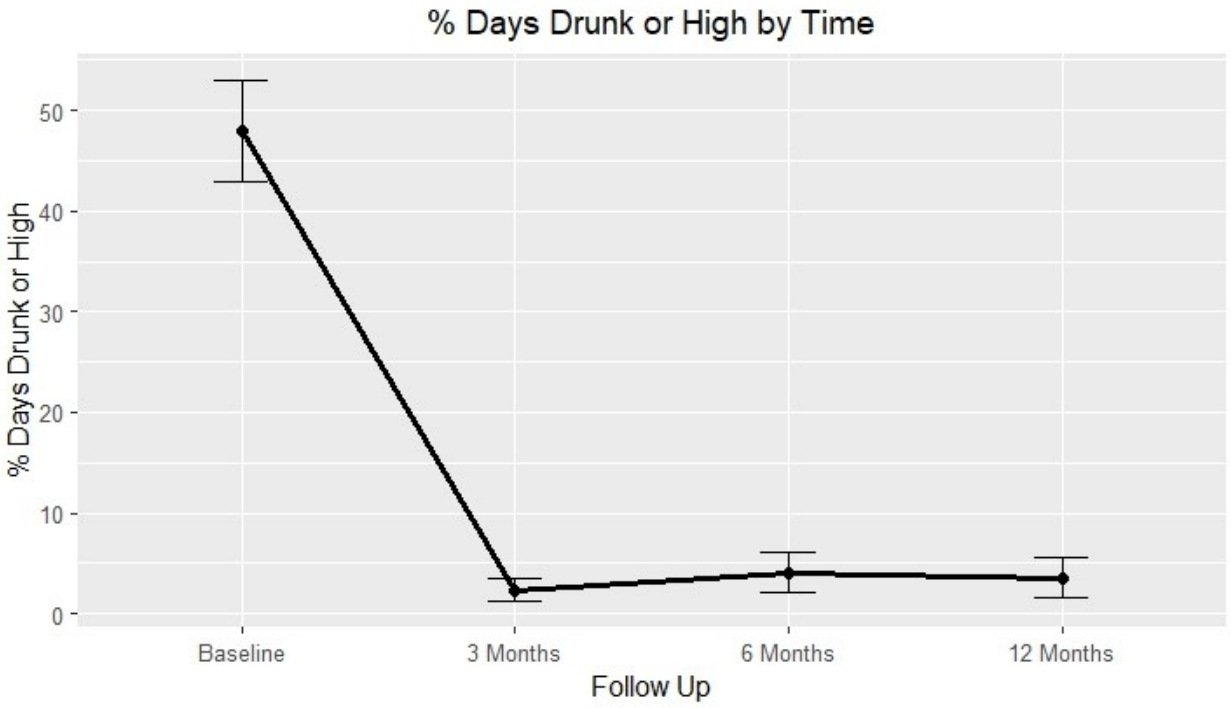
FIGURE 3.8.15: PERCENT HEAVY DRINKING DAYS BY IMPROVED FAMILY RELATIONSHIPS ACROSS TIME



3.8. Percentage of Days Drunk / High

As shown in the table above and figure below, there was a significant decrease in the percentage of days drunk or high, decreasing from 47.89% (SD = 36.21) at baseline to 3.55% (SD = 14.31) at 12-month follow up. This trend continued after controlling for predictors of dropout and other predictors of the percentage of days drunk or high. For full details on statistical modeling, see Appendix 5.

Figure 3.8.16: Percentage of Days Drunk / High over Time



As shown in the figures below, there is a potential interaction of age whereby individuals who are younger have a higher percentage of days drunk or high at baseline compared to individuals who are older. As shown also, there is a potential interaction of primary substance whereby individuals who use alcohol have a lower percentage of days drunk or high at both baseline and 12-month follow up compared to individuals who use other substances (e.g., cocaine, marijuana, opioids, etc.,). There were no observed differences in the trajectory of days drunk or high by gender.

FIGURE 3.8.17: PERCENTAGE OF DAYS DRUNK / HIGH BY AGE OVER TIME

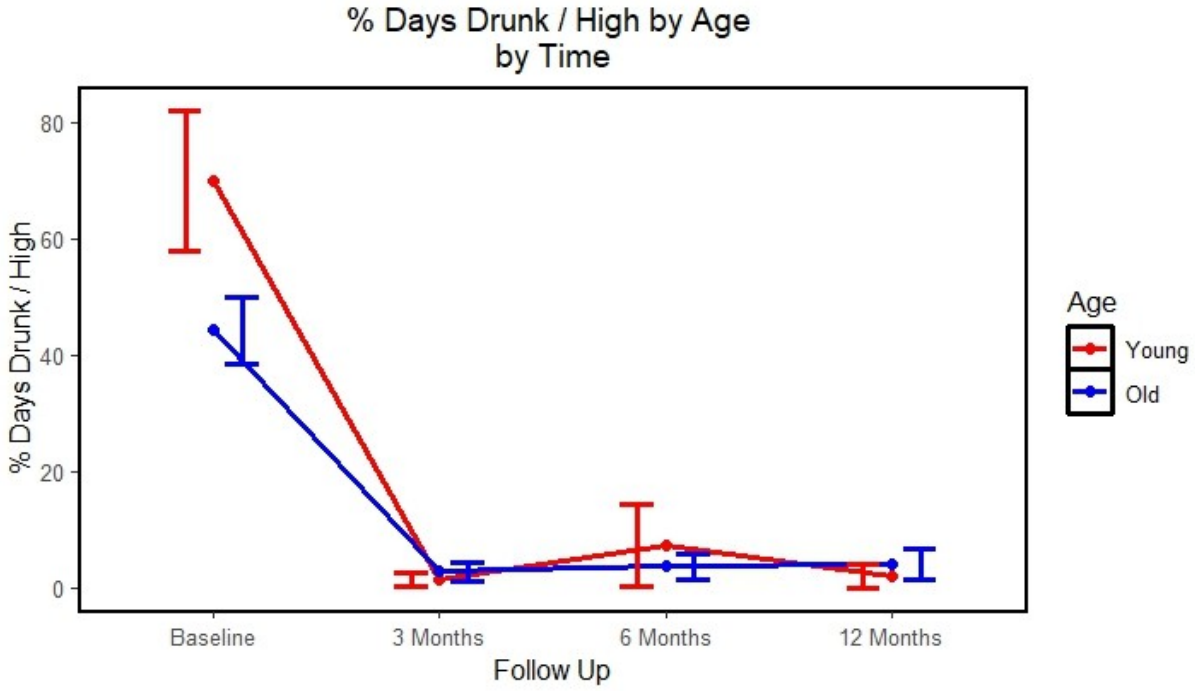


FIGURE 3.8.18: PERCENTAGE OF DAYS DRUNK / HIGH BY GENDER OVER TIME

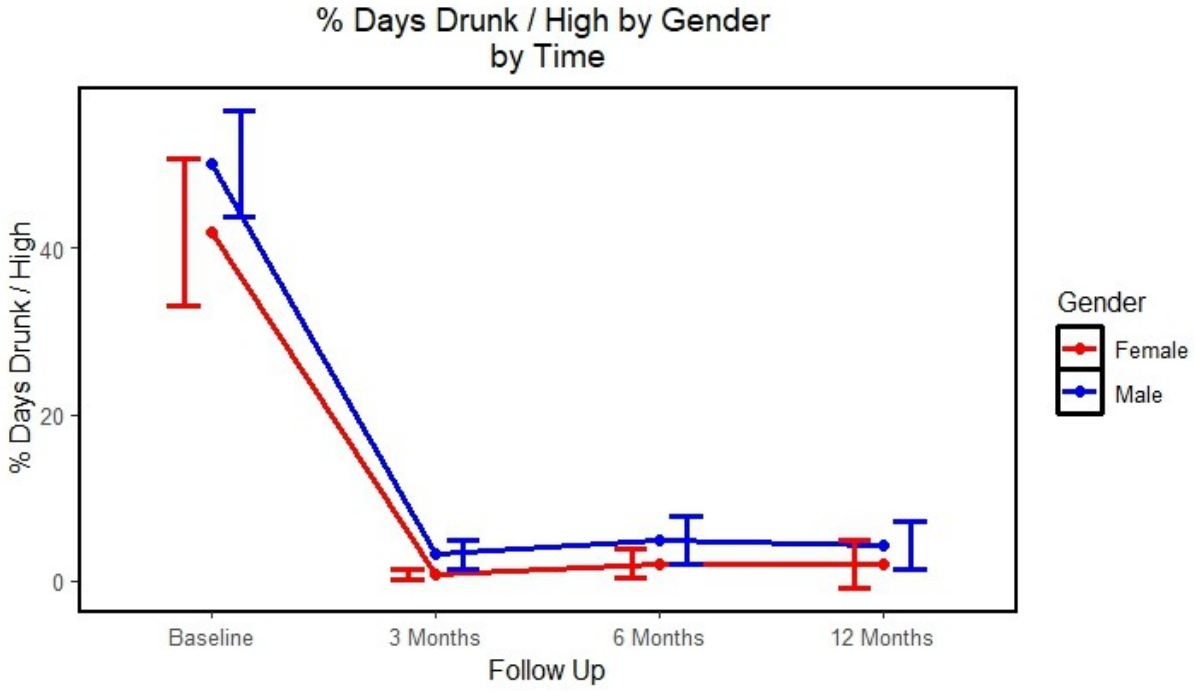


FIGURE 3.8.19: PERCENTAGE OF DAYS DRUNK / HIGH BY PRIMARY SUBSTANCE

OVER TIME

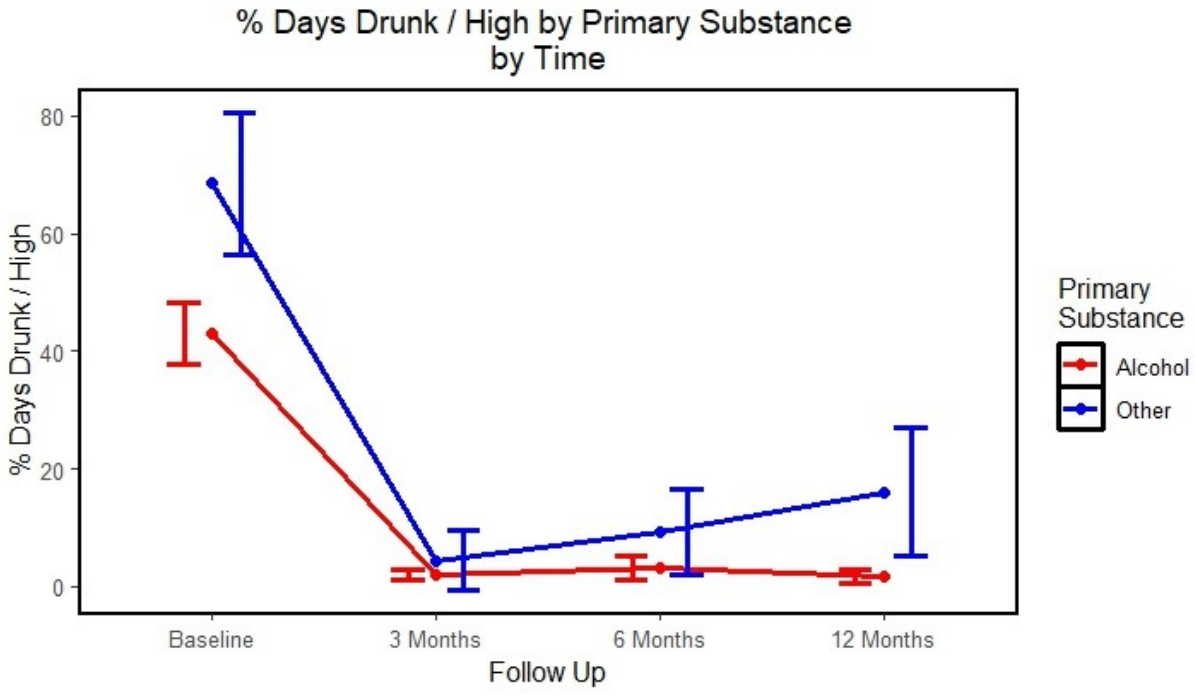


FIGURE 3.8.20: PERCENTAGE OF DAYS DRUNK / HIGH BY FAMILY PARTICIPATION IN RETREAT OVER TIME

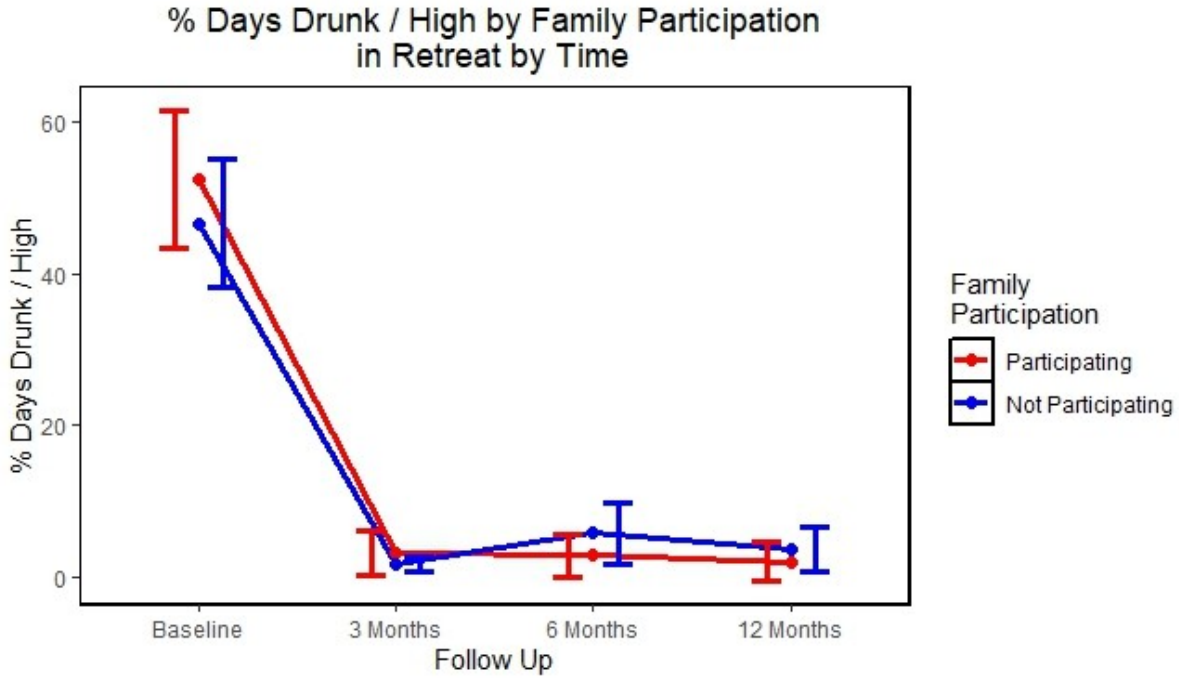


FIGURE 3.8.21: PERCENTAGE OF DAYS DRUNK / HIGH BY FAMILY SUPPORT

OVER TIME

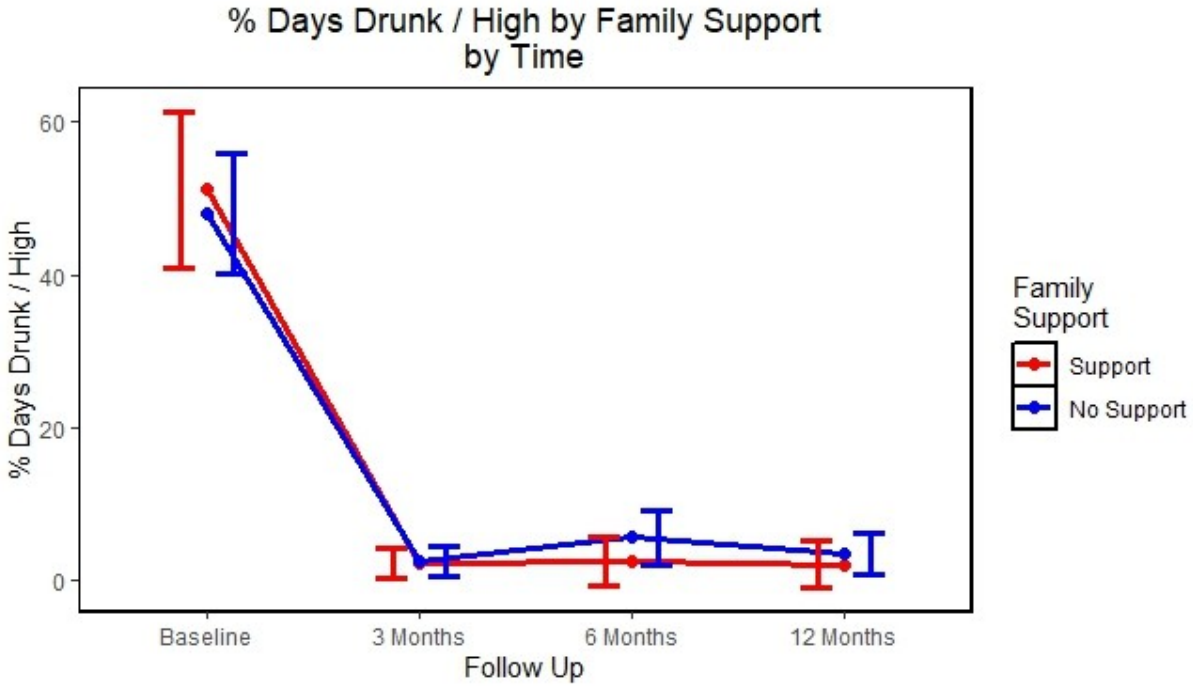
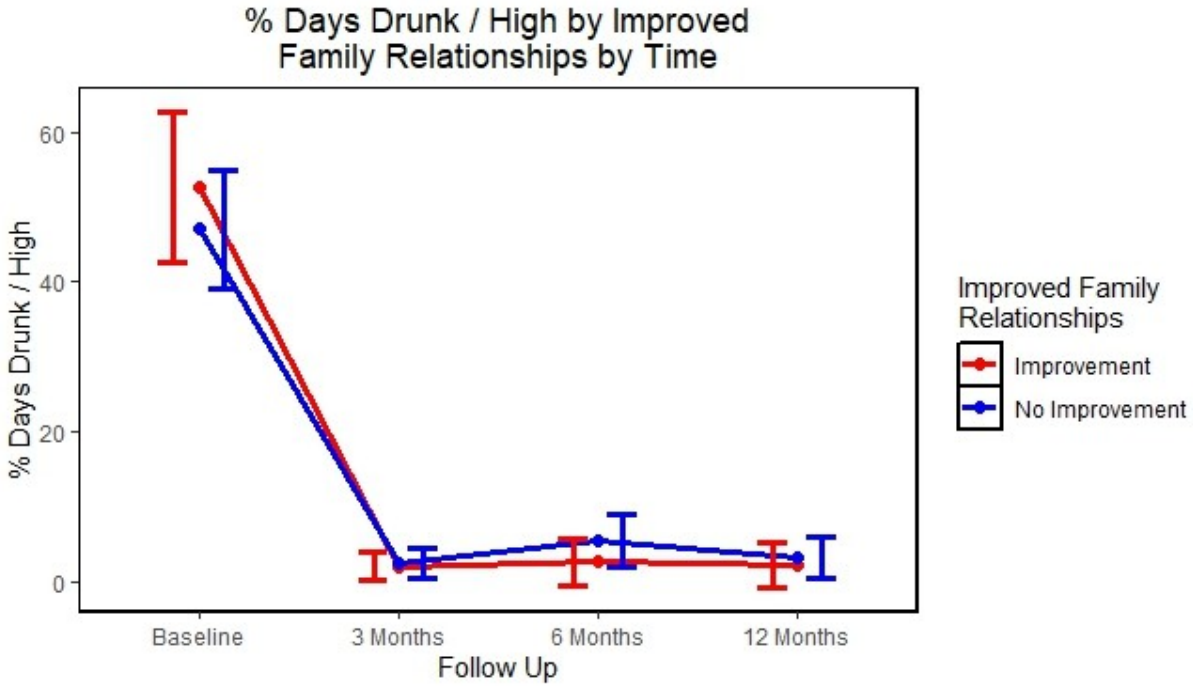


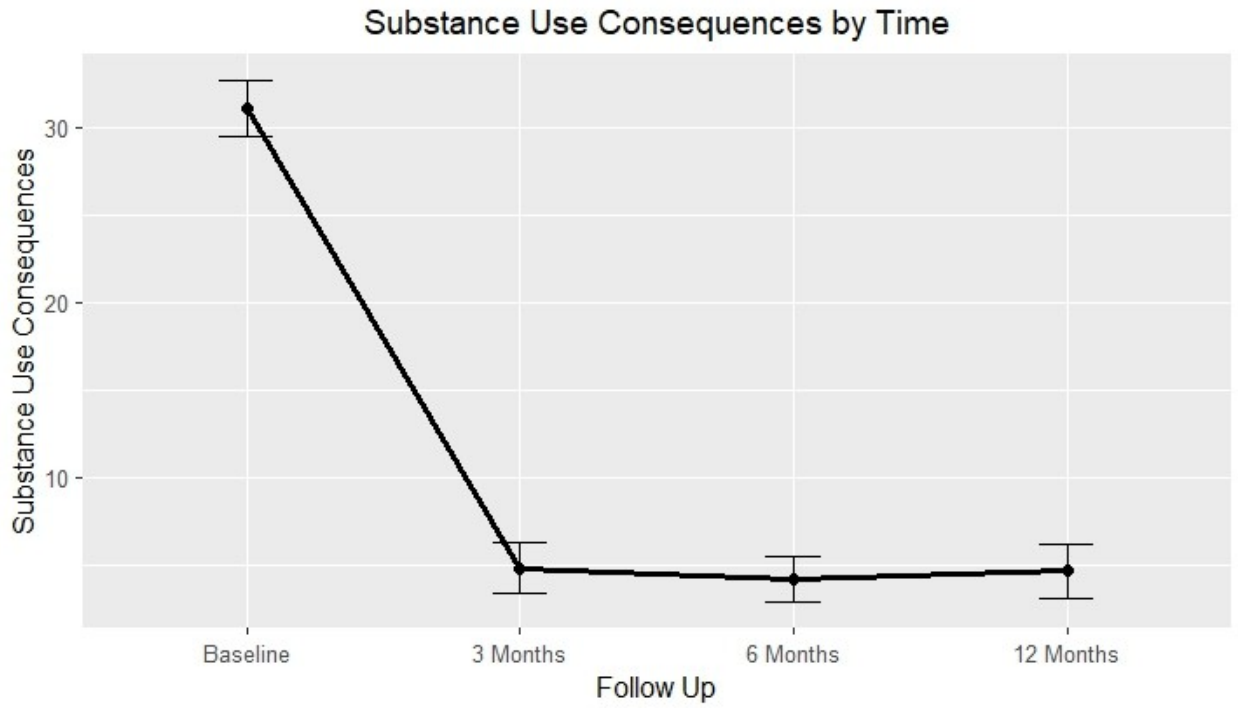
FIGURE 3.8.22: PERCENTAGE OF DAYS DRUNK / HIGH BY IMPROVED FAMILY RELATIONSHIPS OVER TIME



3.8. Alcohol and Other Drug Related Consequences

As shown in the table above and figure below, there was a significant decrease in alcohol and other drug related consequences, decreasing from 32.48 (SD = 9.34) at baseline to 9.54 (SD = 13.26) at 12-month follow up. This trend continued after controlling for predictors of dropout and other predictors of alcohol and other drug related consequences. For full details on statistical modeling, see Appendix 5.

