

Nature Informed Therapy Evaluation Report

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Abstract: Evaluation of Integrating Nature Informed Therapy into SUD Treatment

Background and Purpose

The following report outlines an evaluation aimed at examining the effect of integrating Nature Informed Therapy (NIT) within substance use disorder treatment settings. Substance use disorders (SUDs) are associated with impaired functioning creating a significant burden for the affected individuals, families, and communities (Daley, 2013). Despite the high prevalence rates as well as impact on functioning, only about 10 percent of people with a SUD will receive specialized treatment (Surgeon General's Report, n.d.). This makes it essential for those who do seek and receive treatment to be offered holistic care that integrates evidence-based interventions to improve treatment outcomes. According to existing research, NIT potentially intervenes at multiple levels of contributing factors for SUDs by restoring a healthy relationship with nature, self, and others as well as decreasing risk for psychological disorders leading to improvements in mental health and well-being (CNIT, n.d.).

Methods

Upon admission to the facility, clients completed a biopsychosocial assessment which established the substance use disorder diagnosis confirming eligibility to receive residential treatment services and participate in the intervention. A one-group retrospective post-then-pre questionnaire was then administered to any participant that successfully completed at least 75% of the 4-week, nature informed curriculum within the residential level of care. The printed questionnaire assessed changes in six key outcomes including increased attention, decreased stress and anxiety, increased sense of self-efficacy, improved mood, increased prosocial behavior, and connection to nature.

Results

Results from the evaluation indicate measurable increases in each of the six outcomes. A Paired Sample t-Test was used to determine the two tailed p-value (< 0.01) indicating a statistically large difference between the pre-test and posttest data. Additionally, the standardized mean difference reported as Cohen's d (1.88) indicated a very large effect size in the pre-post differences for participants.

Conclusions and Implications

The research provided valuable insight into understanding the effectiveness of integrating Nature Informed Therapy into substance use disorder treatment. The results of the evaluation are consistent with existing research which supports the physical and psychological benefits of incorporating a relational model with nature in conjunction with other therapy approaches. However, the study did lack rigor as there were several threats to validity present including utilizing self-reported measures as well as lack of a control group, pre-measure, and random assignment of participants. In light of these limitations, it is necessary to consider overestimation of the program effects when determining if modifications are needed to support positive outcomes within the specific clinical setting.

Introduction

For this evaluation project, the agency of focus is a residential treatment facility, BriteLife Recovery, with a target population of individuals seeking alcohol and substance use disorder treatment at their Hilton Head, South Carolina location. A program-level evaluation was conducted of the agency's newly implemented Nature Informed Therapy program in order to assess the effectiveness of the intervention and improve service delivery. For the evaluation project, the nature informed intervention was offered three times per week as hour-long sessions over the client's 4-week residential treatment stay. The curriculum consisted of trauma-informed and mindfulness-based nature exercises that emphasize a non-judgmental therapeutic setting, expand limiting self-perception, support the process of self-discovery, and provide an experience of interconnectedness (Naor & Mayselless, 2021). The following evaluation report outlines a detailed description of the problem being addressed and intervention under evaluation as well as methods, results, and implications of the evaluation.

Literature Review

The following section provides a definition of the problem being addressed, prevalence and impact of the problem, demographics of the affected population, and synthesizes professional literature on best practices to address the problem.

Problem Identification

Our country is experiencing a significant substance use and overdose epidemic with rates more than doubling over the past few years (Hermans et al., 2022). The recent surge is partly attributed to the disruption in daily life, including isolation and stress, related to the COVID-19 pandemic (Chacon et al., 2021). The national prevalence rate for alcohol use disorder is 29.5 million people and 24 million people who classified as having a substance use disorder totaling

46.3 million people, or 16.5% of the population, aged 12 or older (SAMHSA, 2021). From the percentage of people with substance use disorder, rates were highest among young adults ages 18-25 accounting for 25.6% or 8.6 million people, followed by adults aged 26 or older (16.1% or 35.5 million people) (SAMHSA, 2021). For unintentional overdose deaths, Non-Hispanic American Indian or Alaska Native populations had the highest rates followed by Non-Hispanic Black and Non-Hispanic White populations (CDC, 2024). According to the Beaufort County Alcohol and Drug Abuse Department, the highest concentration of alcohol and substance use disorder admissions within the county where the agency is located are between the ages of 29 to 38 (2021). Despite the high prevalence rates of substance use disorder and their impact on society, only about 10 percent of people will receive specialized treatment due to lack of access to affordable care as well as stigma resulting in fear of negative consequences (Surgeon General's Report, n.d.). This makes it essential for those who do seek and receive treatment to be offered holistic care that integrates evidence-based interventions to improve treatment outcomes.