Figure 3.8.23: Alcohol and Other Drug Related Consequences Across Time



As shown in the figures below, there is a potential interaction of primary substance whereby individuals who use alcohol have lower alcohol or other drug related consequences at 12-month follow up compared to individuals who use other substances (e.g., cocaine, marijuana, opioids, etc.,). There was an interaction of family participation at 12-month follow up whereby families who had another family member participating in the retreat program had lower substance use consequences that individuals who did not have another family member participating in the retreat program. There was an interaction of family support at 12-month follow up whereby individuals who had family members supportive of their recovery efforts had lower substance use consequences than individuals whose family members were not supportive of their recovery efforts. There was an interaction of improved family relationships at 12-month follow up whereby individuals who had improved family relationships had lower substance use consequences than participants who reported their relationship with family members did not improve. There were no observed differences in the trajectory of alcohol or other drug related consequences by age or gender.

FIGURE 3.8.24: ALCOHOL AND OTHER DRUG RELATED CONSEQUENCES BY AGE ACROSS TIME

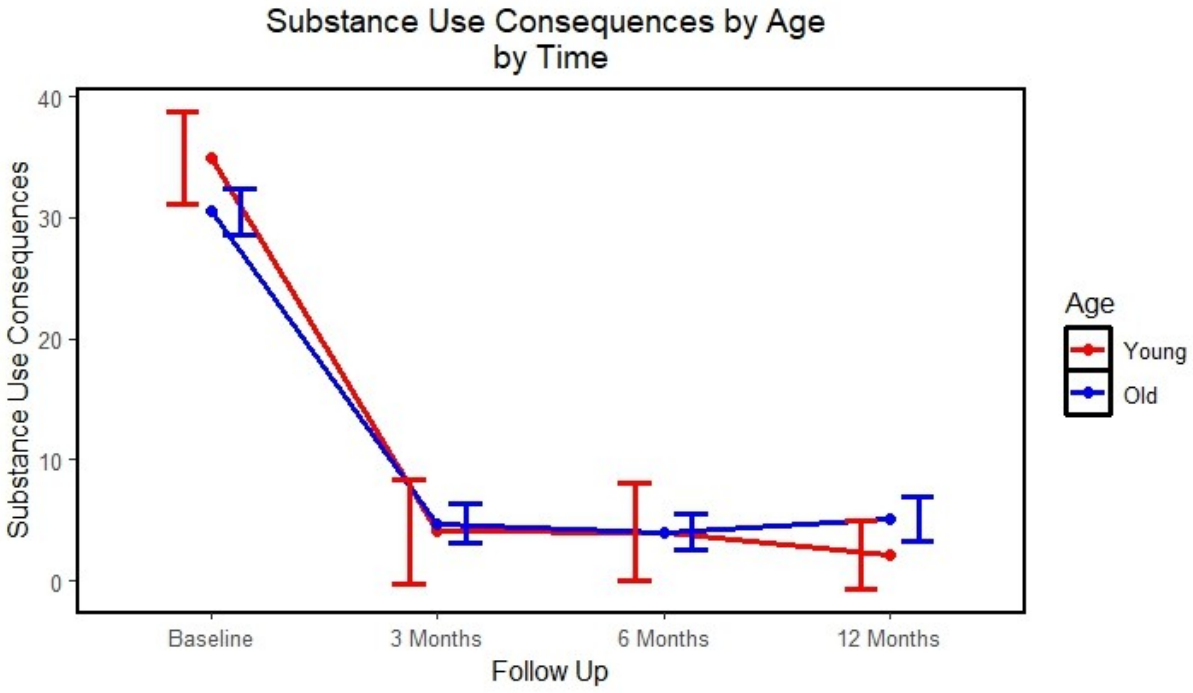


FIGURE 3.8.25: ALCOHOL AND OTHER DRUG RELATED CONSEQUENCES BY GENDER ACROSS TIME

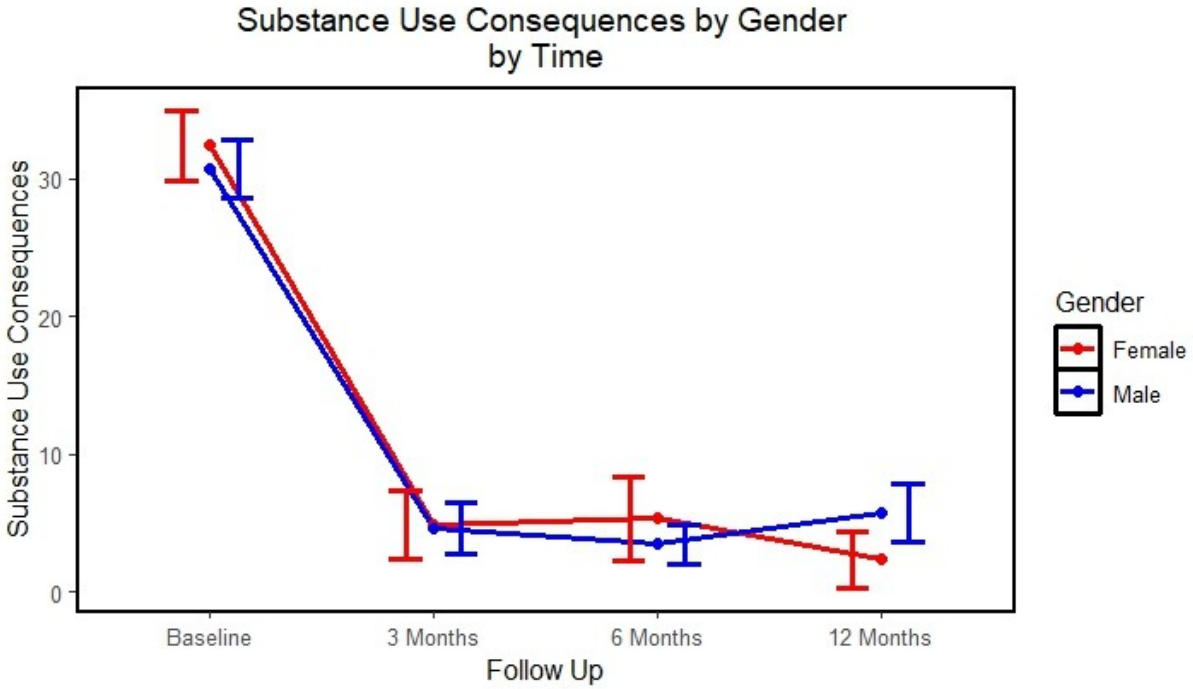


FIGURE 3.8.25: ALCOHOL AND OTHER DRUG CONSEQUENCES BY PRIMARY SUBSTANCE ACROSS TIME

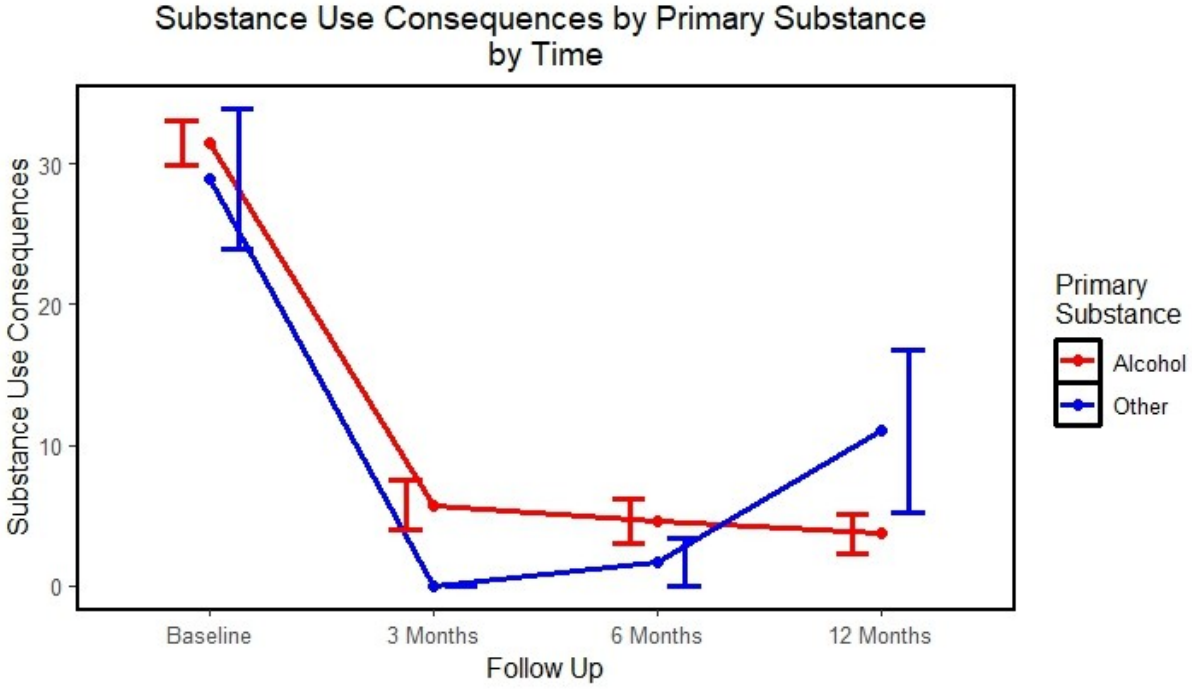


FIGURE 3.8.26: ALCOHOL AND OTHER DRUG CONSEQUENCES BY FAMILY PARTICIPATION IN RETREAT ACROSS TIME

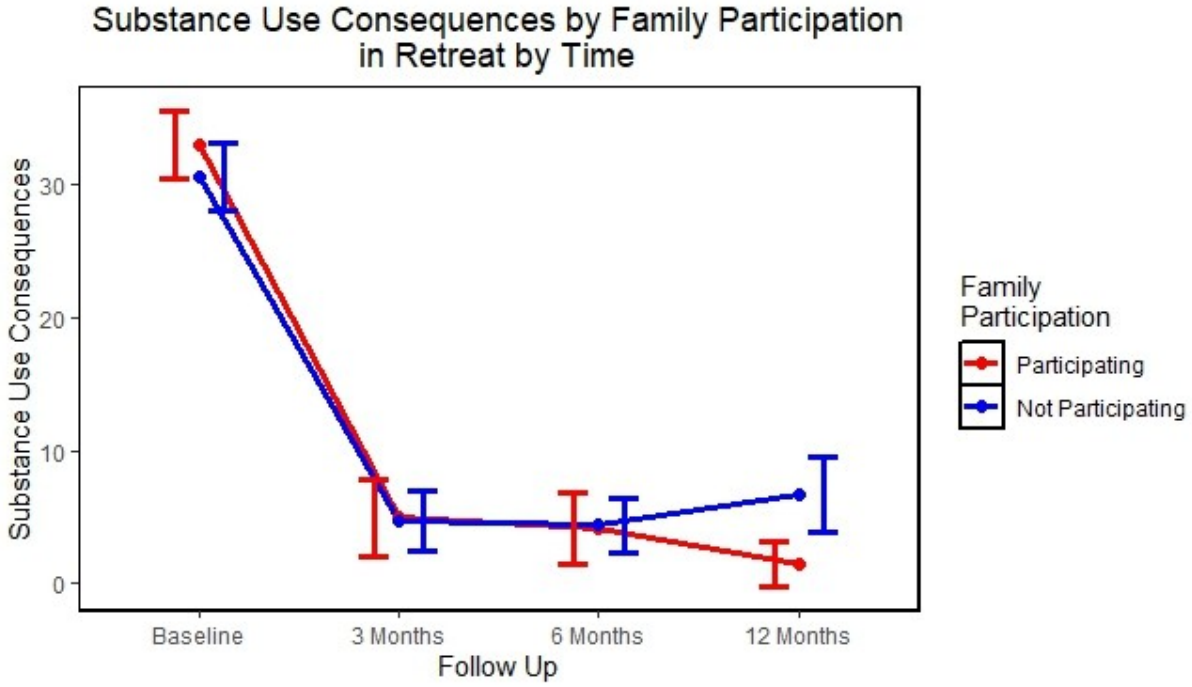


FIGURE 3.8.27: ALCOHOL AND OTHER DRUG CONSEQUENCES BY FAMILY SUPPORT ACROSS TIME

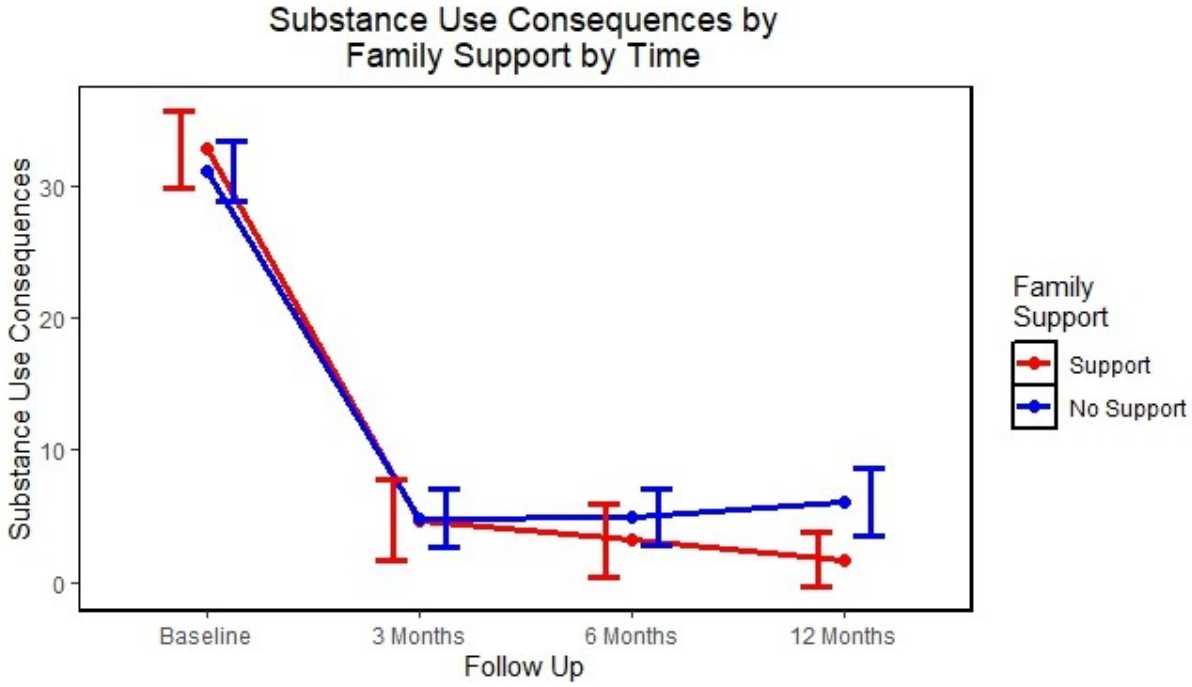
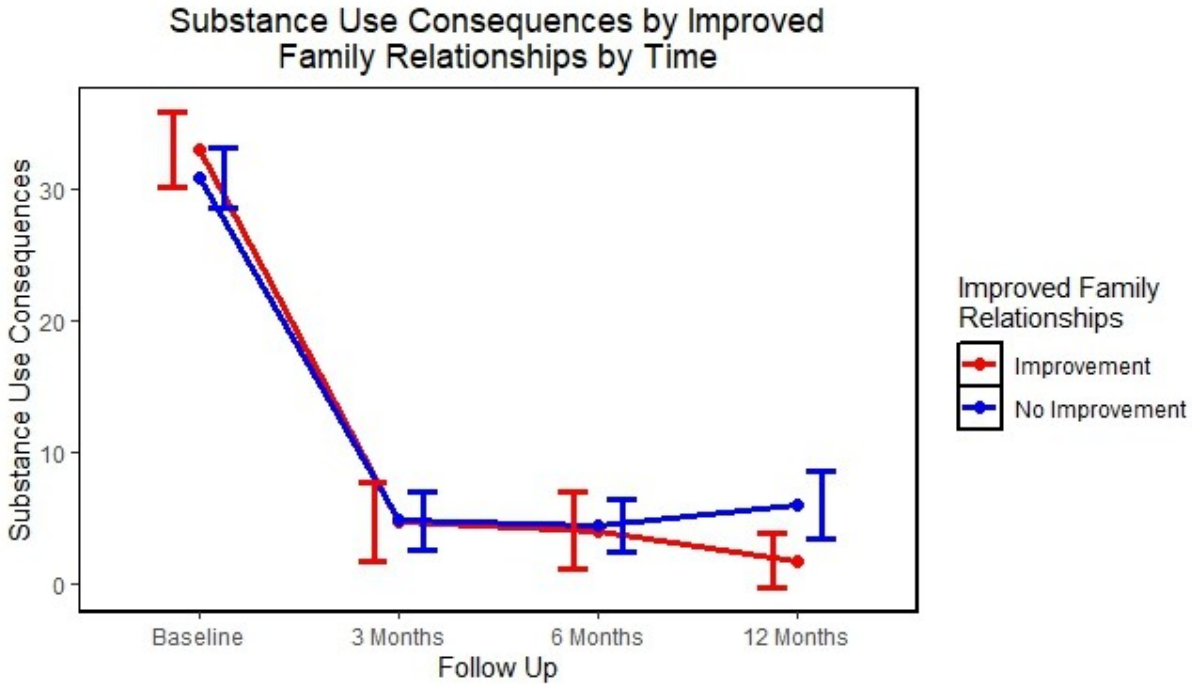


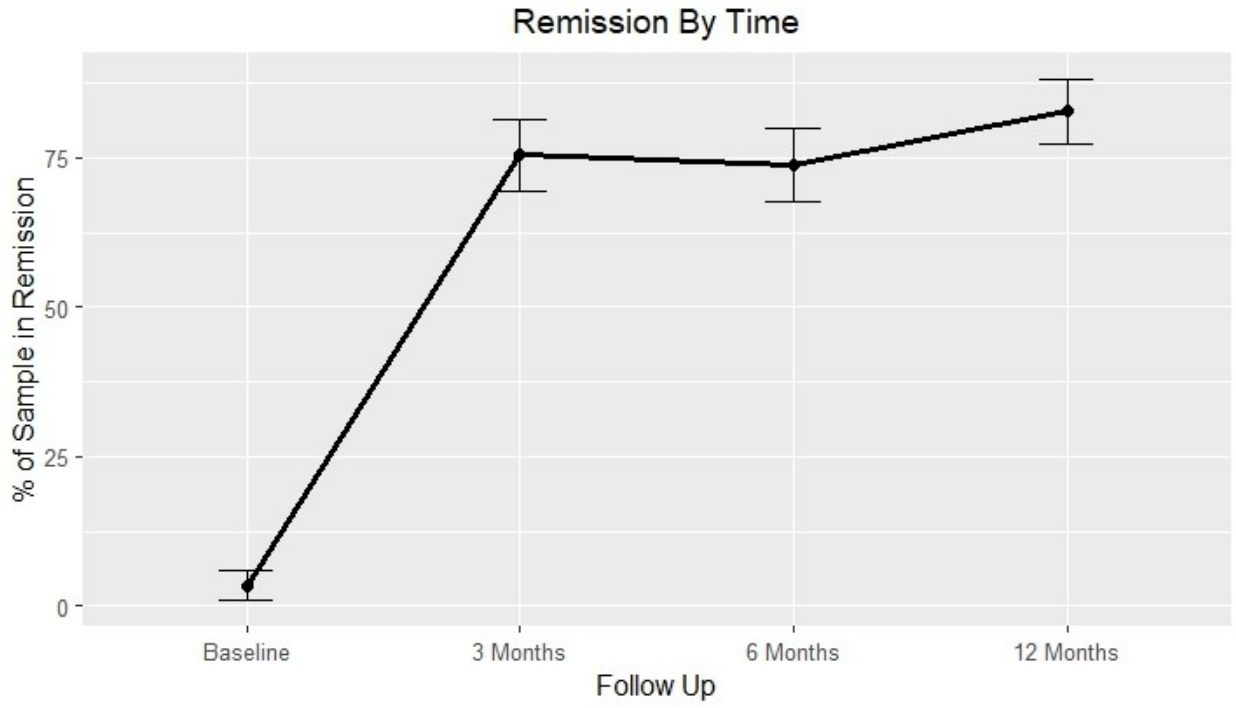
FIGURE 3.8.28: ALCOHOL AND OTHER DRUG CONSEQUENCES BY IMPROVED FAMILY RELATIONSHIPS ACROSS TIME



3.8. Remission Status

As shown in the table above and figure below, there was a significant increase in remission status, increasing from 3.40% at baseline to 82.76% at 12-month follow up. This trend continued after controlling for predictors of dropout and other predictors of remission. For full details on statistical modeling, see Appendix 5.

Figure 3.8.29. Remission Status Across Time



The following section will focus specifically on evaluating changes in quality of life and well-being outcomes (e.g., quality of life, happiness, self-esteem, psychological distress, etc.,) across the course of the study.

3.9. Quality of Life and Functioning and Well-Being Related Outcomes Across Time

The table below presents quality of life and functioning as well as well-being related outcomes across time. The percent of individuals who were employed (either part time or full time), increased from baseline (67.44%) to 12-month follow up (75.73%). In terms of indices of quality of life and functioning, and psychological well-being, there were positive trends observed over time. Specifically, happiness increased from 5.59 (SD = 2.07) at baseline to 7.19 (1.73) at 12-month follow up. Self-esteem increased from 5.21 (SD = 2.34) at baseline to 6.97 (SD = 2.01) at 12-month follow up. Quality of life increased from 25.75 (SD = 6.29) at baseline to 30.23 (SD = 5.93) at 12-month follow up. Psychological distress decreased from 11.22 (SD = 5.10) at baseline to 6.12 (4.95) at 12-month follow up. Emotional Support increased from 32.40 (SD = 7.52) at baseline to 35.63 (SD = 6.25) at 12-month follow up. Recovery capital increased from 47.96 (SD = 7.56) to 50.08 (SD = 6.42) at 3-month follow up, then decreased slightly to 49.30 (SD = 8.98) by 12-month follow up.

Table 3.9: Quality of Life and Functioning and Well-Being Related Outcomes

	Baseline	3 Months	6 Months	12 Months
	% (N)	**% (N)**	**% (N)**	**% (N)**
Employment (% Yes)[1]				
Employed: Full-Time	54.65 (94)	-	-	53.40 (55)
Employed: Occasional Work	1.74 (3)	-	-	3.88 (4)
Employed: Part-Time	11.05 (19)	-	-	18.45 (19)
Unemployed	32.56 (56)	-	-	24.27 (25)
Employment (FT or PT)[1]	67.44% (116)	-	-	75.73% (78)
	M (SD)	**M (SD)**	**M (SD)**	**M (SD)**
Happiness	5.59 (2.07)	6.79 (1.75)	6.92 (1.84)	7.19 (1.73)
Self-Esteem	5.21 (2.34)	6.41 (2.19)	6.83 (2.11)	6.97 (2.01)
Quality of Life	25.75 (6.29)	29.52 (5.5)	29.46 (5.49)	30.23 (5.93)
Life Satisfaction	4.11 (1.72)	5.05 (1.43)	5.07 (1.48)	5.18 (1.41)
Recovery Capital	47.96 (7.56)	50.08 (6.42)	50.56 (7.08)	49.30 (8.98)
Emotional Support [1]	32.40 (7.52)	-	-	35.63 (6.25)

Psychological Distress	11.22 (5.10)	6.77 (4.52)	6.08 (4.53)	6.12 (4.95)

Happiness scored on a 10-point Likert scale anchored at 1 (Completely Unhappy) and 10 (Completely Happy).
Self-Esteem scored on a 10-point Likert scale anchored at 1 and 10 with higher scores reflecting higher degrees of self-esteem.
Life Satisfaction scored on a 7-point Likert scale anchored at 1 and 7 with higher scores reflecting higher satisfaction with life.
1 denotes variable not collected at 3-month or 6-month follow up

3.9 Quality of Life

As shown in the table above and figure below, there was a significant increase in quality of life, increasing from 25.75 (SD = 6.29) at baseline to 0.23 (SD = 5.93) at 12-month follow up. This trend continued after controlling for predictors of dropout and other predictors of quality of life. For full details on statistical modeling, see Appendix 5.

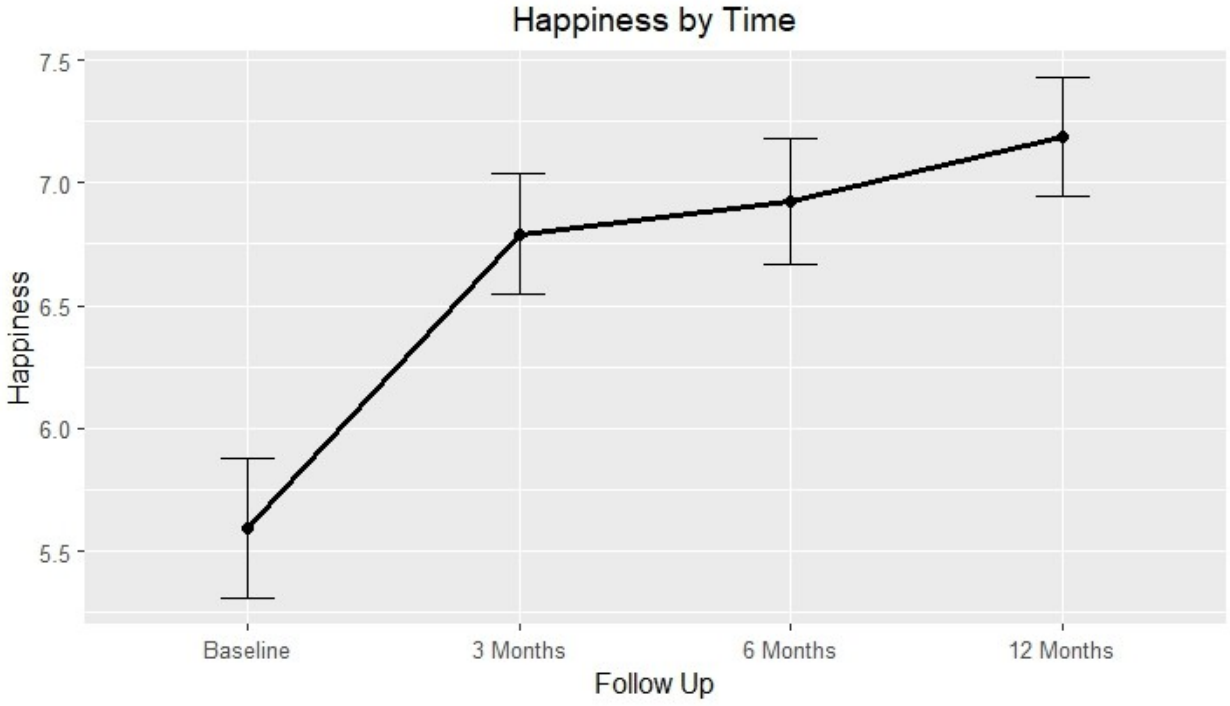
Figure 3.9.1: Quality of Life Across Time



3.9. HAPPINESS

As shown in the table above and figure below there was a significant increase in happiness, increasing from 5.59 (SD = 2.07) at baseline to 7.19 (SD = 1.73) at 12-month follow up. This trend continued after controlling for predictors of dropout and other predictors of happiness. For full details on statistical modeling, see Appendix 5.

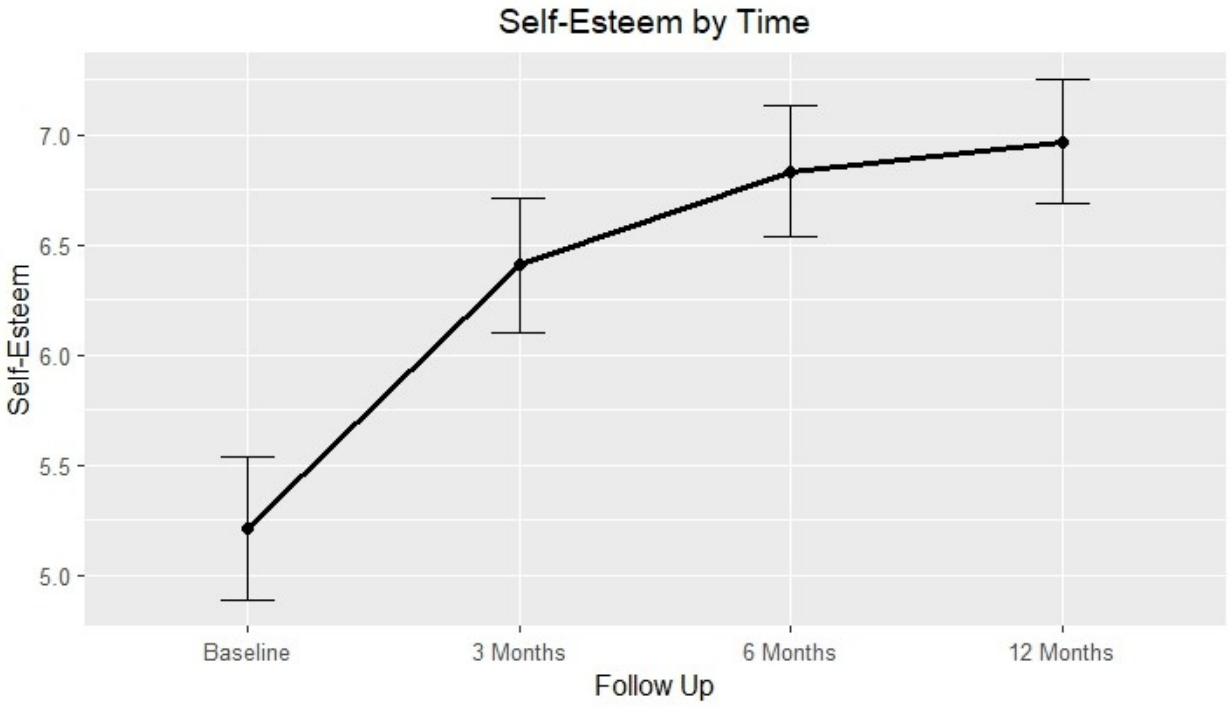
FIGURE 3.9.2: HAPPINESS ACROSS TIME



3.9. SELF-ESTEEM

As shown in the table above and figure below, there was a significant increase in self-esteem, increasing from 5.21 (SD = 2.34) at baseline to 6.97 (SD = 2.01) at 12-month follow up. This trend continued after controlling for predictors of dropout and other predictors of self-esteem. For full details on statistical modeling, see Appendix 5.

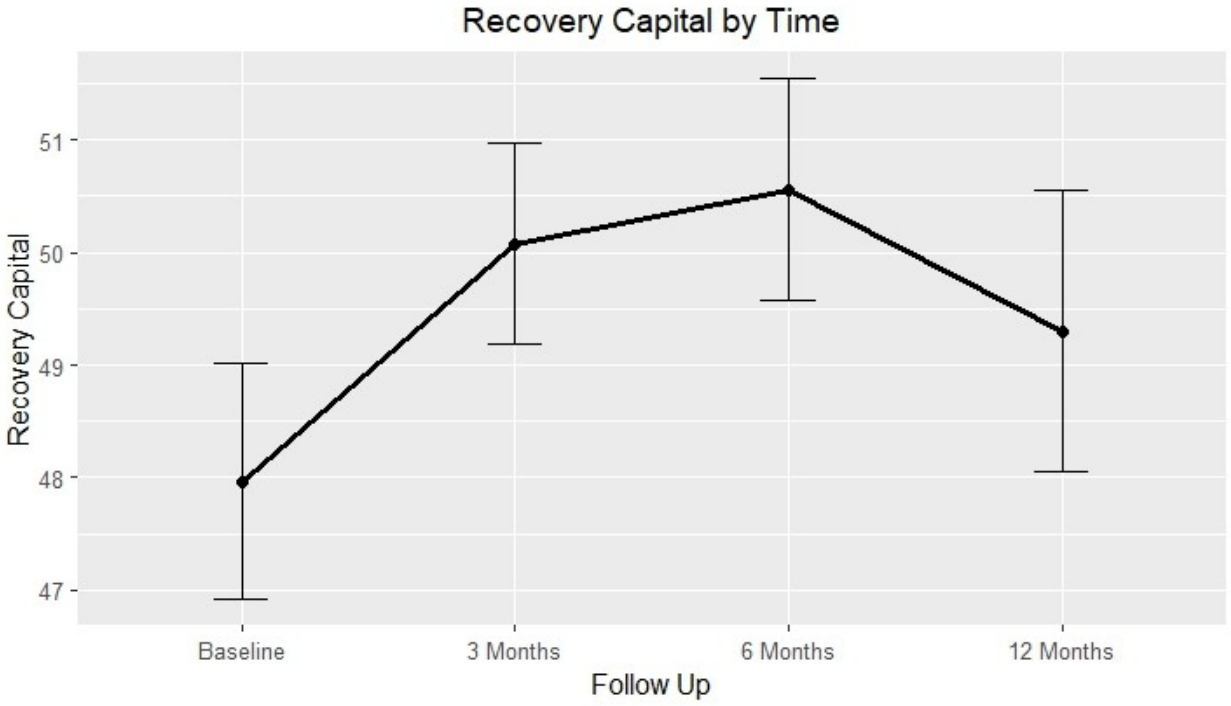
FIGURE 3.9.3: SELF-ESTEEM ACROSS TIME



3.9 Recovery Capital

As shown in the table above and figure below, there was a significant increase in recovery capital from baseline (M = 47.96, SD = 7.56) to 3-month follow up (M = 50.08, SD = 6.42) and later decreasing slightly at the 12-month follow up (M = 49.3, SD = 8.98). These data suggest a potential nonlinear, specifically quadratic, change in recovery capital over the duration of the study. To test this possibility, we modeled time as both linear and quadratic. There was a significant linear increase in recovery capital over time. Interestingly, there was a significant quadratic change in recovery capital suggesting a potential for individuals to return to baseline levels at some point after 12-months following the conclusion of the study, although these effects should be taken with a healthy degree of skepticism given the exploratory nature of the present study. Comparison of effect size estimates suggest a stronger linear increase in recovery capital across time compared to a quadratic increase then decrease in recovery capital across time. Change in recovery capital over time remained consistent after controlling for dropout and other predictors of recovery capital. For full details on statistical modeling, see Appendix 5.

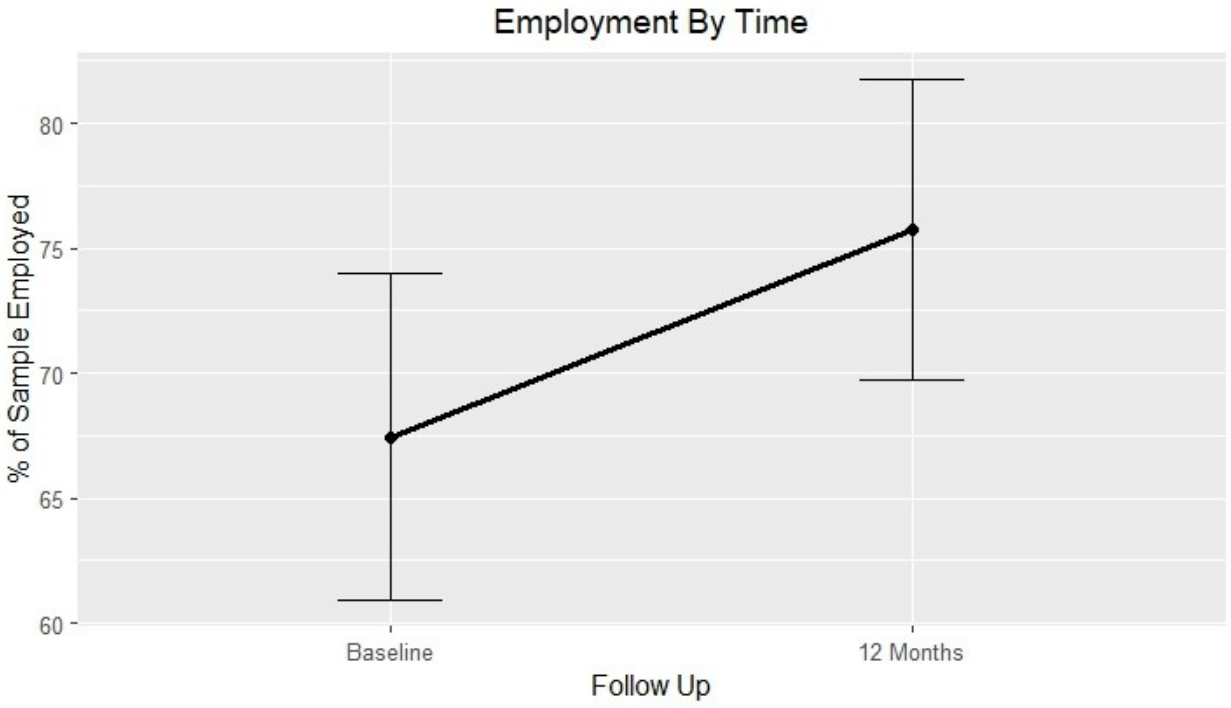
Figure 3.9.4: Recovery Capital Across Time



3.9. Employment Status

As shown in the table above and figure below, there was a significant increase in employment, increasing from 67.44% at baseline to 75.73% at 12-month follow up. This trend continued after controlling for predictors of dropout and other predictors of employment. For full details on statistical modeling, see Appendix 5.

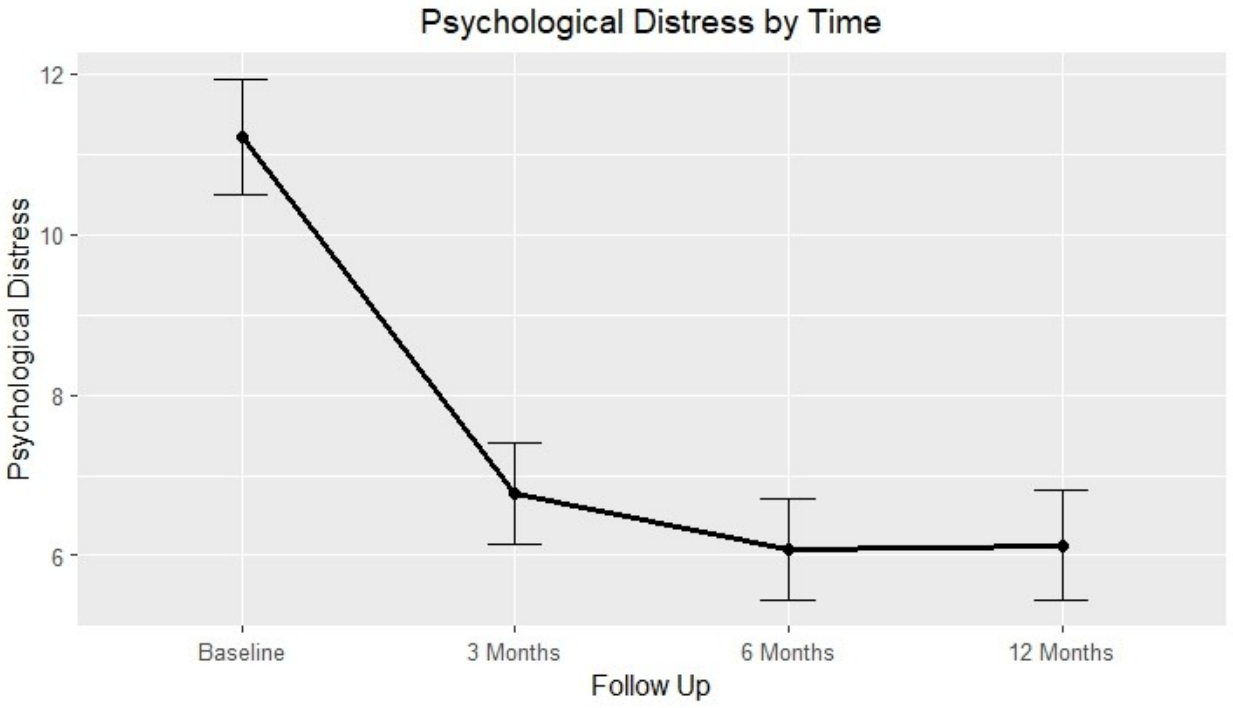
Figure 3.9.5: Employment Status Across Time



3.9. PSYCHOLOGICAL DISTRESS

As shown in the table above and figure below, there was a significant decrease in psychological distress, decreasing from 11.22 (SD = 5.10) at Baseline to 6.12 (SD = 4.95) at 12-month follow up. This trend continued after controlling for predictors of dropout and other predictors of psychological distress. For full details on statistical modeling, see Appendix 5.

FIGURE 3.9.6: PSYCHOLOGICAL DISTRESS ACROSS TIME



The following section will focus specifically on evaluating changes in mutual help involvement focusing on specifically the types of services used as well as the extent to which specific services are utilized across the course of the study.

3.10 Mutual-Help Related Outcomes across Time

As shown in the table below, in terms of the different types of recovery support services use, participants tended to prefer attending AA as is consistent with Retreat program goals and in relation to their primary substance (alcohol). The percentage of individuals attending AA increased from baseline (57.77%) to 3-month follow up (98.56%), then remained constant for the remainder of the study. With respect to meetings attended, the number of AA meetings increased from baseline (M = 12.93, SD = 19.41) to 3-month follow up (M = 51.59, SD = 24.26), then slowly decreased for the remainder of the study though did not return to baseline levels.

As anticipated, given the primary drug profiles of the study participants, a large proportion of the sample reported utilizing AA (57.77% at baseline) with a much smaller proportion using NA (3.4% at baseline). Other MHO groups (e.g., CMA, DDA, SMART, LifeRing, Celebrate Recovery) were seldom used at all. The percentage of participants attending AA use increases considerably at follow-up.

With respect to degree of MHO involvement, using a sum of eight dichotomously coded (yes/no) items measuring degrees of AA involvement (e.g., has a sponsor, contact a sponsor/other members outside of meetings; read AA literatures outside of meetings; verbally participated during meetings etc.), involvement was shown to increase considerably from baseline (M = 3.96, SD = 2.93) to follow up (3 months M = 7.07, SD = 1.45). NA involvement remained relatively low throughout the study. Other MHO involvement levels (CA, CMA, DDA, etc.,) were not reported due to the low percentage of involvement observed above and therefore low degree of involvement. For full details on MHO involvement across time, see Appendix 4.



TABLE 3.10: MUTAL-HELP RELATED OUTCOMES

	Baseline	3 Months	6 Months	12 Months
Average Number of Meetings Attended Past 90 Days	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**
AA In Person [T]	12.36 (18.89)	47.69 (24.35)	30.19 (23.71)	24.97 (23.05)
AA Remote [T]	0.56 (2.58)	3.90 (10.35)	4.4 (14.11)	5.52 (17.22)
AA Total [T]	12.93 (19.41)	51.59 (24.26)	34.59 (24.98)	30.49 (28.43)
SMART In Person [T]	0.04 (0.56)	0.09 (1.10)	0.00 (0.00)	0.00 (0.00)
SMART Remote [T]	0.00 (0.00)	0.02 (0.25)	0.00 (0.00)	0.02 (0.18)
SMART Total [T]	0.04 (0.56)	0.12 (1.13)	0.00 (0.00)	0.02 (0.18)
Other MHO In Person [T]	0.65 (5.66)	0.88 (4.10)	0.84 (2.91)	0.68 (3.02)
Other MHO Remote [T]	0.17 (1.74)	0.61 (6.11)	0.15 (1.21)	0.02 (0.13)
Other MHO Total [T]	0.82 (5.90)	1.50 (7.29)	0.98 (3.11)	0.69 (3.04)
% of Sample Attending Meetings in Past 90 Days	**% (N)**	**% (N)**	**% (N)**	**% (N)**
% Attending AA [R]	57.77% (119)	98.56% (137)	90.16% (110)	82.76% (96)
% Attending CA [R]	0.00% (0)	0.00% (0)	0.00% (0)	0.00% (0)
% Attending CMA [R]	0.97% (2)	0.00% (0)	0.82% (1)	0.00% (0)
% Attending DDA [R]	0.49% (1)	0.00% (0)	0.00% (0)	0.00% (0)
% Attending MA [R]	0.00% (0)	0.72% (1)	0.00% (0)	0.00% (0)
% Attending NA [R]	3.40% (7)	5.76% (8)	3.28% (4)	2.59% (3)
% Attending SMART [R]	0.97% (2)	1.44% (2)	0.00% (0)	0.86% (1)
% Attending LifeRing [R]	0.00% (0)	0.00% (0)	0.82% (1)	0.86% (1)
% Attending Moderation Management [R]	0.00% (0)	0.00% (0)	0.00% (0)	0.00% (0)
% Attending Celebrate Recovery [R]	0.49% (1)	0.00% (0)	0.00% (0)	0.00% (0)
% Attending Women for Sobriety [R]	0.00% (0)	0.00% (0)	0.00% (0)	0.00% (0)
% Attending SOS [R]	0.00% (0)	0.00% (0)	0.00% (0)	0.00% (0)
MHO Involvement	**M (SD)**	**M (SD)**	**M (SD)**	**M (SD)**

AA Involvement	3.96 (2.93)	7.07 (1.45)	6.41 (2.42)	5.68 (2.97)
NA Involvement	0.22 (1.00)	0.29 (1.25)	0.19 (1.11)	0.14 (0.90)

[T] denotes determined via Timeline Followback, [R] denotes RSSTX redcap instrument
Total meeting attendance is the sum of all in person meetings and all remote meetings of the specified type.