Impact of the Problem

Substance use disorders are associated with impaired functioning at the physical, psychological, and spiritual levels creating a significant burden for the affected individuals, families, and communities (Daley, 2013). For the individual, substance use impairs social functioning and contributes to medical and psychiatric conditions as well as leads to economic difficulties and legal issues (Daley, 2013). For family members and children of individuals with substance use disorder, there are often unmet developmental needs, impaired attachment, emotional distress, and a higher risk of developing their own substance use issues later in life (Lander et al., 2013). For society at large, substance misuse contributes to an annual economic burden of \$249 billion for alcohol misuse and \$193 billion for drug use impacting public health

agencies, the criminal justice system, and community resources (HHS, 2023). Therefore, access to effective interventions and improving treatment outcomes are essential to reducing criminal justice involvement and strain on social systems due to increased unemployment, homelessness, food instability, and unmet need for mental health services.

Evidence Based Practices

The agency currently integrates evidence-based practices such as individual counseling, group and family therapy, mindfulness-based interventions, medication assisted treatment, and cognitive-behavioral approaches to treat both substance use and co-occurring mental health disorders (BriteLife, n.d.).

Cognitive Behavioral Group Therapy

Multiple studies suggest that integrating cognitive behavioral therapy to simultaneously treat substance use disorder and co-occurring mental health disorders greatly improves treatment outcomes (Hien et al., 2009). Research has also documented a high level of comorbidity with substance use disorder and posttraumatic stress disorder due to substance use increasing the risk of exposure to traumatic events and inhibiting coping mechanisms when traumatic stressors occur as well as shared vulnerability between both disorders (Haller & Chassin, 2014). Additionally, there are shared risk factors in the development of both disorders including lack of social support, diminished self-efficacy, and lack of access to quality mental health care and treatment (NIDA, 2020).

One approach to incorporating group cognitive behavioral therapy that the agency utilizes is the Seeking Safety curriculum which outlines a variety of cognitive, behavioral, and interpersonal domains to address safe coping skills relevant to both post-traumatic stress and substance use disorders (Najavits, 2003). Incorporating the Seeking Safety content has shown

positive outcomes compared to solely treating substance use disorder and supports relapse prevention efforts (Hien et al., 2009). As such, multiple studies have shown significant improvements in substance use and associated problems when integrating Seeking Safety curriculum (Najavits et al., 2006).

Mindfulness-Based Interventions

Another program currently being utilized at the agency is mindfulness-based interventions (MBI) which have been shown to reduce relapse, lower cravings, improve mood, and support treatment retention (Bautista et al., 2019). In contrast to cognitive behavioral approaches, MBIs focus is on cultivating a non-judgmental awareness that supports self-regulation processes and moderates the stress response (Bautista et al., 2019). This helps participants increase awareness of their experiences in the present moment, learn to respond to situations instead of reacting to emotions, and increases self-control (Bautista et al., 2019). MBIs further support relapse prevention by helping participants understand the passing nature of craving and develop strategies to reduce impulsivity and stress reactivity (Bautista et al., 2019).

According to the theoretical rationale that supports integrating MBIs, cultivating mindfulness weakens substance use relapse cycles that are spurred by attempts to avoid unwanted cognitive and emotional states (Black & Amaro, 2019). Through mindfulness skills, self-regulation is improved which further reduces the impulsivity to leave treatment and return to use (Black & Amaro, 2019). In one study, outcomes were measured based on retention rates for residential substance use disorder treatment as well as showing increases in psychological flexibility and reduction of craving (Black & Amaro, 2019). The study showed clinically significant improvement in treatment retention which is predictive of better treatment outcomes and lower relapse rates (Black & Amaro, 2019).

Medication Assisted Treatment

Next, medication for substance use disorder, which suppresses and reduces cravings, is another intervention currently being utilized at the agency. Medications especially those for opioid use disorder are considered highly effective in decreasing mortality, increasing treatment adherence, and reducing use (Kumar et al., 2021). One study in particular contrasted the effectiveness of opioid agonist treatment compared to various psychosocial therapies (Rice et al., 2020). From a retention perspective, rewards-based intervention such as contingency management, alone or combined with counseling or a community reinforcement approach, was most effective and was significantly more effective than opioid agonist treatment alone (Rice et al., 2020).

In another systematic review, the most common outcomes being measured were linked to treatment post-detoxification, frequency of use during the follow-up period, and first use post-discharge (Ameral et al., 2022). According to the study, medications for substance use disorder should be introduced early in the treatment process and combined with other psychosocial interventions for the best outcomes (Ameral et al., 2022). These findings are supported across multiple systematic reviews with the addition of incorporating support from social networks and mutual help programs (Kumar et al., 2021).