The following section will focus specifically on evaluating changes in formal clinical service utilization (e.g., hospitalizations, inpatient treatments, outpatient treatments, detox treatments) focusing on specifically the types of services used as well as the extent to which specific services are utilized across the course of the study.

3.11 Formal Clinical Service Utilization

The table below presents formal clinical service utilization (e.g., hospitalizations, inpatient treatments, outpatient treatments, detox treatments) across time. Of note, use of emergency services such as emergency department (ED) visits went down substantially over time, with the proportion reporting any ED visits dropping by over 75% from baseline to the 12-month follow up. Likewise, the percentage of the sample who utilized SUD overnight treatment decreased by over 75% from baseline to 12 months follow with the average number of days decreasing from 2 days to less than 1 day. The percent of the sample who used any SUD or mental health service decreased by over one-third from baseline to 12 months follow up. Detox treatments decreased by 88% from baseline to 12 months while inpatient treatments decreased by 80% during that same period. As expected, the use of sober living environments increased - doubling from baseline to the 12-month follow up. This pattern of large reductions in these more intensive and expensive medically managed or supervised settings was similar across the variety of settings.

Table 3.11: Formal Clinical Service Utilization

	Baseline % (N)	3 Months % (N)	6 Months % (N)	12 Months % (N)
% ER Visits [1]	47.57% (98)	14.39% (20)	17.21% (21)	11.21% (13)
% Hospital Admission (for any reason) [1]	37.86% (78)	12.95% (18)	10.92% (13)	11.21% (13)
% Hospitalization Overnight (for any reason) [1]	33.98% (70)	12.23% (17)	9.24% (11)	7.76% (9)
% SUD Overnight [1]	11.65% (24)	6.47% (9)	1.68% (2)	0.86% (1)
Days Using SUD/MH Services M (SD)	10.69 (16.62)	24.67 (21.76)	10.98 (17.5)	5.48 (8.8)
% Using Any SUD/MH Service	74.76% (154)	79.86% (111)	51.22% (63)	46.15% (54)
% Outpatient Treatment [1]	10.68% (22)	30.94% (43)	23.77% (29)	8.62% (10)
% Detox Treatment [1]	49.51% (102)	7.91% (11)	5.74% (7)	6.03% (7)
% Inpatient Treatment [1]	16.5% (34)	32.37% (45)	4.92% (6)	3.45% (4)
% Sober Living Environments [1]	9.22% (19)	40.29% (56)	34.43% (42)	19.83% (23)

[1] All items report past 90-day service utilization

The following section will focus specifically on evaluating changes in legal system involvement across the course of the study.

3.12 Legal System Involvement

The table below summarizes legal system involvement from baseline to 12-month follow up. The percentage of the sample arrested in the past 90 days decreased from 16.39% (N = 20) at baseline to 5.8% (N = 4) at 12-month follow up. Total number of arrests in the past 90 days decreased slightly from 0.20 (SD = 0.49) to 0.10 (SD = 0.46) at 12-month follow up.

Table 3.12: Legal System Involvement

	Baseline	12 Months
Total Arrests in Past 90 Days (M (SD)	0.20 (0.49)	0.10 (0.46)
% Arrests in Past 90 Days (% Yes) % (N)	16.39% (20)	5.8% (4)

Legal system involvement variables not administered at 3 month or 6 month follow up.

The following section will focus specifically on evaluating change in family involvement (i.e., family participation, family support, and improved family relationships) across the course of the study.

3.13 Family Involvement in the Retreat

As seen in the table and figures below, there were generally positive improvements in family participation in the Retreat, family support and improved family relationships. About 43% of participants reported that they had a family member who participated in the retreat program. This increased to 49% by 12-month follow up. About 36% of participants felt supported in their recovery by family members at 3-month follow up. This increased to 45% at 6-month follow up and decreased slightly to 43% by 12-month follow up. About 37% of participants noted their relationship with family has improved because of their participation in the Retreat program at 3-month follow up. This increased to 43% by 12-month follow up.

Table 3.13: Family Involvement, Support and Improved Relationships

	3 Months % (N)	6 Months % (N)	12 Months % (N)
Family Participant in Retreat (% Yes)	43.17% (60)	49.18% (60)	49.14% (57)
Family Support (% Yes)	35.97% (50)	45.45% (55)	43.1% (50)
Improved Family Relationships (% Yes)	36.69% (51)	44.26% (54)	44.83% (52)

Items not given at baseline

FIGURE 3.13.1: FAMILY PARTICIPATION IN RETREAT ACROSS TIME

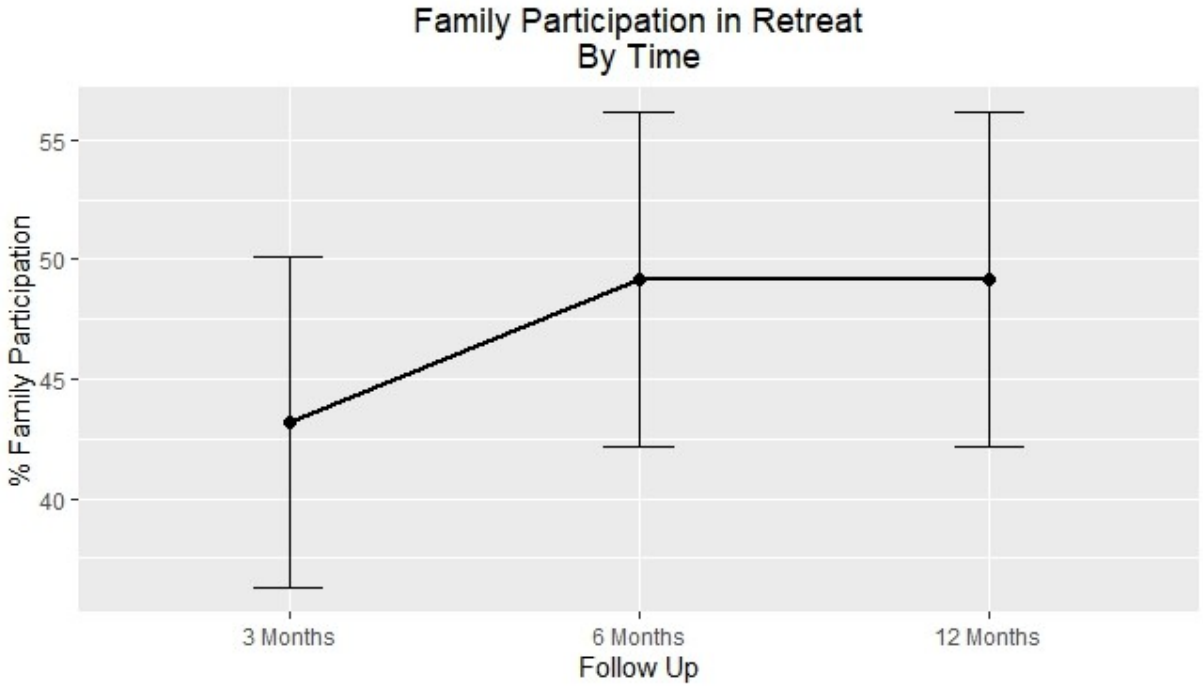


FIGURE 3.13.2: FAMILY SUPPORT ACROSS TIME

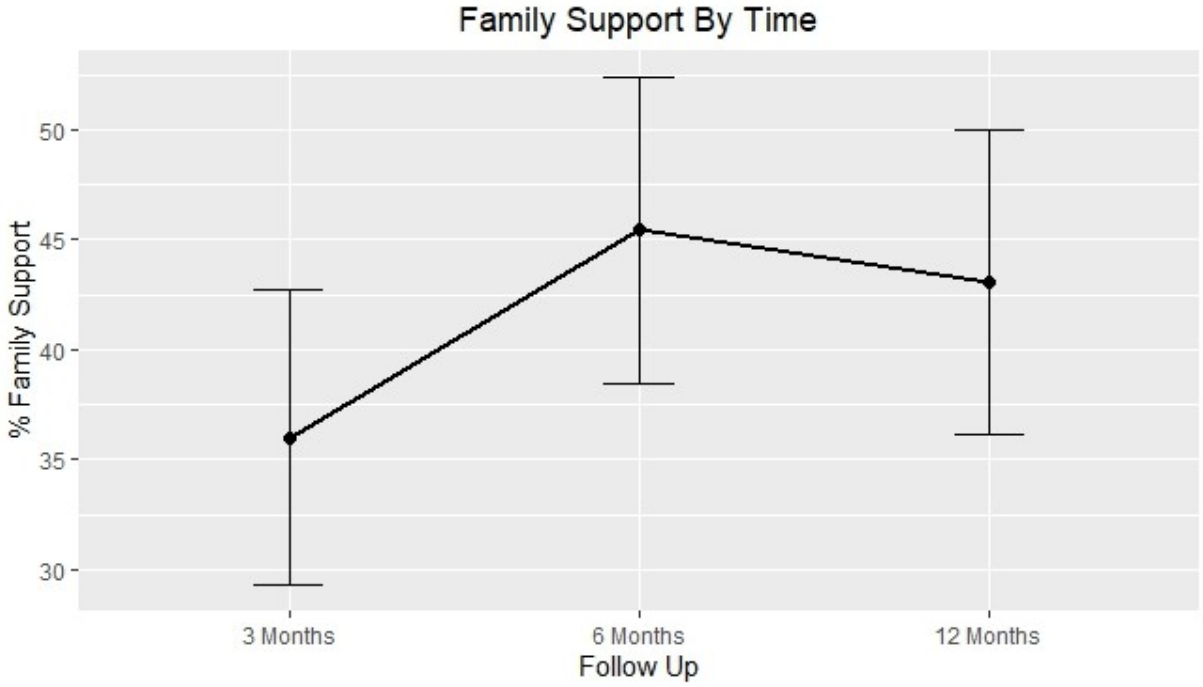
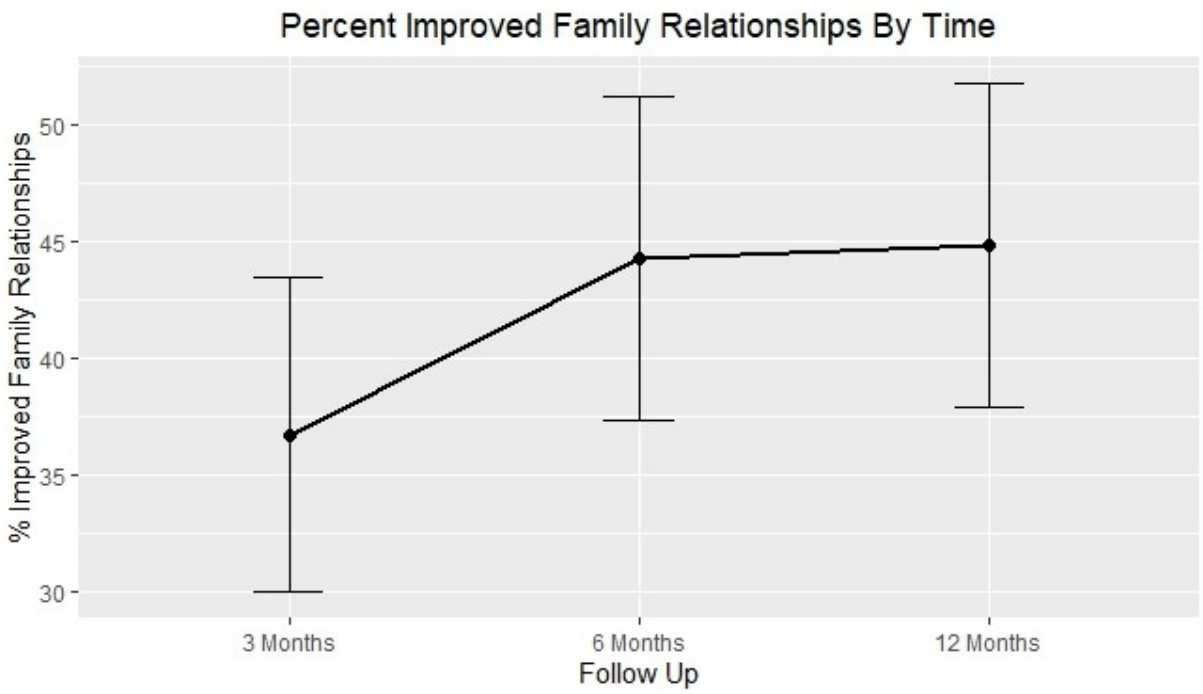


FIGURE 3.13.3: IMPROVED FAMILY RELATIONSHIPS ACROSS TIME


Percent Improved Family Relationships By Time
% Improved Family Relationships
50
45
40
35
30
3 Months
6 Months
12 Months
Follow Up

The following section will focus specifically on evaluating change in outcomes that occurred from baseline to mid-stay, and end of stay but prior to 3-month follow up.

3.14. During-Retreat Program Outcomes

In addition to outcomes measured at baseline, 3-month, 6-month, and 12-month follow up, several outcomes were measured at mid-stay and end of stay in order to assess response to treatment during service delivery in residential care. The table below displays descriptive statistics of these outcomes across mid-stay and end of stay, as well as reports effect sizes for changes in between baseline and end of stay. The following sections describe each outcome in detail.

Table 3.14: During- Retreat Program Outcomes Across Time

	Baseline (N = 206)	Mid-Stay (N = 128)	End of Stay (N = 173)	Cohen's d
Abstinence Self-Efficacy	58.56 (20.78)	-	73.26 (21.74)	-0.69
Commitment to Sobriety	27.38 (4.40)	-	27.23 (5.23)	0.03
Quality of Life	25.75 (6.29)	-	29.26 (5.18)	-0.61
Self-Esteem	5.21 (2.34)	-	6.50 (2.04)	-0.59
Happiness	5.59 (2.07)	-	6.75 (1.71)	-0.61
Satisfaction with Life	4.11 (1.72)	-	4.92 (1.37)	-0.52
Psychological Distress	11.22 (5.10)	7.79 (4.54)	7.04 (4.19)	0.90

Cohen's d computes effect size differences between baseline and end of stay
– denotes data was not collected at mid-stay.

3.14 During- Retreat Program Abstinence Self-Efficacy

As shown in the table above and the figure below, abstinence self-efficacy increased from approximately 58.56 (SD = 20.86) at baseline to 73.26 (SD = 21.74) by the end of stay suggesting a moderate positive improvement in abstinence self-efficacy (d= -.69; a moderate to large effect size).

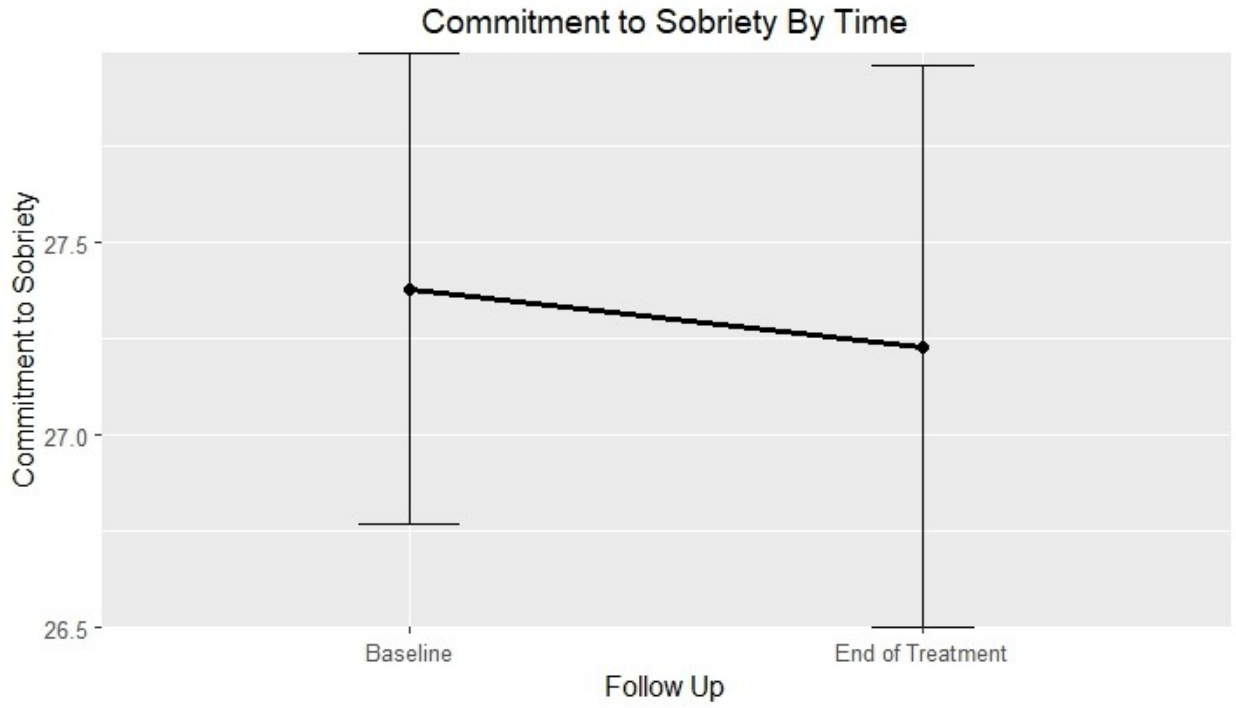
Figure 3.14.1: Abstinence Self-Efficacy from Baseline to End of RETREAT PROGRAM



3.14 During Retreat Program Commitment to Sobriety

As shown in the table above and the figure below, commitment to sobriety remained consistently high at about 27.38 (SD = 4.40) at baseline to 27.23 (SD = 5.23) by end of stay, suggesting an extremely low change in commitment to sobriety (d= 0.03; negligible effect).

Figure 3.14.2: Commitment to Sobriety from Baseline to end of Retreat Program



3.14. During Retreat Program Quality of Life

As shown in the table above and the figure below, quality of life increased from approximately 25.75 (SD = 6.29) at baseline to 29.26 (SD = 5.18) by the end of stay, suggesting a moderate increase in quality of life (d= -.61; a moderate effect size).

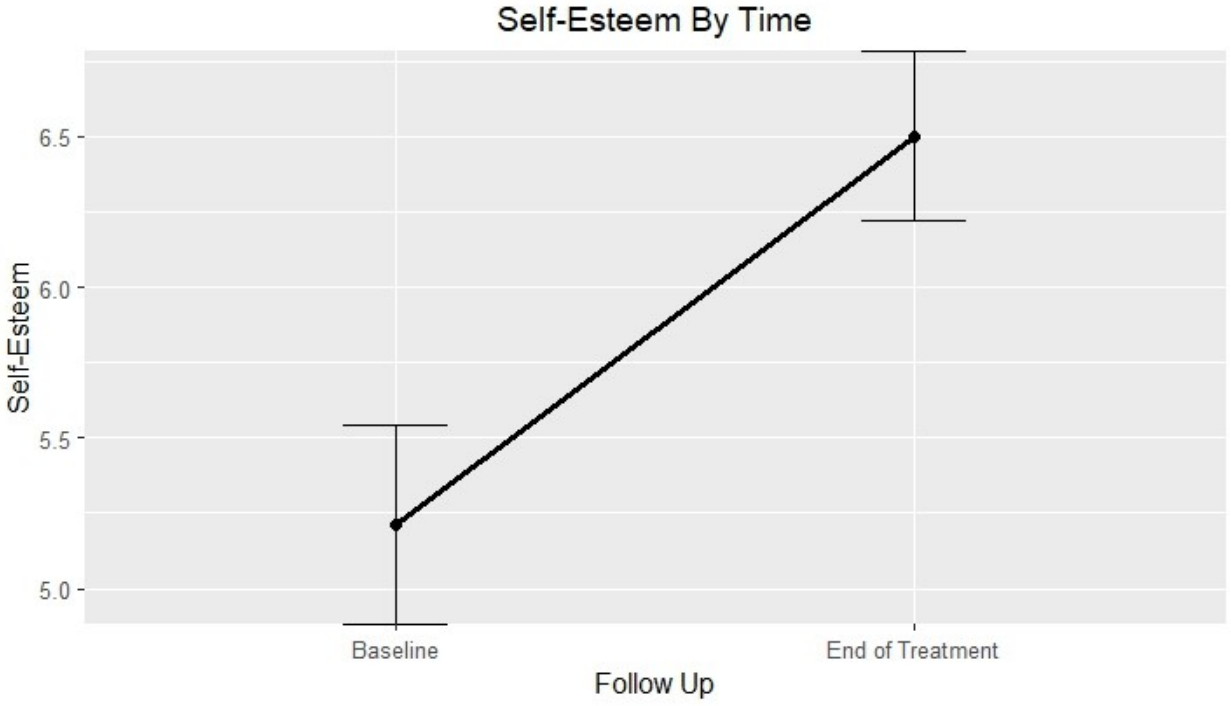
Figure 3.14.3: Quality of life from Baseline to End of Retreat Program



3.14. During Retreat Program Self-Esteem

As shown in the table above and the figure below, self-esteem increased from approximately 5.21 (SD = 2.34) at baseline to 6.50 (SD = 2.04) by the end of stay suggesting a moderate increase in self-esteem (d= -.59; a moderate effect size).

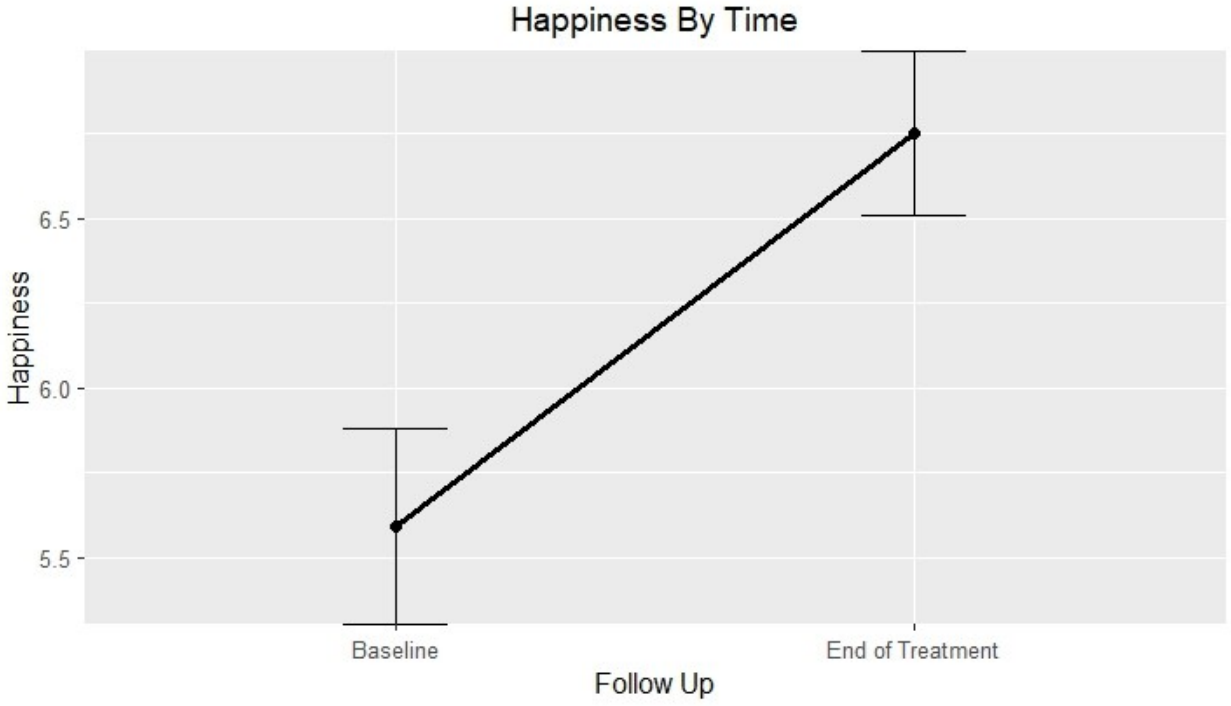
Figure 3.14.4: Self-Esteem from Baseline to End of Retreat Program



3.14. During Retreat Program Happiness

As shown in the table above and the figure below, happiness increased from approximately 5.59 (SD = 2.07) at baseline to 6.75 (SD = 1.71) by the end of stay, suggesting a moderate increase in happiness (d= -.61; a moderate effect size).

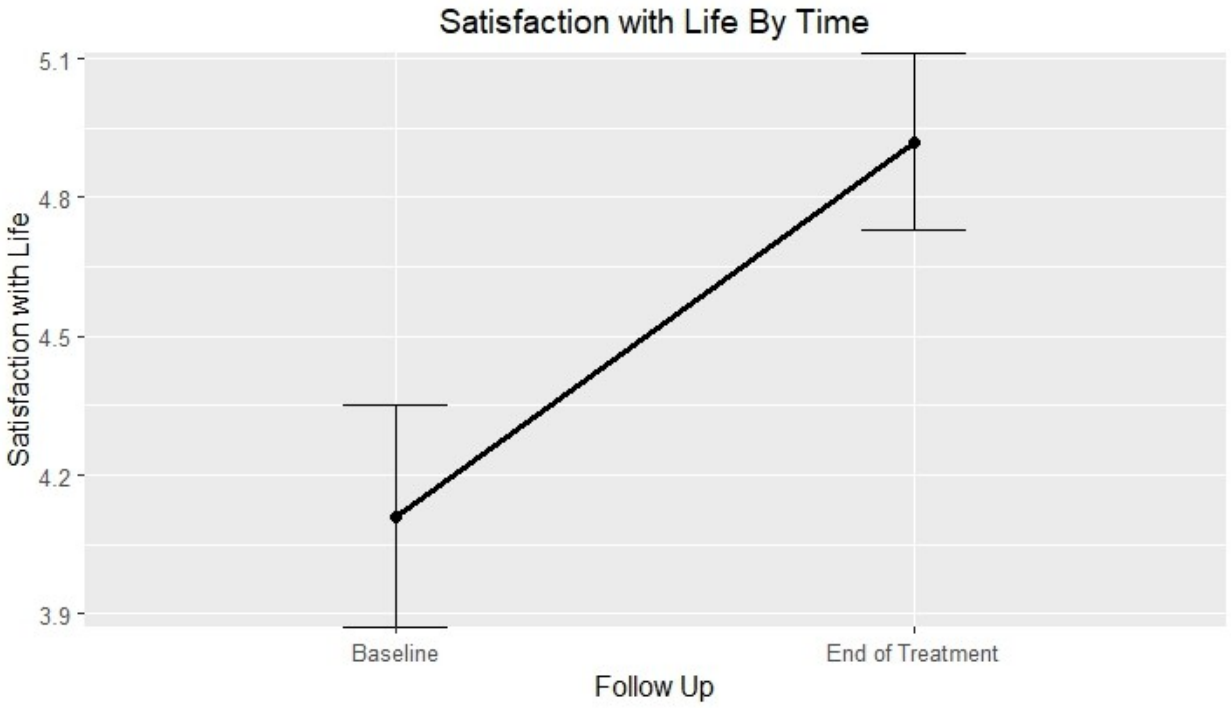
Figure 3.14.5: Happiness from Baseline to End of Retreat Program



3.14. During Retreat Program Satisfaction with Life

As shown in the table above and the figure below, satisfaction with life increased from 4.11 (SD = 1.72) at baseline to approximately 4.92 (SD = 1.37) by the end of stay, suggesting a moderate increase in satisfaction with life (d= -.52, a moderate effect size).

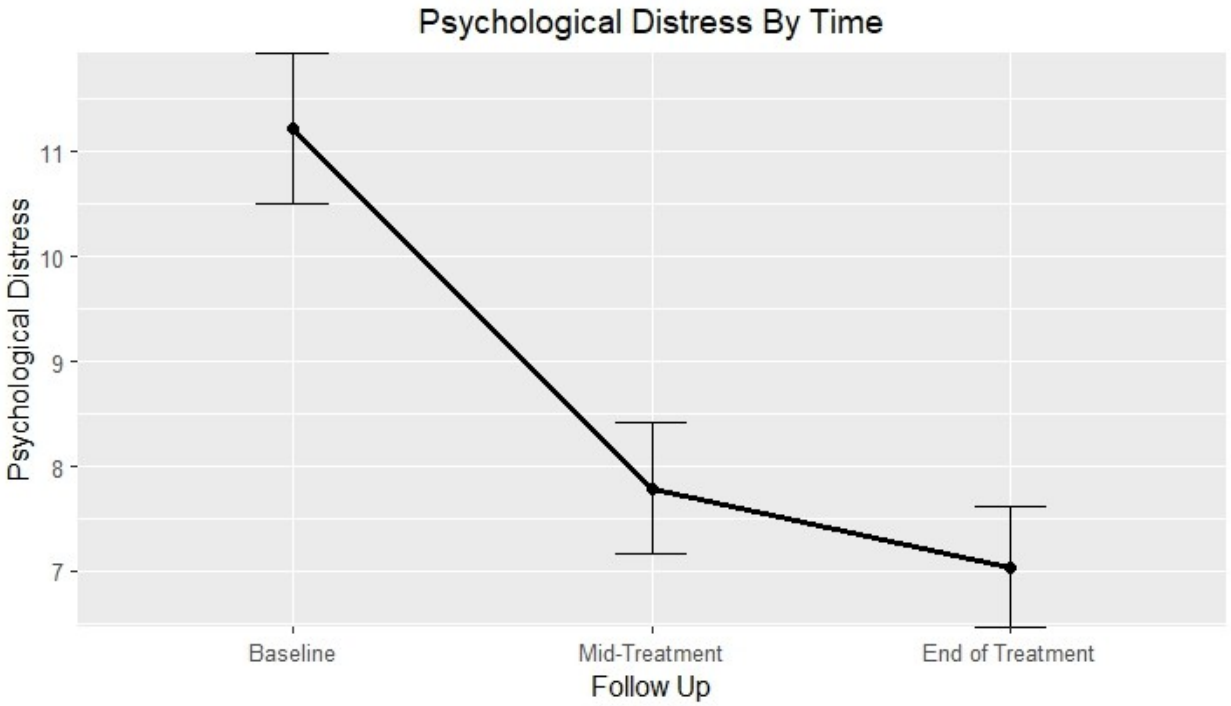
Figure 3.14.6: Satisfaction with Life from Baseline to End of Retreat Program



3.14. During Retreat Program Psychological Distress

As shown in the table above and the figure below, psychological distress decreased from 11.22 (SD = 5.1) at baseline to approximately 7.04 (SD = 4.19) by the end of stay, suggesting a large reduction in psychological distress (d= .90, a large effect size).

Figure 3.14.7: Psychological Distress from Baseline to End of Retreat Program



The following section will focus specifically on evaluating change in both 12-step and non-12-step volunteer activities, as well as activity engagement, alumni involvement, and app utilization from end of Retreat program participation to 12-month follow up.

3.15. Detailed Summary of 12-Step and Non-12-Step Volunteer Service Work, Sober Activity Engagement and Alumni Involvement

3.15. Summarization of 12-Step Specific Service Work

As shown in the table below, participant engaged in a variety of 12-step specific service work including but not limited to sponsoring new members, serving as treasurer, serving as secretary, and being responsible for meeting literature. Overall, participants tended to help members informally (69.9%), help set up / break down meetings (59.71%) and made coffee for meetings (33.5%). Participants would help members informally and help set up / break down meetings occasionally to a few times a week, whereas participants would make coffee for meetings occasionally. Engagement in volunteer activities generally decreased by 12 month-follow up.



TABLE 3.15: DETAILED SUMMARIZATION OF 12-STEP SPECIFIC SERVICE WORK

	End of Stay	3 Months	6 Months	12 Months
Sponsor new members				
M (SD)	1.29 (0.94)	1.11 (0.60)	1.11 (0.49)	1.29 (0.94)
% Involved (N)	1.94% (4)	2.43% (5)	3.40% (7)	5.34% (11)
Help new members informally				
M (SD)	2.53 (1.40)	2.83 (1.39)	2.61 (1.36)	2.53 (1.40)
% Involved (N)	69.90% (144)	53.40% (110)	43.20% (89)	36.89% (76)
Served as a greeter				
M (SD)	1.69 (1.12)	1.77 (1.27)	1.73 (1.13)	1.69 (1.12)
% Involved (N)	17.48% (36)	22.82% (47)	21.36% (44)	17.96% (37)
Made coffee for meetings				
M (SD)	1.55 (1.03)	1.66 (1.21)	1.53 (1.01)	1.55 (1.03)
% Involved (N)	33.50% (69)	19.90% (41)	16.5% (34)	14.56% (30)
Help set up / break down meetings				
M (SD)	2.28 (1.33)	2.49 (1.44)	2.49 (1.43)	2.28 (1.33)
% Involved (N)	59.71% (123)	43.69% (90)	36.89% (76)	31.55% (65)
Served as a treasurer				
M (SD)	1.16 (0.61)	1.10 (0.56)	1.10 (0.54)	1.16 (0.61)
% Involved (N)	0.97% (2)	2.43% (5)	2.43% (5)	3.88% (8)
Served as a secretary / chairperson				
M (SD)	1.27 (0.77)	1.31 (0.89)	1.43 (1.05)	1.27 (0.77)
% Involved (N)	2.43% (5)	8.25% (17)	10.68% (22)	6.80% (14)
Responsible for meeting literature				
M (SD)	1.57 (1.05)	1.55 (1.16)	1.43 (0.93)	1.57 (1.05)
% Involved (N)	19.90% (41)	14.56% (30)	13.59% (28)	14.56% (30)

Data not collected at baseline
Items scored on a 5-point Likert Scale (1 = Never, 2 = Occasionally, 3 = Several times a week, 4 = weekly, 5 = More than once a week)
Dichotomous items scored as Never (1) vs Occasionally (2) or more. % Occasionally or More reported



3.15. Summarization of Non-12-Step Volunteer Service Work

As shown in the table below, participant engaged in a variety of non-12-step service work including but not limited to transporting members to retreat, volunteering at community religious entities, and engagement in other unspecified volunteer activities (e.g., Retreat Buddy Program). Overall, participants would volunteer (43.30%) as well as volunteer at addiction and mental health facilities (16.5%). Participants would volunteer occasionally to a few times a week and volunteer at addiction and mental health agencies occasionally. Other volunteer activities were rarely engaged in. Engagement in volunteer activities generally decreased by 12-month follow up; however, a few notable excepts are worth highlighting. Transportation to the retreat increased from 2.91% at end of stay to 25.73% at 3-month follow up, then decreased slightly to 16.5% by 12-month follow up. Volunteering at community religious entities and social service entities increased slightly from end of stay to 12-month follow up, although these findings should be taken with a healthy degree of skepticism due to the low cell sizes.

Table 3.15: Detailed Summarization of Non-12-Step Volunteer Service Work

	End of Stay	3 Months	6 Months	12 Months
Volunteer				
M (SD)	2.31 (1.28)	2.04 (1.31)	2.23 (1.24)	2.31 (1.28)
% Involved (N)	43.2% (89)	34.47% (71)	36.89% (76)	33.98% (70)
Transportation to retreat				
M (SD)	1.6 (1.12)	1.83 (1.28)	1.7 (1.19)	1.6 (1.12)
% Involved (N)	2.91% (6)	25.73% (53)	19.9% (41)	16.5% (34)
Volunteered at community religious entities				
M (SD)	1.22 (0.73)	1.14 (0.62)	1.15 (0.51)	1.22 (0.73)
% Involved (N)	0.49% (1)	3.88% (8)	5.83% (12)	5.34% (11)
Volunteered for social services agencies				
M (SD)	1.22 (0.63)	1.22 (0.81)	1.24 (0.81)	1.22 (0.63)
% Involved (N)	0.97% (2)	5.83% (12)	5.34% (11)	7.28% (15)
Volunteered at healthcare agencies				
M (SD)	1.03 (0.21)	1.02 (0.15)	1.02 (0.18)	1.03 (0.21)
% Involved (N)	0% (0)	1.46% (3)	0.49% (1)	0.97% (2)
Volunteered at addiction and mental health agencies				
M (SD)	1.23 (0.69)	1.28 (0.81)	1.24 (0.74)	1.23 (0.69)
% Involved (N)	16.5% (34)	9.22% (19)	7.28% (15)	6.8% (14)



Other					
	M (SD)	1.34 (0.95)	1.14 (0.58)	1.14 (0.57)	1.34 (0.95)
	% Involved (N)	8.74% (18)	4.37% (9)	3.88% (8)	7.28% (15)

Data not collected at baseline
Items scored on a 5-point Likert Scale (1 = Never, 2 = Occasionally, 3 = Several times a week, 4 = weekly, 5 = More than once a week)
Dichotomous items scored as Never (1) vs Occasionally (2) or more. % Occasionally or More reported

3.15. Retreat Sober Activity Engagement and Alumni Association Involvement

Participants reported rarely engaging in organized recovery community activities in the past 90 days. In contrast, participants reported engaging in unorganized recovery activities in the past 90 days approximately once or twice a month on average. Both trends remained consistent throughout the 12-month follow up period (see table below).

Table 3.15: Types of Sober Activity Engagement Across Time

	3 Months M (SD)	6 Months M (SD)	12 Months M (SD)
Organized sober activity engagement	1.74 (1.07)	1.63 (1.12)	1.6 (1.03)
Unorganized sober activity engagement	3.05 (1.41)	2.98 (1.35)	2.97 (1.3)

Responses not collected at baseline
Items scored on a 5-point Likert Scale (1 = Never, 2 = Once or Twice, 3 = Once or Twice a Month, 4 = Weekly, 5 = Several Times a week)

3.15. Retreat Alumni "APP" and Other Retreat Contact and other Alumni Activities Across Time

Participants report contacting the retreat approximately once or twice on average in the past 90 days throughout the duration of the study. Similarly, participant report using the alumni app on average approximately once or twice a month to once or twice in the past 90 days immediately at 3-month follow up. Use of the alumni app slowly decreased throughout the study to approximately using the app approximately once or twice in the past 90 days. Participants reported that the retreat alumni activities were moderately helpful and decreased slightly throughout the course of the study (see table below).

Table 3.15: Retreat Alumni Activities Across Time

	3 Months M (SD)	6 Months M (SD)	12 Months M (SD)
Contact with Retreat activities and events[1]	2.07 (1.29)	2.01 (1.22)	1.73 (1.08)
Used alumni app[1]	2.60 (1.60)	2.22 (1.49)	1.87 (1.32)
Helpfulness	4.94 (3.00)	4.46 (3.17)	3.91 (3.08)

M (SD)
[1] denotes items scored on a 5-point Likert Scale (1 = Never, 2 = Once or Twice, 3 = Once or Twice a Month, 4 = Weekly, 5 = Several Times a week)
Helpfulness item scored on a 10-point Likert Scale anchored at 1 (not at all helpful) and 10 (extremely helpful).
Evaluation of Alumni activities was not conducted at baseline as individuals were actively involved in the Retreat and had not completed the program



4. DISCUSSION AND IMPLICATIONS

This single-group longitudinal evaluation of an adult residential alcohol and drug supportive-educational, community-based model of care program ("The Retreat") showed large, broad-based improvements across substance use, functioning/quality of life, recovery supports, and downstream service utilization over 12 months. Participants entered The Retreat with substantial disorder chronicity and clinical severity—approximately half their days involved being drunk/high and nearly half of days were heavy drinking days, accompanied by high substance-related consequences and marked interference in functioning. Severity of SUD was also consistently very high across the sample. Across follow-ups, outcomes improved substantially by 3 months and were largely sustained through 6 and 12 months, suggesting the program was associated with rapid stabilization and improvement followed by maintenance of gains over the ensuing year.

ALCOHOL AND DRUG OUTCOMES: ROBUST IMPROVEMENT WITH A NOTABLE HIGH-RISK SUBGROUP

Participants demonstrated striking increases in percent days abstinent (PDA) from alcohol (from ~51% baseline to ~97% at 12 months), steep declines in drinks per day and heavy drinking days (PHDD from ~47% to ~2%), and large reductions in substance use consequences. Remission status increased from 3.4% at baseline to 82.8% at 12 months. In addition, the proportion achieving *complete* alcohol abstinence (100% PDA) rose from 4.4% baseline to 76.1% by 12 months, and full abstinence from alcohol/drugs increased to 82.8% at 12 months.

At the same time, results point to meaningful heterogeneity in recovery courses. Roughly 28.6% were abstinent at every follow-up timepoint, whereas about 5.3% continued to use substances at every follow-up, and 12.6% displayed intermittent abstinence/non-abstinence patterns. These results are consistent with the clinical reality that recovery is often non-linear and that a subset of patients requires more intensive continuing care or different combinations of services.

One clinically important nuance is that among those who continued to drink, *drinks per drinking day remained high* (roughly 17–18) from baseline to 12 months. This suggests that, while overall frequency of use and heavy drinking days declined dramatically at the sample level, individuals who returned to alcohol use tended to drink in a binge-like pattern when they did drink. This "low-frequency but high-intensity" profile is associated with elevated risk for acute harms (injury, overdose risk when combined with other substances, medical complications, violence/victimization) and rapid progression back to even heavier problematic and consequential use. It underscores the importance of (a) explicit relapse management plans, (b) targeted craving/trigger interventions, and (c) medication and harm-reduction strategies for those who do not sustain complete abstinence. These findings might be due to a variety of factors such as substance use severity. Among individuals who continue to drink, substance use severity remained moderate at approximately 5 to 6 symptoms across the follow up periods. Additionally, commitment to sobriety was noticeable lower at 6-month and 12-month follow up and substance related consequences was higher suggesting this group might reflect a phenotype of moderate to severe AUD/SUD and a general ambivalence to their own substance use.



Quality of Life, Wellbeing, and Functioning: Improvement Beyond Symptom Reduction

Participants improved not only in substance use but also in subjective and functional domains—quality of life, happiness, self-esteem, life satisfaction, emotional support, and psychological distress all moved in very favorable directions. Psychological distress declined sharply from baseline to 3 months and remained improved at 12 months. Employment increased (from ~67% to ~76%), suggesting gains in role functioning that are often slow to change and highly consequential for longer-term recovery stability can be achieved and maintained. Collectively, these findings align with a "recovery-oriented" interpretation of outcomes—improvements were not limited to substance use metrics but extended to well-being and real-world functioning, consistent with contemporary models that define recovery as improved health and quality of life, that occur as a function of increased abstinence and remission (Kelly & Hoeppner, 2015).

Recovery capital showed a small increase early (baseline to 3 months), followed by a slight decrease by 12 months, with modeling suggesting a potential quadratic trend. Clinically, this pattern can reflect the predictable transition from the highly structured supports of residential care (and immediate post-discharge momentum) to the more complex realities of community reintegration. Early post-Retreat program participation may temporarily boost perceived resources, while later months can reveal gaps (housing, employment stability, social networks, mental health care access). The observed leveling/slight decline suggests a window for strengthening continuing care and "resource scaffolding" between 6 and 12 months to prevent erosion of recovery capital. These results, however, should be interpreted cautiously as the study design did not allow for precise temporal evaluations of recovery capital which could be obtained through other research methods (e.g., Ecological Momentary Assessment). While these findings highlight a potential for needed resource scaffolding, further research is needed to understand the stability and extent of this effect.

Mutual-Help Engagement: Strong Alignment with Program Orientation, with Expected Tapering

Mutual-help involvement—especially AA—rose dramatically from baseline to 3 months and remained common at 12 months. AA meeting attendance showed a large early increase followed by a gradual decrease that did not return to baseline levels, and AA involvement (e.g., sponsorship/contact/participation) similarly increased early and tapered over time. This trajectory is clinically plausible: many programs encourage intensive meeting attendance early, followed by a more sustainable schedule as individuals stabilize and expand other roles (employment, family responsibilities). NA and other mutual-help organizations were infrequently used, consistent with participant primary substance patterns (mostly primary alcohol sample) and program emphasis.

When evaluating the classifications of MHOs, traditional 12-step MHOs seem to be used more frequently than newer, second wave MHOs. This finding is again consistent with the lower use of the newer MHOs (Bergman et al., 2024; Kelly et al., 2025) and the participant primary substance patterns (mostly alcohol). However, these results do highlight a potential area for growth among individuals who do not use alcohol as their primary substance. Scaffolding to other 12-step (e.g., CA, MA) and second wave groups (SMART, Moderation Management, Celebrate Recovery) might be particularly beneficial for these individuals.



Service/volunteer activity (both 12-step and non–12-step) tended to decline over the year. Because service is often conceptualized as a mechanism for sustained engagement and social integration, decreasing service participation may represent a missed opportunity for longer-term maintenance—particularly for those with fluctuating abstinence patterns. This decline also may reflect competing demands, reduced program contact, or lack of structured pathways into service roles after discharge. Of note, employment for the present sample at baseline was considerable and increased over the one-year period. Returning to work could decrease opportunities for engagement in structured service/volunteer activities in favor of more unstructured service/ volunteer activities. In keeping with 12-step group roles and expectations, sponsorship of other members and service positions associated with greater responsibilities (e.g., group treasurer) that require longer lengths of continuous sobriety (e.g., a year or longer or more) remained low.

Formal service utilization and criminal justice involvement: potential downstream system impacts

The study documented large reductions in high cost and high-intensity service use (ED visits, hospital admissions/overnights, detox, inpatient treatment, and SUD overnight stays) by 12 months, alongside increased sober living utilization. These results are consistent with a shift away from crisis-driven care toward recovery-supportive environments and may indicate meaningful cost offsets and reduced system burden. Legal system involvement also declined (arrests in past 90 days dropping from ~16% to ~6%) and employment levels increased across the duration of the study. Overall, this pattern of findings suggests both broader public health and public safety benefits as well as economic benefits accompanying improved substance use and stability. These economic benefits are critical as reports estimate approximately 80% of the economic cost of AUD / SUD is due to lost productivity (e.g., Sorge et al, 2020).

Family involvement: modest improvements and limited evidence of differential trajectories

Family participation, perceived family support, and improved family relationships increased modestly from 3 to 12 months. Importantly, the figures described suggest few consistent differences in trajectories by family involvement indicators for key substance outcomes (PDA, PHDD, consequences), though there may be baseline differences by primary substance and age for some outcomes (e.g., younger participants having higher days drunk/high at baseline). The lack of observed trajectory differences could reflect true equivalence, restricted range (if family involvement was broadly encouraged), or measurement timing (family variables not collected at baseline). However, family involvement (i.e., family participant, perceived support, and improved family relationships) were all assessed dichotomously (i.e., yes / no) thus preventing more precise conclusions on the extent of positive change within the family unit. Nonetheless, the overall improvements in family relationship indicators are clinically meaningful because family functioning improvement takes time, is complex and challenging, and often lags behind substance use improvements but can influence long-term relapse risk and wellbeing.

Program implications

Sustain what appears to be working early—then intensify months 6–12 continuing care

Most gains were realized by 3 months and maintained thereafter, which argues for (a) preserving current service structure and strong discharge planning including early post-discharge linkage, and (b)



building a deliberate continuing-care "step-down" model through 12 months. The slight attenuation in recovery capital and tapering of mutual-help/service suggest that the later period may be where structured supports matter most. This is a common challenge.

Identify and tailor care for the high-risk subgroup with intermittent abstinence or persistent use.

The subgroup data imply at least three patterns: mostly stable abstinence, persistent use, and fluctuating trajectories. Programs can translate this into a practical stratification approach:

- **Stable abstinence:** focus on maintenance, community integration / 12 step involvement, and role functioning.
- **Fluctuating:** focus on rapid re-engagement pathways (booster sessions, contingency plans, proactive outreach after slips/relapse) including use of online social recovery resources.
- **Persistent use:** reassess fit/intensity/service extensity (medication, recovery goal / motivation, primary substance, co-occurring disorders, housing instability, trauma, pain, cognitive impairment, or social network exposure).

Address "binge-intensity drinking" among those who continue to drink.

The persistently high drinks-per-drinking-day among those who consumed alcohol during follow-ups suggests the need for targeted relapse prevention and risk reduction:

  - Stronger craving/trigger management plans and high-risk situation rehearsal.
  - Consideration of AUD/SUD pharmacotherapy (e.g., naltrexone, acamprosate, etc., as clinically indicated) and coordinated follow-up.
  - Harm-reduction planning (avoid mixing with sedatives/opioids, overdose education when polysubstance risk exists, safe transportation planning, medical monitoring).

Leverage mutual-help engagement while supporting sustainable involvement

AA involvement was near-universal early and remained high. This is a very positive outcome given the role that AA participation has been shown to play in enhancing remission outcomes (Kelly et al., 2020; Kelly et al., 2008; Moos & Moos, 2004; Ye & Kaskutas, 2009). Programs can optimize this by:

  - Ensuring *quality* of connection (sponsor relationship, verbal participation during meetings, home group integration), not just meeting counts.
  - Facilitating transitions from attendance to roles that deepen belonging (service commitments, greeting/coffee setup, chairing) while balancing feasibility.
  - Offering parallel pathways or additional recovery resource use for those who prefer additions or alternatives (SMART, LifeRing, Celebrate Recovery, etc.), even if utilization was low—because matching patient preference can improve long-term engagement.



Strengthen recovery capital intentionally during reintegration

The early rise and later leveling in recovery capital suggests a need for targeted supports in employment, housing, legal issues, mental health care access, and social network building. A structured "recovery capital check-up" at 3, 6, and 12 months (with referrals to resources) could help prevent erosion and support sustained quality-of-life gains.

Sober living appears to be a key post-discharge resource

The increased use of sober living alongside reductions in detox/inpatient care suggests sober living may function as an effective continuing-care scaffold. The Retreat could formalize partnerships with additional high-quality sober living providers, standardize referral criteria, and monitor for fit and safety.

Downstream system benefits are plausible and worth quantifying

Reductions in ED/hospital/detox/inpatient utilization, employment, and arrests imply potential cost offsets and broader social impact. Future evaluations could attach standardized cost estimates to utilization changes to inform payers and policymakers about the economic value of recovery-oriented residential care plus continuing support such as that provided by the Retreat.

Alumni app and organized recovery activities showed modest engagement—an implementation opportunity

Retreat "App" use and perceived helpfulness declined somewhat over time. This may reflect "intervention fatigue," usability issues, or insufficient personalization. The Retreat might increase engagement by tailoring content and tailoring content to specific recovery stage and life contexts, adding proactive prompts at predictable high-risk windows (e.g., 60–120 days post-discharge), integrating peer outreach, and aligning app features with what participants already value (sponsor contact, meeting finding, service opportunities, sober social events, unstructured volunteer activities).

Limitations and Cautions in Interpretation

Findings from this evaluation should be interpreted cautiously in light of several important limitations inherent in the study design. First, the single-group design limits causal inference. Improvements over time cannot be definitively attributed to the Retreat program, because natural recovery, regression to the mean, concurrent services (including sober living and mutual-help), and selection effects may contribute to observe effect estimates. That said, the interrupted time-series nature of the sudden and large magnitude changes seen in this study along with prior research finding, strongly suggest positive health effects attributable to the Retreat program. Second, attrition and missing data may bias estimates. Although models controlled for predictors of dropout, those lost to follow-up may differ in unobserved ways (e.g., severity, instability), potentially inflating estimates of apparent improvement. Third, self-report and interview-based measurement may introduce recall or social desirability bias. Timeline Follow-back procedures strengthens recall relative to single-item reports, but objective corroboration (biomarkers, administrative utilization records) would further strengthen confidence in the results. Fourth, limited statistical power to analyze subgroup differences and timing of measurement for moderators means that future larger scale work will need to examine the effects of Retreat programming on different individuals over time. Some subgroup findings (age/primary substance interactions/family involvement) should be viewed as hypothesis-generating rather than hypothesis confirming. Finally, generalizability may be limited. Results reflect one adult residential educational-supportive program (The Retreat) with strong 12-step orientation and may not generalize to other settings, populations (e.g.,



younger adults, different socioeconomic profiles, non-primary alcohol), or programs with different emphases.

Future directions

Some future directions for program evaluation would be to add a comparison group (e.g., matched controls, waitlist, or alternative residential/IOP) to improve causal inference and specific attribution to the Retreat program's effects. Also, future work could model recovery heterogeneity explicitly (latent class growth analysis or growth mixture models) to identify distinct trajectories (stable abstinence, intermittent, persistent use) and their predictors. Mechanisms investigations (e.g., does AA involvement mediate improvements in PDA, distress, or service utilization? Does recovery capital protect against later relapse?) could help explain the positive effects observed from Retreat participation. Also, future work could validate utilization changes with administrative data (ED/hospital claims, arrests) and estimate cost offsets, which are likely to be large. Further program service changes and implementation evaluations could test any enhancements for months 3–12 (structured continuing care, recovery capital boosters, app-based proactive outreach, service role pathways) to reduce tapering in supports and prevent late relapse.

Conclusions

Over a 12-month follow-up period, participants in this adult residential supportive-educational, community-based model of care program demonstrated substantial and sustained improvements across alcohol and other drug use, numerous indices of quality of life, psychological well-being, and functioning, recovery support engagement, and downstream service utilization. Alcohol outcomes improved markedly, with percent days abstinent rising from approximately half of days at baseline to near complete abstinence by 12 months, accompanied by steep reductions in drinks per day and heavy drinking days. Parallel gains were observed for other drug use and for alcohol/drug-related consequences, with remission increasing to more than four out of five participants by 12 months. These improvements emerged rapidly by 3 months and were generally maintained over time, suggesting strong early stabilization followed by sustained recovery-oriented benefit from Retreat participation.

Improvements extended beyond alcohol and other drug use to broader indicators of wellbeing and functioning. Quality of life, happiness, self-esteem, life satisfaction, emotional support, and psychological distress all moved in favorable directions, and employment increased over the follow-up period. Mutual-help participation—particularly AA—rose dramatically post-Retreat program participation and remained intensive at 12 months, consistent with the program's 12-step recovery support orientation. Importantly, there was also a pronounced reduction in high-intensity, crisis-driven service utilization (e.g., emergency department visits, hospitalization, detoxification, inpatient treatment) alongside increased use of sober living, suggesting a potential shift from acute care to more stable recovery supports. Legal system involvement also decreased substantially.

At the same time, results indicate some meaningful heterogeneity: while many participants sustained abstinence or nearly complete abstinence across follow-ups, a smaller subgroup continued to use or cycled in and out of abstinence, and those who resumed drinking tended to drink at high intensity when they did drink. Overall, despite the limitations inherent in a single-group design, the longitudinal findings here provide encouraging evidence that this type of supportive-educational, community-based



care model that promotes long-term use of robust recovery support pathways through mutual-help participation and other recovery support services scaffolding can produce substantial and durable improvements in both clinical and real-world outcomes over one year.

5. REFERENCES

Beetham, T., Saloner, B., Gaye, M., Wakeman, S. E., Frank, R. G., & Barnett, M. L. (2021). Admission Practices And Cost Of Care For Opioid Use Disorder At Residential Addiction Treatment Programs In The US. *Health Aff (Millwood)*, *40*(2), 317-325. https://doi.org/10.1377/hlthaff.2020.00378

Bergman, B. G., Boorman, E. P., Russell, A. M., Colditz, J. B., & Kelly, J. F. (2026). Effects of participation in a large, online community for substance use disorder recovery: A naturalistic, longitudinal study. *Psychol Addict Behav*. https://doi.org/10.1037/adb0001123

Bergman, B. G., Greene, M. C., Zemore, S. E., & Kelly, J. F. (2024). Prevalence and correlates of 12-step and second-wave mutual-help attendance in a nationally representative US sample. *Alcohol Clin Exp Res (Hoboken)*, *48*(3), 545-555. https://doi.org/10.1111/acer.15268

Carey, V. J., Lumley, T., & Ripley, B. D. (2012). *gee: Generalized estimation equation solver*. In (Version 4) R Foundation for Statistical Computing.

Dennis, M. L., Scott, C. K., Funk, R., & Foss, M. A. (2005). The duration and correlates of addiction and treatment careers. *J Subst Abuse Treat*, *28 Suppl 1*(2), S51-62. https://doi.org/10.1016/j.jsat.2004.10.013

Jason, L. A., Davis, M. I., Ferrari, J. R., & Bishop, P. D. (2001). Oxford House: A Review of Research and Implications for Substance Abuse Recovery and Community Research. *Journal of Drug Education*, *31*(1), 1-27. https://doi.org/10.2190/tmnp-m3cc-bupn-9ee6

Kelly, J., Hoeppner, B., Bergman, B., & Vilsaint, C. (2017). Recovery from substance use disorder in the United States: Prevalence, characteristics, and pathways from the first national probability-based sample. ALCOHOLISM-CLINICAL AND EXPERIMENTAL RESEARCH,

Kelly, J. F., & Hoeppner, B. (2015). A biaxial formulation of the recovery construct. *Addiction research & theory*, *23*(1), 5-9. https://doi.org/10.3109/16066359.2014.930132

Kelly, J. F., Humphreys, K., & Ferri, M. (2020). Alcoholics Anonymous and other 12-step programs for alcohol use disorder. *Cochrane Database Syst Rev*, *3*(3), CD012880. https://doi.org/10.1002/14651858.CD012880.pub2

Kelly, J. F., Levy, S. A., & Hoeppner, B. B. (2023). An investigation of SMART Recovery: protocol for a longitudinal cohort study of individuals making a new recovery attempt from alcohol use disorder. *BMJ open*, *13*(2), e066898. https://doi.org/10.1136/bmjopen-2022-066898

Kelly, J. F., Myers, M. G., & Rodolico, J. (2008). What do adolescents exposed to Alcoholics Anonymous think about 12-step groups? *Subst Abus*, *29*(2), 53-62. https://doi.org/10.1080/08897070802093122

Kelly, J. F., O'Connor, J. B., Klein, M. R., Hoffman, L. A., Eddie, D., Vilsaint, C. L., Bergman, B. G., & Hennessy, E. A. (2025). One-stop shopping for recovery? A systematic review of the evidence on U.S. recovery community centers. *Journal of Substance Use and Addiction Treatment*, *175*, 209723. https://doi.org/https://doi.org/10.1016/j.josat.2025.209723

Kelly, J. F., & Stout, R. L. 15. Community Recovery Support Services for Opioid Use Disorder Recovery. In *Responding to the Opioid Epidemic: A Guide for Public Health Practitioners*. https://doi.org/10.2105/9780875533452ch15

King, C. A., Beetham, T., Smith, N., Englander, H., Button, D., Brown, P. C. M., Hadland, S. E., Bagley, S. M., Wright, O. R., Korthuis, P. T., & Cook, R. (2024). Adolescent Residential Addiction Treatment In The US: Uneven Access, Waitlists, And High Costs. *Health Aff (Millwood)*, *43*(1), 64-71. https://doi.org/10.1377/hlthaff.2023.00777

Laudet, A. B., Harris, K., Kimball, T., Winters, K. C., & Moberg, D. P. (2015). Characteristics of students participating in collegiate recovery programs: A national survey. *Journal of Substance Abuse Treatment*, *51*, 38-46. https://doi.org/10.1016/j.jsat.2014.11.004

Moos, R. H., & Moos, B. S. (2004). Long-Term Influence of Duration and Frequency of Participation in Alcoholics Anonymous on Individuals With Alcohol Use Disorders. *Journal of Consulting and Clinical Psychology*, *72*(1), 81-90. https://doi.org/10.1037/0022-006X.72.1.81

R Core Team. (2021). *R: A language and environment for statistical computing*. In R Foundation for Statistical Computing.

Volkow, N. D., & Li, T. K. (2004). Drug addiction: the neurobiology of behaviour gone awry. *Nat Rev Neurosci*, *5*(12), 963-970. https://doi.org/10.1038/nrn1539

Ye, Y., & Kaskutas, L. A. (2009). Using propensity scores to adjust for selection bias when assessing the effectiveness of Alcoholics Anonymous in observational studies. *Drug Alcohol Depend*, *104*(1-2), 56-64. https://doi.org/10.1016/j.drugalcdep.2009.03.018



APPENDIX 1. MEASURES

TABLE A.1. OVERVIEW OF MEASURES AND ADMINISTRATION TIMES

AIM/CONSTRUCT	MEASURES	0m	Mid-tx	End-tx	3m	6m	1
Demographics	Form 90 & GAIN	X					
Criminal Justice Involvement	GAIN-I, Form 90, TCU	X					
Psychiatric Diagnostic Status; Professional SUD/MH Service Utilization; MH Medication	GAIN-I; Form 90	X			X	X	
Mental Health	Brief Trauma Questionnaire (BTQ)	X					
	PTSD Checklist (PCL-5)			X	X	X	
	Adverse Childhood Experience (ACE) Questionnaire	X					
Substance Use, Treatment Utilization, MHO attendance	TLFB, Form 90, GAIN	X			X	X	
	RSSTX	X			X	X	
	Multidimensional Mutual-Help Meeting Activity Scale (MM-HAS)	X			X	X	
	Medication Attitudes	X					
	SUD DART	X			X	X	
	Addiction Treatment Medication (Anti-Craving & Anti-Relapse Medication)	X			X	X	
	The Leeds Dependence Questionnaire (LDQ)	X					
	Penn Alcohol/Drug Craving Scale (PADCS)	X	X	X	X	X	
	Short Inventory of Problems (SIP-2R)	X			X	X	

	Working Alliance Inventory – Short Revised (WAI-SR)		X	X			
	Group Environment Scale (GES) – Cohesion subscale		X	X			
Tobacco Use	Form 90- GAIN	X			X	X	
Recovery Motivation	Commitment to Sobriety Scale (CSS-5)	X		x	X	X	
	Alcohol-Drug Abstinence Self-Efficacy Scale (AD-ASES-20)	X	X	X	X	X	
Self-Efficacy	Single-Item Self-Efficacy	X		X	X	X	
Recovery	Twelve Promises Scale (TPS)	X		X	X	X	
	Drinking And Drug Use Goal	X					
	Questions About Recovery	X		X	X	X	
	Year End Summary (YES)						
	Coping Strategies Scale (CSS)	X			X	X	
	Family Involvement in Recovery/ Al-Anon				x	x	
	Recreational Activity Involve-ment				x	x	
	The Retreat Alumni Association Involvement				x	x	
	Substance Use Dreams	X	X	X	X	X	
	Service/volunteer Activity In-volvement			x	x	x	
Recovery Capital	BARC-10	X			X	X	
Relapse	Advance Warning of Relapse: AWARE Questionnaire 3.0				X	X	
Quality of Life, Psychosocial Functioning	Kessler-6 (K6)	X	X	X	X	X	
	EUROHIS-QOL-8	X		X	X	X	

	Self-Reported Self-Esteem, Happiness, and Life Satisfaction	X		X	X	X	
Religiosity/Spirituality	Religious Backgrounds and Behaviors Scale (RBBS)	X			X	X	
	DSES	X		X			
	Religious Intensity				X	X	
Impulsivity	Impulsivity (SUPPS-P)	X				X	
Behavioral Addictions	Behavioral Addictions Questionnaire	X					
Physical Health	Pittsburgh Sleep Quality Index (PSQI)	X		X	X	X	
	International Physical Activity Questionnaire (IPAQ)	X			X	X	
	Pain Assessment	X	X	X	X	X	
Social relationships	Emotional Support (Ages 18+) – Fixed Form	X					
	Social Support Questionnaire (SSQ)	X			X	X	

APPENDIX 2. UNABRIDGED DESCRIPTIVE STATISTICS

TABLE A.2. UNABRIDGED DESCRIPTIVE STATISTICS

	M (SD)
Demographic	
Sample Size (N)	206
Age	43.95 (13)
Gender % (N)	
Female	28.16% (58)
Male	64.08% (132)
Missing	7.77% (16)
Sex Assigned at Birth % (N)	
Female	26.70% (55)
Male	62.62% (129)
Intersex	0.49% (1)
Missing	10.19% (21)
Sexual Orientation % (N)	
Asexual	1.46% (3)
Heterosexual or straight	82.52% (170)
Homosexual, gay or lesbian	1.94% (4)
Bisexual	3.88% (8)
Pansexual	0.49% (1)
Not sure	0.97% (2)
Prefer not to answer	0.97% (2)
Missing	7.77% (16)
Race % (N)	
American Indian or Alaskan Native	1.46% (3)
Asian	1.46% (3)

Black or African American	1.46% (3)
Native Hawaiian or Other Pacific Islander	0.49% (1)
White or Caucasian	84.47% (174)
Multiracial	0.97% (2)
Missing	9.71% (20)
Ethnicity % (N)	
Hispanic or Latino	3.88% (8)
Not Hispanic or Latino	86.89% (179)
Missing	9.22% (19)
Education % (N)	
Less than high school graduate (no degree)	0.97% (2)
High school graduate (or GED)	9.71% (20)
Some college/university (no diploma)	20.87% (43)
Associate's degree completed	9.22% (19)
Bachelor's degree completed	29.13% (60)
Master's degree completed	8.74% (18)
Professional degree completed (e.g., MD, PhD, JD)	2.91% (6)
Missing	18.45% (38)
Income % (N)	
Less than $15,000	9.22% (19)
At least $15,000 but less than $30,000	10.19% (21)
At least $30,000 but less than $45,000	12.14% (25)
At least $45,000 but less than $60,000	10.19% (21)
At least $60,000 but less than $75,000	5.83% (12)
At least $75,000 but less than $90,000	6.31% (13)
At least $90,000 but less than $105,000	3.88% (8)
At least $105,000 but less than $120,000	3.40% (7)
Greater than $120,000	21.84% (45)
Missing	16.99% (35)



Employed % (N)	
Yes	56.31% (116)
No	27.18% (56)
Missing	16.50% (34)
Relationship Status % (N)	
Single, not currently in a romantic relationship with a significant other	40.78% (84)
In a romantic relationship with a significant other, but not married or living together	12.62% (26)
In a romantic relationship with a significant other and living together	9.71% (20)
Engaged to be married; living together	1.94% (4)
Married	20.87% (43)
Married, but separated	5.83% (12)
Missing	8.25% (17)
Clinical	
Primary Substance % (N)	
Alcohol	80.58% (166)
Marijuana	1.46% (3)
Cocaine	6.80% (14)
Prescription opioids	0.97% (2)
Heroin	1.46% (3)
Fentanyl	1.46% (3)
Methamphetamine	3.88% (8)
Benzodiazepines	2.43% (5)
Inhalants	0.49% (1)
Other	0.49% (1)
% in Remission % (N)	
In Remission	3.40% (7)
Not in Remission	96.60% (199)
Primary Substance Symptoms	9.00 (2.54)
Psychological Distress	11.22 (5.10)



% Lifetime Mental Health Diagnoses % (N)	
Yes	68.93% (142)
No	31.07% (64)
Prior Treatment	
Lifetime SLE Treatments	0.83 (1.77)
Past 90 Day SLE Treatments	0.59 (6.34)
Lifetime Outpatient Treatments	1.38 (1.71)
Past 90 Day Outpatient Treatments	0.11 (0.33)
Lifetime Detox Treatments	2.84 (5.32)
Past 90 Day Detox Treatments	0.67 (0.90)
Lifetime Inpatient Treatments	2.66 (3.38)
Past 90 Day Inpatient Treatments	0.35 (2.33)
% SUD service in Past 90 Days % (N)	
Yes	60.19% (124)
No	39.81% (82)
% SUD service in Lifetime % (N)	
Yes	88.83% (183)
No	11.17% (23)
Legal System Involvement	
Lifetime Arrests (% Yes)	
Yes	59.71% (123)
No	23.30% (48)
Missing	16.99% (35)
Lifetime Number of Arrests	2.17 (2.47)

APPENDIX 3. COMPARISON OF RETREAT SAMPLE AND VISTA REPORT

To determine the extent to which the Retreat sample mirrors other inpatient settings, we compared sample characteristics to those obtained in the Vista report (vista repot). Comparisons were made where we had the same or similar measures assessed at similar timepoints. We recoded data in the Retreat sample as well as in the Vista report where appropriate to allow for comparisons between studies (see footnotes for details).

Table A.3 compares demographic characteristics of the Retreat program with national averages obtained in the Vista report. Chi square comparisons between groups were made where applicable. Overall, the demographic characteristics of the Retreat are similar to national averages with respect to gender, race, employment, and living arrangements. However, we did observer significant differences in marital status whereby individuals in the retreat were more likely to be married. Likewise, individuals in the retreat were more likely to have a higher level of education.

TABLE A.3. COMPARISON OF DEMOGRAPHICS IN THE RETREAT SAMPLE WITH NATIONAL AVERAGES (VISTA REPORT)

	Vista %	Retreat %	X^2	p
N		41093	206	
Gender	0.27	0.60		
Female		35%	28%	
Male		65%	64%	
Other / Decline to Answer		0%	8%	
Age (Median)	34	42	NA	NA
Race	0.26	0.61		
White, non-Hispanic		79%	82%	
Hispanic or Latino		8%	4%	
African-American		6%	1%	
Native American		2%	1%	
Asian		1%	1%	
Other		4%	10%	
Marital Status	7.09	0.03		
Single		53%	41%	
Married		27%	45%	
No longer married / Other		20%	14%	
Education	12.0	<.001		
High School or Less		36%	11%	
College or More		60%	71%	
Other / Decline to Answer		5%	18%	
Employment	2.35	0.31		
Yes		64%	56%	
No		28%	27%	
Other		10%	17%	
Living Arrangements	0.00	0.99		

Living in a home	79%	80%
Living in SUD center	4%	4%
Homeless	5%	1%
Other	12%	15%

“Other” response for gender comprised of transgender and decline to answer.
Chi square for gender excludes “Other” response category.
IQR for Age not provided in vista report and as such, we cannot perform statistical comparisons between groups.
“Other” response for race includes multiracial, and decline to answer.
Chi square for race compares white vs all other non-white categories (i.e., Hispanic, African American, native American, Asian, and other).
“Married” response for marital status includes married, in a romantic relationship with significant other but not married nor living together, in a romantic relationship with significant other and living together, engaged to be married and living together, engaged to be married not living together, and married.
“No longer married / other” response for martial status includes of divorced, separated, widowed, married but separated, and decline to answer.
Chi square for marital status compares all response categories.
“High school or less” response option for education comprised of attended high school but have not graduated, have graduated from high school or received a GED
“College or more” response option comprised of attended college but have not received a degree, associates degree, bachelor’s degree, masters, degree, and Ph.D. degree and professional degree completed.
Chi square for education excludes “Other” response category
“Other” response for education includes other, and decline to answer.
“Not employed” response option for employment includes not employed, working in the home, student, neither working or in school (by choice), fired or kicked out, in jail.
“Other” response for employment includes other and decline to answer.
Chi square for employment uses all response options.
“Living in home” response option includes living in their own home apartment or dorm room, living in their parents guardians or other family members home, living in a place where they could stay as long as they wanted, with family members of relatives, with group of friends or non-family members, and alone in own dwelling.
“Living in SUD center” response option includes of living in a sober living environment such as a halfway house, hospital, rehabilitation facility or nursing home, and sober house.
“Other” response option for living arrangements includes other and decline to answer.
Chi square for living arrangements compares living in a home against all other response options.

Figure A.3.1 indicates that participants in the Retreat report higher levels of happiness generally than those of national averages. These findings however should be taken with a healthy degree of skepticism due to the large number of participants (approximately 19%) who declined to indicate their level of happiness in the Retreat study.

FIGURE A.3.1. COMPARISON OF HAPPINESS LEVELS IN THE RETREAT SAMPLE WITH NATIONAL AVERAGES (VISTA REPORT)

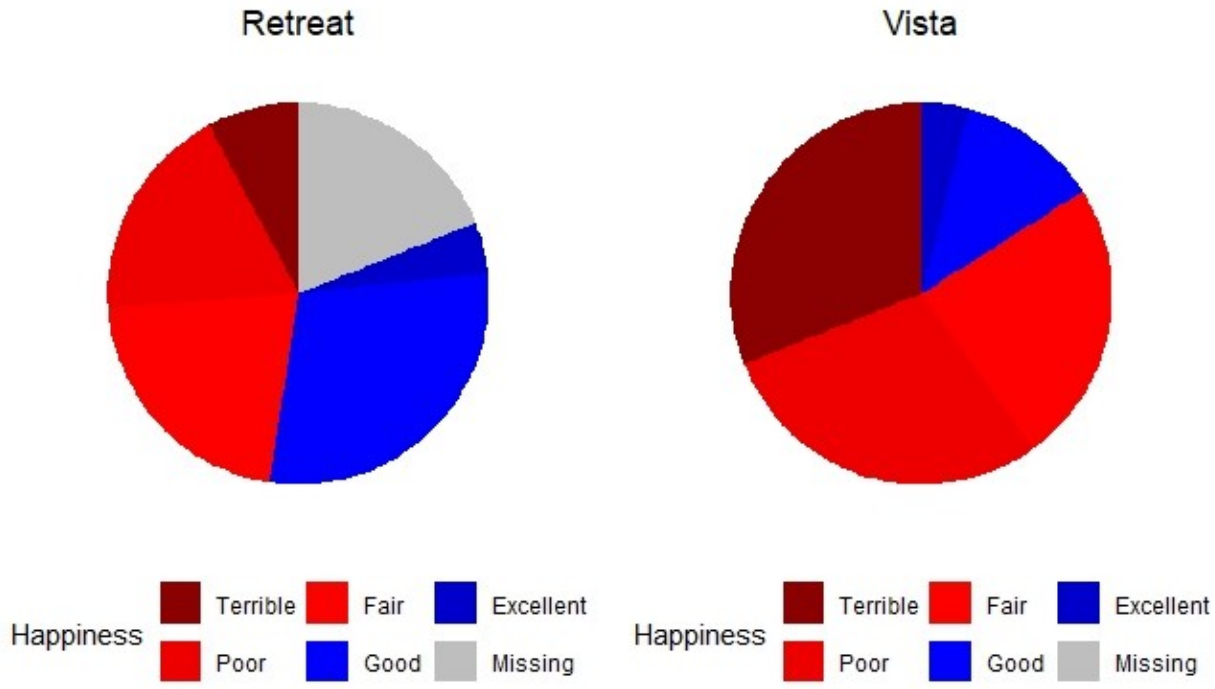


Figure A.3.2 indicates that participants in the Retreat reported comparably high levels of SUD severity to those observed in national averages. However, both national averages and participants from the Retreat have extremely high levels of SUD severity nonetheless.

FIGURE A.3.2. COMPARISON OF SUD SEVERITY IN THE RETREAT SAMPLE WITH NATIONAL AVERAGES (VISTA REPORT)

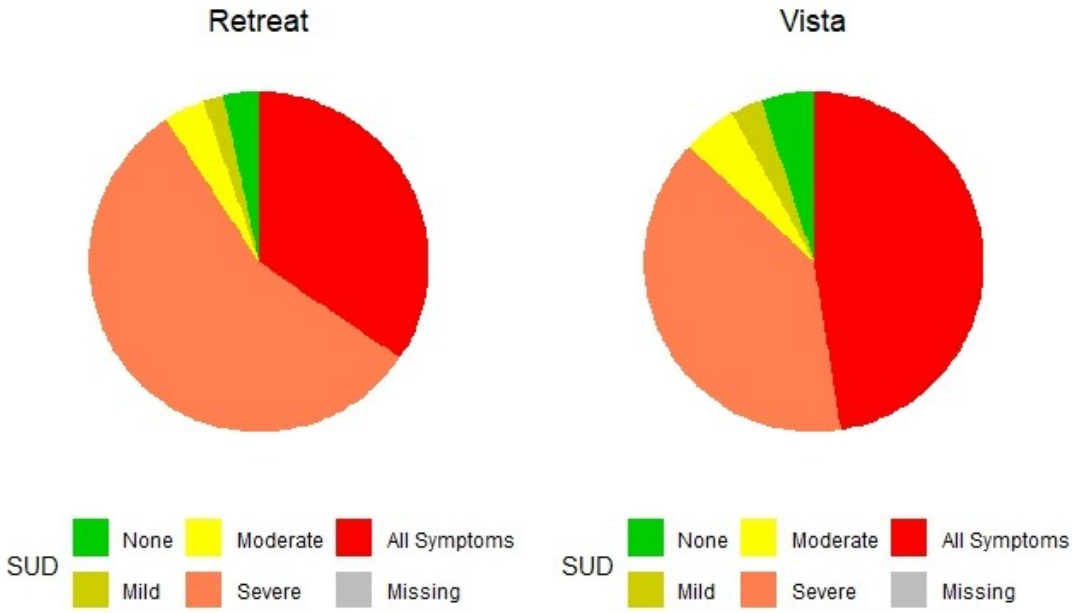
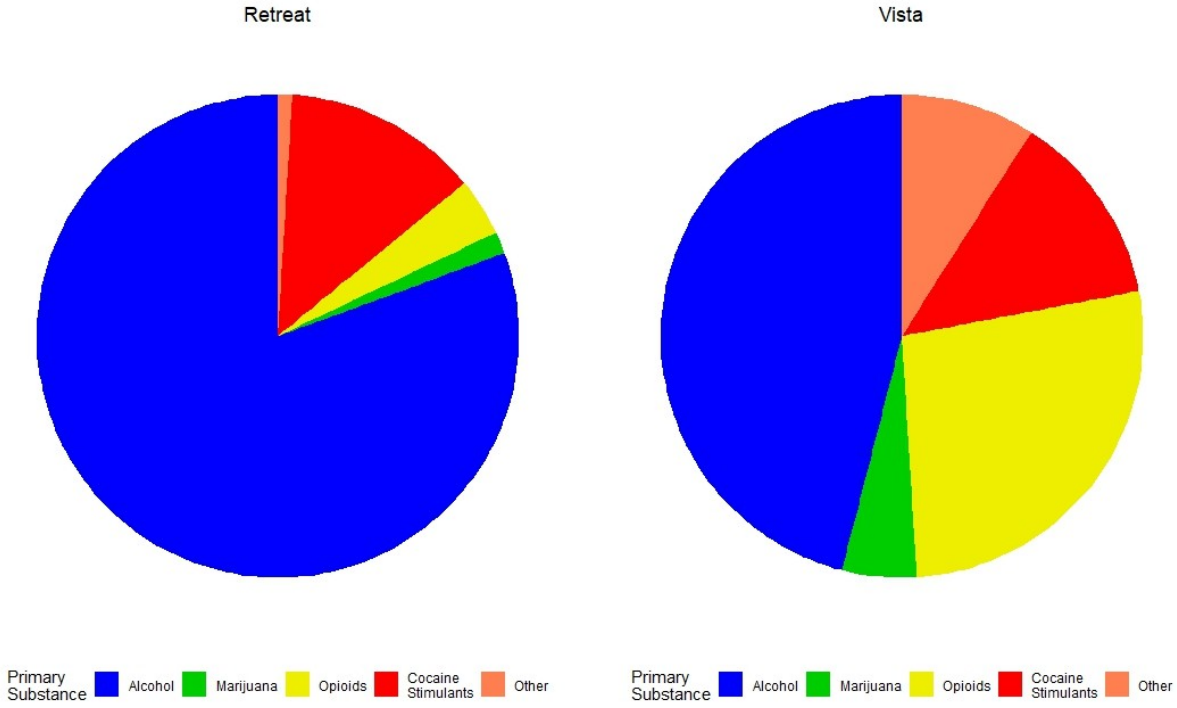


Figure A.3.3 indicates that the majority of the participants in the Retreat report Alcohol as their primary substance with cocaine and stimulants being used by a smaller proportion of the sample. In contrast, while alcohol remains the most common primary substance in national averages, opioids are reported as the primary substance more frequently in the Vista report.

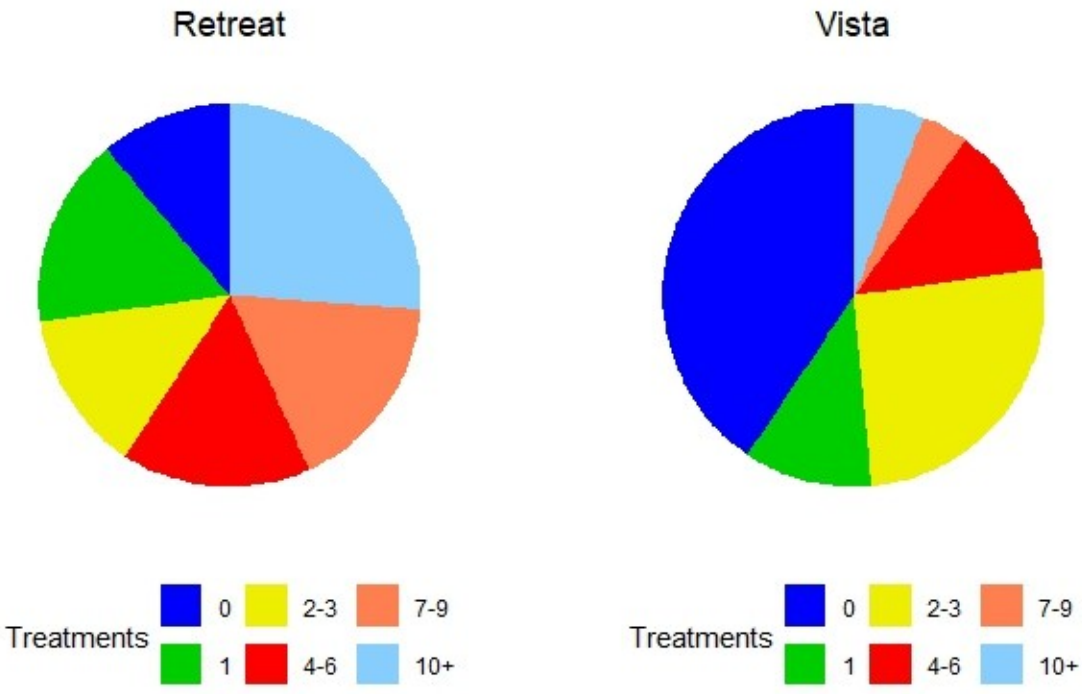
FIGURE A.3.3. COMPARISON OF PRIMARY SUBSTANCE IN THE RETREAT SAMPLE WITH NATIONAL AVERAGES (VISTA REPORT)



"Cocaine/Stimulants" category includes cocaine, methamphetamine, amphetamines.
"Opioids" category includes of opioids, prescription opioids, heroin, and fentanyl.
"Other" substance category includes of benzodiazepines, inhalants, and other drugs.

Figure A.3.4 indicates that the majority of participants in the Retreat have used SUD treatment facilities at considerably higher rates compared to those observed in the Vista report. While 11% of individuals in the Retreat study used 0 SUD treatments, 41% of participants from the vista report indicating using 0 SUD treatments.

FIGURE A.3.4. COMPARISON OF PRIOR TREATMENTS IN THE RETREAT SAMPLE WITH NATIONAL AVERAGES (VISTA REPORT)



Prior treatments in Retreat determined by summing lifetime detox, inpatient, outpatient, and sober living environment as determined via rsstx instrument.

Figure A.3.5 indicates that individuals in the Retreat program report smaller changes in self-reported happiness compared to larger changes observed in the Vista report.

FIGURE A.3.5. COMPARISON OF FEELING GOOD OVERALL IN THE RETREAT SAMPLE WITH NATIONAL AVERAGES (VISTA REPORT)

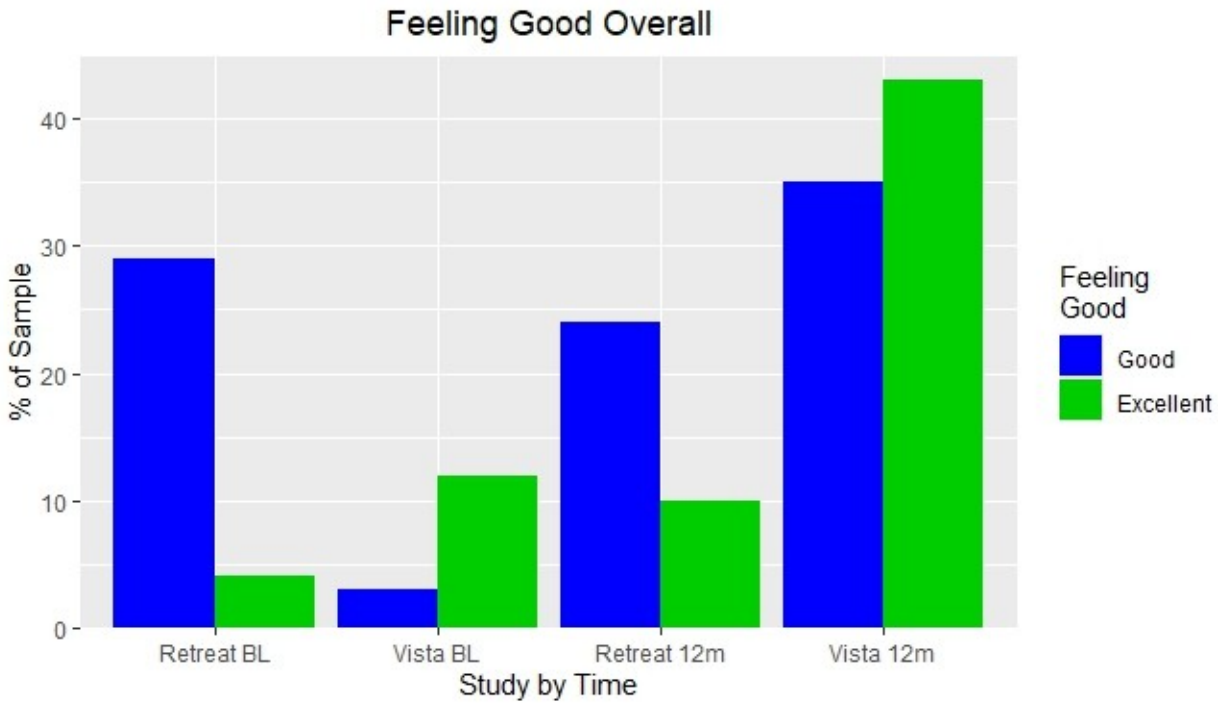
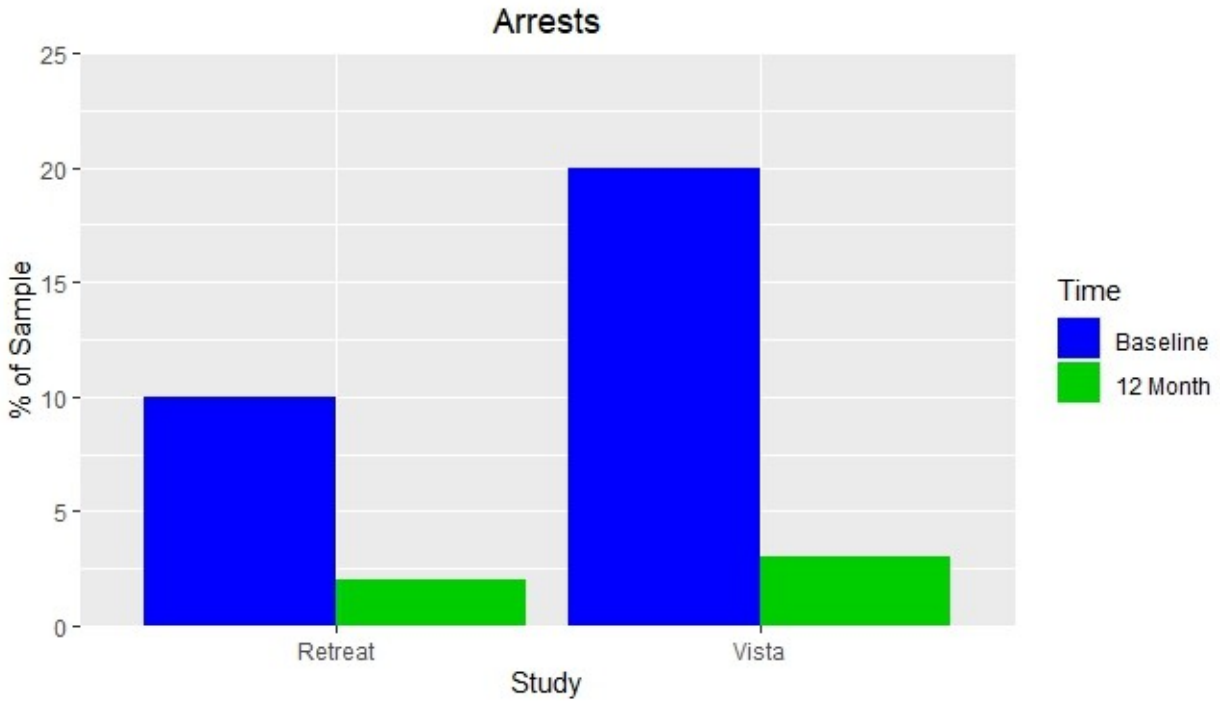


Figure A.3.6. indicates a substantial decrease in arrests from baseline to 12-month follow up in the Retreat study, akin to patterns observed in the Vista report.

FIGURE A.3.6. COMPARISON OF ARRESTS THE RETREAT SAMPLE WITH NATIONAL AVERAGES (VISTA REPORT)



Vista report reports arrests at 12 months prior to start of Retreat Program participation / baseline and at 12-month follow up. Retreat reports arrests in the past 90 days at baseline and 12 months. The time comparison at baseline for the Vista report is 4 times as long (1 year) as the retreat report (3 months).

APPENDIX 4. UNABRIDGED SERVICE UTILIZATION

TABLE A.4. DESCRIPTIVE STATISTICS OF SERVICE UTILIZATION IN THE PAST 90 DAYS ACROSS TIME

	Follow Up	M (SD)	Median (IQR)	Min - Max
12 Step MHO				
AA In Past 90 Days				
	Baseline	14.46 (21.22)	3.00 (25.00)	0 - 90
	3 Months	55.47 (32.41)	51.00 (35.50)	0 - 250
	6 Months	38.17 (27.51)	37.50 (41.75)	0 - 129
	12 Months	31.85 (28.85)	26.00 (37.25)	0 - 158
CA In Past 90 Days				
	Baseline	0.00 (0.00)	0.00 (0.00)	0 - 0
	3 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
	6 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
	12 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
CMA In Past 90 Days				
	Baseline	0.01 (0.10)	0.00 (0.00)	0 - 1
	3 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
	6 Months	0.06 (0.63)	0.00 (0.00)	0 - 7
	12 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
DDA In Past 90 Days				
	Baseline	0 (0.07)	0.00 (0.00)	0 - 1
	3 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
	6 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
	12 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
MA In Past 90 Days				
	Baseline	0.00 (0.00)	0.00 (0.00)	0 - 0
	3 Months	0.05 (0.59)	0.00 (0.00)	0 - 7
	6 Months	0.00 (0.00)	0.00 (0.00)	0 - 0



12 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
NA In Past 90 Days			
Baseline	0.49 (5.63)	0.00 (0.00)	0 - 80
3 Months	0.68 (3.90)	0.00 (0.00)	0 - 34
6 Months	0.34 (2.03)	0.00 (0.00)	0 - 13
12 Months	0.27 (2.44)	0.00 (0.00)	0 - 26
Second Wave MHO			
SMART In Past 90 Days			
Baseline	0.04 (0.56)	0.00 (0.00)	0 - 8
3 Months	0.12 (1.13)	0.00 (0.00)	0 - 13
6 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
12 Months	0.02 (0.19)	0.00 (0.00)	0 - 2
LifeRing In Past 90 Days			
Baseline	0.00 (0.00)	0.00 (0.00)	0 - 0
3 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
6 Months	0.02 (0.18)	0.00 (0.00)	0 - 2
12 Months	0.01 (0.09)	0.00 (0.00)	0 - 1
Moderation Management In Past 90 Days			
Baseline	0.00 (0.00)	0.00 (0.00)	0 - 0
3 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
6 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
12 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
Women for Sobriety In Past 90 Days			
Baseline	0.00 (0.00)	0.00 (0.00)	0 - 0
3 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
6 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
12 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
Secular Organization for Sobriety In Past 90 Days			
Baseline	0.00 (0.00)	0.00 (0.00)	0 - 0



	3 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
	6 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
	12 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
Celebrate Recovery				
Celebrate Recovery In Past 90 Days				
	Baseline	0.01 (0.21)	0.00 (0.00)	0 - 3
	3 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
	6 Months	0.00 (0.00)	0.00 (0.00)	0 - 0
	12 Months	0.00 (0.00)	0.00 (0.00)	0 - 0

Celebrate Recovery reported separately from 12-step MHOs (e.g., AA, NA) and Second-Wave MHOs (e.g., SMART, LifeRing), given that Celebrate Recovery is an explicitly religious organization yet was founded considerably later than traditional 12-step MHOs (Bergman et al., 2026; Bergman et al., 2024).

APPRENDIX 5. DROPOUT

A.5.1. DROPOUT PREDICTORS

Prior to running statistical analyses, we first needed to statistically control for both dropout and any other predictors of the specified outcome. With respect to dropout, dropout was operationalized as any participant who failed to attend at least one follow up visit (i.e., 3-month, 6-month, 12-month follow up). There were 51 participants (24.75%) of the sample who dropped out of the study. We first ran a series of univariate models to determine if there were any differences between individuals who completed the study and those who did not complete the study. We compared the two groups along a variety of factors including demographic (e.g., age, gender, race, ethnicity), psychosocial (quality of life, happiness, life satisfaction) and clinical variables (e.g., primary substance, primary substance symptoms, psychological distress). We retained any predictors with $p > .10$ in order to provide a more conservative estimate of any variable that might need to be controlled for in subsequent models. The remaining variables were added to a multivariate logistic regression model predicting dropout. The results are presented below in Table A.5.1.

TABLE A.5.1. UNIVARIATE PREDICTORS OF DROPOUT

	Dropout M (SD) N = 51	Completed M (SD) N = 155	t	p
Demographic				
Age M (SD)	40.84 (10.41)	44.87 (13.56)	**2.02**	**0.046**
Sex % (N)			0.00	0.999
Female	25.49% (13)	27.10% (42)		
Male	58.82% (30)	63.87% (99)		
Missing / Decline to Answer	15.69% (8)	9.03% (14)		
Gender % (N)			0.00	0.999
Female	25.49% (13)	29.03% (45)		
Male	60.78% (31)	65.16% (101)		
Missing / Decline to Answer	13.73% (7)	5.81% (9)		
Race % (N)			0.30	0.737
White	80.39% (41)	85.81% (133)		
Other	3.92% (2)	6.45% (10)		



Missing / Decline to Answer	15.69% (8)	7.74% (12)		
Ethnicity % (N)			0.57	0.666
Hispanic	1.96% (1)	4.52% (7)		
Not Hispanic	84.31% (43)	87.74% (136)		
Missing / Decline to Answer	13.73% (7)	7.74% (12)		
Relationship Status % (N)			1.18	0.278
In a relationship	35.29% (18)	48.39% (75)		
Single	50.98% (26)	45.16% (70)		
Missing / Decline to Answer	13.73% (7)	6.45% (10)		
Education % (N)			**4.84**	**0.038**
Less than or equal to High School	17.65% (9)	8.39% (13)		
Some College or More	56.86% (29)	75.48% (117)		
Missing / Decline to Answer	25.49% (13)	16.13% (25)		
Employment % (N)			0.00	0.999
No	25.49% (13)	27.74% (43)		
Yes	52.94% (27)	57.42% (89)		
Missing / Decline to Answer	21.57% (11)	14.84% (23)		
Primary Substance % (N)			**5.22**	**0.022**
Alcohol	68.63% (35)	84.52% (131)		
Other	31.37% (16)	15.48% (24)		
Mental Health Condition % (N)			0.00	0.999
No	31.37% (16)	30.97% (48)		
Yes	68.63% (35)	69.03% (107)		
Legal Status % (N)			1.86	0.173
Yes	9.80% (5)	20.65% (32)		



No	68.63% (35)	64.52% (100)		
Missing / Decline to Answer	21.57% (11)	14.84% (23)		
Lifetime Arrests	2.00 (2.76)	2.22 (2.38)	0.45	0.652
Psychosocial				
Abstinence Self-Efficacy (ADSES)	63.74 (20.32)	57.05 (20.74)	**-1.78**	**0.081**
Recovery Capital (BARC10)	47.26 (8.69)	48.17 (7.22)	0.59	0.561
Commitment to Sobriety	26.95 (5.12)	27.51 (4.18)	0.62	0.537
Coping	2.91 (0.53)	2.86 (0.57)	-0.50	0.618
Daily Spiritual Experiences	3.50 (1.14)	3.39 (1.09)	-0.53	0.601
Emotional Support	31.57 (7.72)	32.63 (7.48)	0.74	0.460
Psychological Distress	11.21 (5.42)	11.22 (5.02)	0.01	0.995
Leeds Dependency	23.24 (9.51)	20.43 (9.40)	-1.60	0.114
Bothered by Mental Health	34.50 (38.05)	39.36 (34.98)	0.72	0.474
Mental Health Interference	19.38 (25.96)	20.46 (27.00)	0.23	0.819
Bothered by Pain	29.71 (35.66)	27.56 (33.84)	-0.33	0.743
Pain Interference	16.95 (28.54)	16.05 (29.04)	-0.17	0.867
Quality of Life	24.43 (6.79)	26.12 (6.12)	1.37	0.178
Recovery Status	2.82 (0.39)	2.82 (0.39)	-0.03	0.974
Recovery Define	2.83 (0.38)	2.84 (0.41)	0.23	0.822
Substance Use Consequences	28.95 (13.97)	31.64 (10.65)	1.11	0.272
Impulsivity	47.68 (8.26)	47.56 (8.53)	-0.08	0.937
Craving (TPS)	10.63 (3.16)	11.08 (2.76)	0.79	0.435
TPS Well-Being	49.29 (9.42)	48.92 (8.00)	-0.22	0.825
Drinking Goal	4.62 (0.54)	4.60 (0.72)	-0.16	0.875
Craving (PADCS)	4.32 (1.53)	4.45 (1.32)	0.48	0.636
Self-Esteem	5.00 (2.30)	5.27 (2.35)	0.64	0.528
Happy	5.45 (2.16)	5.64 (2.04)	0.48	0.635
Life Satisfaction	4.05 (1.72)	4.12 (1.73)	0.22	0.823



Abstinence Self-Efficacy Indicator	8.37 (1.63)	8.44 (1.51)	0.23	0.823
Primary Substance Symptoms	8.98 (2.57)	9.00 (2.54)	0.05	0.962

Bold denotes p < .10

In the multivariate model shown in Table A.5.2, education was a significant predictor of dropout whereby individuals who completed the study were more likely to have attended some college (75.48%) compared to individuals who dropped out of the study (56.86%). Additionally, individuals who listed their primary substance as "other" (i.e., not alcohol) were more likely to drop out of the study (31.27%) compared to those who completed the study (15.48%). As such, these predictors were retained for all subsequent analyses.

TABLE A.5.2. MULTIVARIATE LOGISTIC REGRESSION PREDICTING DROPOUT

	Odds Ratio	B	Std Error	Z	p
Baseline ADSES	1.01	0.01	0.01	1.42	0.156
Primary Substance: Alcohol vs. Other	**2.62**	**0.96**	**0.46**	**2.09**	**0.036**
Age	0.98	-0.02	0.02	-1.04	0.300
Education: Less than or equal to High School vs. Some College or More	**0.34**	**-1.08**	**0.51**	**-2.10**	**0.036**

Bold denotes p < .10

A.5.3. GENERALIZED ESTIMATING EQUATION (GEE) MODELS TESTING FOR THE EFFECTS OF GROUP CONDITION OVER TIME ON CLINICAL, PUBLIC HEALTH, FUNCTIONING, QUALITY OF LIFE, AND WELL-BEING OUTCOMES

Beginning with Table A.5.5, a number of GEE models are reported focusing on PDA, percent heavy drinking days (i.e., the percentage of days in each follow up period on which participants reported consuming 4 or more standard drinks for a woman, or 5 or more for man in any given day), percentage of days intoxicated (i.e., "drunk / high for most of the day"), substance use consequences, remission status, psychological distress, quality of life, happiness, self-esteem, recovery capital, and employment status.

As noted in the Analysis Plan section above, models were tested which statistically controlled for predictors of study dropout (i.e., education level, primary substance; as discussed above). Further, we screened for and controlled for any other baseline predictors of the specific outcome variable being tested. Similar to the process for screening for predictors of dropout, we first ran a series of univariate



models to determine if there were any differences in outcomes along a variety of factors including demographic (e.g., age, gender, race, ethnicity), psychosocial (quality of life, happiness, life satisfaction) and clinical variables (e.g., primary substance, primary substance symptoms, psychological distress). We retained any predictors with p > .10 in order to provide a more conservative estimate of any variable that might need to be controlled for in subsequent models. The remaining variables were added to a multivariate model predicting outcomes.

To address any potential multicollinearity among predictors, we ran Pearson r correlation matrices among the specific predictors identified in the multivariate model. Specifically, any intercorrelations between any two included variables that exceeded r >= .60 were investigated. If such an intercorrelation was observed between two variables of that magnitude or greater, to be conservative, we included only the variable of the two that had the strongest univariate relationship to the specific outcome variable being tested in that model.

Relatedly, if we observed more than 4 predictors at a given step in model building (i.e., either dropout or other predictors of outcomes), we generate a propensity score. A propensity score is a predicted score and single numerical value representing the combined effects of a series of variables on a given outcome. This value can be used in a regression model in lieu of a series of separate individual variables thus preserving statistical power.

To determine if there was a significant change in outcome variables over time, we tested a series of different statistical model. First, we tested a statistically unadjusted model controlling for time only, which we designated as “Model 0”. We then tested a model that adjusted additionally for predictors of study dropout which we designated as “Model 1”. Finally, we tested a model that statistically adjusted additionally for any other baseline predictors of that model dependent variable, which we designated as, “Model 2”. This incremental model building approach, showing parameter estimate and statistical significance changes from Model 0 to Model 1 and subsequently to Model 2, was done to show the unadjusted effect of time on the outcome as well as detail how inclusion of each set of these control variables affected the estimate of Retreat Program participation effectiveness (i.e., time).

At this exploratory stage of investigation where avoiding Type II error is of greater importance than avoiding Type I error, we describe findings if significant at the Type I error rate of <0.10.

Given the small cell sizes for comparisons and subsequent low power, we elected not to run any formal statistical tests exploring these interactions. However, these graphs were nonetheless generated to reveal any potential moderating factor that might be worthy of investigation in subsequent research.

TABLE A.5.4. INTERACTION VARIABLE CELL SIZES

Variable	Response Option	% (N)
Age		

	Young	13.59% (28)
	Old	74.27% (153)
	Missing	12.13% (25)
Gender		
	Female	28.15% (58)
	Male	64.07% (132)
	Other / Missing	7.76% (16)
Primary Substance		
	Alcohol	80.58% (166)
	Other	19.42% (40)
Family Participation in Retreat		
	Participating	29.13% (60)
	Not Participating	38.35% (79)
	Missing	32.52% (67)
Family Support		
	Support	24.27% (50)
	No Support	43.20% (89)
	Missing	32.53% (67)
Improved Family Relationships		
	Improvement	24.76% (51)
	No Improvement	42.72% (88)
	Missing	32.52% (67)

Interactions for age, gender, and primary substance were based upon values obtained at baseline. As family involvement variables were not collected at baseline but were rather collected at 3-month, 6-month, and 12-month follow ups, we evaluated changes in the trajectory of outcomes based upon observations in variables at the 3-month follow up.

TABLE A.5.5. EFFECT OF RETREAT PROGRAM PARTICIPATION ON PERCENTAGE DAYS ABSTINENT FROM ALCOHOL ACROSS TIME

	Model 0				Model 1				Model 2	
	B	SE	Z	p	B	SE	Z	p	B	SE
Time	**15.61**	**0.79**	**19.67**	**<.001**	**15.80**	**0.90**	**17.61**	**<.001**	**15.90**	**0.8**
Education: Less than or equal to High School vs. Some College or More					**7.78**	**3.38**	**2.30**	**0.021**	**7.65**	**3.1**
Primary Substance: Alcohol vs. Other					**10.43**	**2.43**	**4.30**	**<.001**	**10.37**	**2.3**
Employed									**-4.78**	**2.0**
Baseline SUD Symptoms									-0.39	0.4

Bold denotes p < .10

TABLE A.5.6. EFFECT OF RETREAT PROGRAM PARTICIPATION ON 100% ABSTINENCE FROM ALCOHOL ACROSS TIME

	Model 0				Model 1				Model 2	
	B	SE	Z	p	B	SE	Z	p	B	SE
Time	**1.21**	**0.12**	**10.39**	**<.001**	**1.21**	**0.12**	**10.11**	**<.001**	**1.27**	**0.1**
Education: Less than or equal to High School vs. Some College or More					-0.41	0.31	-1.32	0.188	-0.18	0.2
Primary Substance: Alcohol vs. Other					**0.70**	**0.27**	**2.56**	**0.010**	**0.65**	**0.2**
Baseline Adverse Childhood Events									**0.10**	**0.0**
Baseline Substance Use Consequences									**-0.03**	**0.0**

Bold denotes p < .10

TABLE A.5.7. EFFECT OF RETREAT PROGRAM PARTICIPATION ON PERCENT HEAVY DRINKING DAYS ACROSS TIME

	Model 0				Model 1				Model 2			
	B	SE	Z	P	B	SE	Z	P	B	SE	Z	P
Time	**-15.13**	**0.81**	**-18.59**	**<.001**	**-15.37**	**0.94**	**-16.38**	**<.001**	**-15.09**	**0.94**	**-16.03**	**<.001**
Education: Less than or equal to High School vs. Some College or More					**-8.90**	**3.32**	**-2.68**	**0.007**	**-6.22**	**3.32**	**-1.88**	**0.061**
Primary Substance: Alcohol vs. Other					**-12.39**	**2.39**	**-5.17**	**<.001**	**-14.03**	**2.14**	**-6.56**	**<.001**
Race: White vs. Other									**-9.01**	**3.57**	**-2.52**	**0.012**
Baseline Cravings (padcs)									**3.73**	**0.64**	**5.83**	**<.001**

Bold denotes p < .10

TABLE A.5.8. EFFECT OF RETREAT PROGRAM PARTICIPATION ON PERCENT DAYS DRUNK / HIGH ACROSS TIME

	Model				Model 1				Model 2
	B	SE	Z	p	B	SE	Z	p	B
Time	**-15.05**	**0.90**	**-16.63**	**<.001**	**-14.43**	**1.03**	**-14.01**	**<.001**	**-14.68**
Education: Less than or equal to High School vs. Some College or More					**-14.26**	**2.87**	**-4.96**	**<.001**	**-12.09**
Primary Substance: Alcohol vs. Other					**14.59**	**4.59**	**3.18**	**0.001**	**12.78**
Propensity Score									**0.86**

Propensity score is the predicted percent days drunk /high based upon age, gender, baseline mental health interferences days, baseline substance use consequences, baseline cravings (padcs), and baseline primary substance symptoms



Bold denotes p < .10

TABLE A.5.9. EFFECT OF RETREAT PROGRAM PARTICIPATION ON SUBSTANCE USE CONSEQUENCES ACROSS TIME

	Model 0				Model 1				Model 2
	B	SE	Z	p	B	SE	Z	p	B
Time	**-8.74**	**0.41**	**-21.34**	**<.001**	**-8.97**	**0.45**	**-20.04**	**<.001**	**-9.11**
Education: Less than or equal to High School vs. Some College or More					0.99	2.20	0.45	0.653	0.28
Primary Substance: Alcohol vs. Other					-0.78	1.85	-0.42	0.673	0.26
Baseline SUD Symptoms									**1.12**

Bold denotes p < .10

TABLE A.5.10. EFFECT OF RETREAT PROGRAM PARTICIPATION ON REMISSION ACROSS TIME

	Model 0				Model 1				Model 2
	B	SE	Z	p	B	SE	Z	p	B
Time	**1.39**	**0.13**	**10.41**	**<.001**	**1.41**	**0.14**	**9.94**	**<.001**	**1.47**
Education: Less than or equal to High School vs. Some College or More					0.32	0.36	0.88	0.378	**0.61**
Primary Substance: Alcohol vs. Other					0.15	0.36	0.42	0.675	-0.23
Ethnicity: Hispanic vs. Non-Hispanic									**-0.83**
Baseline Adverse Childhood Events									**0.14**
Baseline SUD Symptoms									**-0.18**

Bold denotes p < .10

TABLE A.5.11. EFFECT OF RETREAT PROGRAM PARTICIPATION ON QUALITY OF LIFE ACROSS TIME

	Model 0				Model 1				Model 2			
	B	SE	Z	p	B	SE	Z	p	B	SE	Z	p
Time	**1.27**	**0.19**	**6.58**	**<.001**	**1.24**	**0.21**	**5.94**	**<.001**	**1.32**	**0.22**	**6.04**	**<.001**
Education: High School vs. College					0.56	1.26	0.44	0.657	1.39	1.03	1.35	0.177
Primary Substance: Alcohol vs. Other					**-2.7**	**1.09**	**-2.48**	**0.013**	**-1.89**	**0.95**	**-1.98**	**0.047**
Propensity Score									**1.56**	**0.13**	**11.84**	**<.001**

Propensity Score is the predicted quality of life score based upon gender, baseline number of days pain interferes with functioning, baseline substance use consequences, baseline impulsivity, baseline drinking goal, baseline life satisfaction
Bold denotes p < .10

TABLE A.5.12. EFFECT OF RETREAT PROGRAM PARTICIPATION ON HAPPINESS ACROSS TIME

	Model 0				Model 1				Model 2			
	B	SE	Z	p	B	SE	Z	p	B	SE	Z	p
Time	**0.50**	**0.06**	**7.98**	**<.001**	**0.48**	**0.07**	**7.24**	**<.001**	**0.47**	**0.07**	**6.88**	**<.001**
Education: Less than or equal to High School vs. Some College or More					**-0.69**	**0.40**	**-1.70**	**0.089**	**-0.39**	**0.24**	**-1.65**	**0.099**
Primary Substance: Alcohol vs. Other					-0.51	0.39	-1.30	0.193	-0.24	0.29	-0.84	0.403
Propensity Score									**1.22**	**0.11**	**11.35**	**<.001**

Propensity Score is the predicted level of happiness based upon gender, baseline number of days bothered by pain, baseline impulsivity, baseline cravings (tps) and baseline life satisfaction.
Bold denotes p < .10

TABLE A.5.13. EFFECT OF RETREAT PROGRAM PARTICIPATION ON SELF-ESTEEM ACROSS TIME

	Model 0				Model 1				Model 2	
	B	SE	Z	p	B	SE	Z	p	B	SE
Time	**0.55**	**0.06**	**8.57**	**<.001**	**0.55**	**0.07**	**7.90**	**<.001**	**0.54**	**0.**
Education: Less than or equal to High School vs. Some College or More					-0.47	0.46	-1.02	0.306	0.17	0.
Primary Substance: Alcohol vs. Other					-0.49	0.43	-1.14	0.255	0.02	0.
Propensity Score									**1.37**	**0.**

Propensity score is the predicted level of self-esteem based upon baseline recovery definition, baseline craving (tps), baseline happiness, and lifetime diagnosis of a mental health condition.
Bold denotes p < .10

TABLE A.5.14. EFFECT OF RETREAT PROGRAM PARTICIPATION ON RECOVERY CAPITAL ACROSS TIME

	Model 0				Model 1				Model 2			
	B	SE	Z	p	B	SE	Z	p	B	SE	Z	p
Time (linear)	**4.23**	**1.21**	**3.49**	**<.001**	**4.79**	**1.25**	**3.83**	**<.001**	**4.72**	**1.26**	**3.75**	**<.001**
Time (quadratic)	**-0.76**	**0.25**	**-3.04**	**0.002**	**-0.90**	**0.26**	**-3.39**	**0.001**	**-0.88**	**0.27**	**-3.29**	**0.001**
Education: Less than or equal to High School vs. Some College or More					-2.00	1.32	-1.51	0.130	-0.86	1.00	-0.86	0.389
Primary Substance: Alcohol vs. Other					-1.27	1.44	-0.89	0.375	-0.25	1.19	-0.21	0.836
Propensity Score									**0.91**	**0.08**	**11.87**	**<.001**

Propensity score is the predicted level of recovery capital based upon relationship status, baseline emotional support, baseline number of days bothered by mental health, baseline recovery status, baseline psychological well-being, baseline drinking goal, baseline happiness.
Bold denotes p < .10

TABLE A.5.15. EFFECT OF RETREAT PROGRAM PARTICIPATION ON EMPLOYMENT ACROSS TIME

	Model 0				Model 1				Model 2			
	B	SE	Z	p	B	SE	Z	p	B	SE	Z	p
Time	**0.44**	**0.24**	**1.82**	**0.069**	**0.71**	**0.28**	**2.55**	**0.011**	**0.96**	**0.33**	**2.94**	**0.003**
Education: Less than or equal to High School vs. Some College or More					0.02	0.46	0.04	0.970	0.27	0.51	0.53	0.599
Primary Substance: Alcohol vs. Other					0.05	0.40	0.14	0.892	-0.63	0.48	-1.31	0.191
Age									**-0.08**	**0.01**	**-5.48**	**<.001**
Baseline Cravings (padcs)									**0.19**	**0.1**	**1.61**	**0.10**

			2	**8**

Bold denotes p < .10

TABLE A.5.16. EFFECT OF RETREAT PROGRAM PARTICIPATION ON PSYCHOLOGICAL DISTRESS ACROSS TIME

	Model 0				Model 1				Model 2			
	B	SE	Z	p	B	SE	Z	p	B	SE	Z	p
Time	**-1.71**	**0.18**	**-9.69**	**<.001**	**-1.68**	**0.19**	**-8.62**	**<.001**	**-1.68**	**0.20**	**-8.34**	**<.001**
Education: Less than or equal to High School vs. Some College or More					-1.01	0.99	-1.02	0.308	**-1.75**	**0.70**	**-2.51**	**0.012**
Primary Sub-stance: Alcohol vs. Other					1.32	0.96	1.37	0.170	0.52	0.70	0.75	0.454
Propensity Score									**1.16**	**0.09**	**13.41**	**<.001**


RECOVERY
RESEARCH
INSTITUTE
RECOVERYANSWERS.ORG
VE
RI
TAS