Nature Informed Therapy

Nature Informed Therapy is an intervention that integrates the healing components of nature with other evidence-based treatment models (CNIT, n.d.). The intervention seeks to improve mental health and well-being through restoring a healthy relationship with nature, self, and others (CNIT, n.d.). This connection is explored by integrating therapeutic modalities like CBT and DBT with nature interactions such as hiking, mindfulness, and nature art therapy

(CNIT, n.d.). The intervention is intended to reduce anxiety, stress, PTSD, and grief as well as improve well-being and life satisfaction (CNIT, n.d.). The fully immersive nature experience is supported by research that demonstrates that connection to nature has both physical and psychological benefits including increased attention, decreased stress, improved mood, decreased risk for psychological disorders, and increased empathy (Naor & Mayseless, 2021).

There is extensive research which supports the benefits of incorporating nature-based interventions including the biophilia hypothesis which proposes that humans have an innate drive to connect with nature, the stress reduction hypothesis suggesting that nature produces a physiological response that lowers stress, and the attention restoration theory which states being in nature replenishes cognitive resources (Naor & Mayseless, 2021). Supported by these theories, specific adaptive emotional and cognitive responses to nature were identified which support psychological well-being as well as reduction in stress and anxiety that may be particularly beneficial when integrated into treatment settings for substance use (Naor & Mayseless, 2021).

The restorative effects of nature at the physical, mental, and spiritual level are further supported by a range of systematic reviews which include positive physiological effects such as decreased heart rate and blood pressure and improvement in neurological conditions as well as reduction in confusion, anger, and depression (Cooley et al., 2020). The evidence suggests that these benefits as well as optimal well-being may be achieved with nature exposure of at least two hours or more per week (Cooley et al., 2020). These restorative benefits may be particularly beneficial to help individuals in treatment for SUDs mitigate the physical and psychological symptoms that accompany post-acute withdrawal syndrome, such as cognitive deficiencies, irritability, depression, anger, sleep disturbances, and anxiety (Bahji et al., 2022).

Lastly, a recent case study found that NIT can be both restorative and preventative for individuals that have experienced trauma by promoting healing, reducing stress, regulating the nervous system, and improving sleep (Fisher, 2023). This is integral with the target population as research has documented a high level of comorbidity of individuals with substance use disorder having a lifetime prevalence of posttraumatic stress disorder ranging from 14 to 60 percent (Vujanovic et al., 2016). Furthermore, individuals with both disorders have been linked to poor outcomes including higher rates of relapse and lower functioning (Flanagan et al., 2016). Therefore, the nature therapy model which integrates a relational and mindful approach assists clients in learning coping skills and grounding techniques to regulate their nervous system as well as connect with themselves and others supporting positive treatment outcomes (Fisher, 2023).

Intervention Evaluation

The following section provides a description of the intervention being evaluated including intervention context and setting, goal and desired outcomes, client eligibility to participate in program, implementation details, and review of the logic model.

Intervention Setting

The agency is a residential substance use disorder treatment program, BriteLife Recovery, with locations in Hilton Head, South Carolina and Hanover, Pennsylvania. The Hilton Head facility where the evaluation was conducted consists of two programs at separate locations which offer a 34-bed, men's program and a 16-bed, women's program for detox and residential services. The agency prioritizes an individualized and evidence-based approach by integrating individual counseling, group and family therapy, and cognitive-behavioral approaches to treat both substance use and co-occurring mental health disorders. Additionally, holistic therapies are

fully integrated into the treatment model including yoga, mindfulness, meditation, acupuncture, and art therapy in order to promote overall well-being. The agency also recently integrated Nature Informed Therapy into its offerings that is being delivered by the evaluator on a weekly basis to clients at both the men's and women's programs at the South Carolina location. In order to provide the intervention, the evaluator attended training in order to become a Certified Nature Informed Therapist.

Goal & Desired Outcomes

Based on research that supports the physical and psychological benefits of incorporating a relational model with nature in conjunction with other therapy approaches, the evaluation questions focus on six key outcomes including 1) increased attention, 2) decreased stress and anxiety, 3) increased sense of self-efficacy, 4) improved mood, 5) increased prosocial behavior, and 6) connection to nature (Naor & Mayseless, 2021). The above outcomes were selected due to the direct correlation with the risk and protective factors for substance use disorder. According to existing evidence-based research, NIT potentially intervenes at multiple levels of contributing factors for substance use disorder while increasing protective factors such as coping skills, social functioning, prosocial behavior, and resources for mental health support (NIDA, 2020). Therefore, it is anticipated that the integration of NIT will lead to a long-term impact of increased engagement and treatment retention as well as improved outcomes and reduced relapse rates. As this is a new program at the agency, the evaluation will be integral to determine if participants are achieving the desired outcomes or if modifications are needed to make the program more effective.

Client Eligibility & Service Components

Nature Informed Therapy was offered three times per week as hour-long, sessions to all clients during their 4-week residential treatment stay. The curriculum consisted of trauma-informed and mindfulness-based nature exercises that emphasize a non-judgmental therapeutic setting, expand limiting self-perception, support the process of self-discovery, and provide an experience of expansiveness and interconnectedness (Naor & Maysless, 2021). Given the organization, randomization was not feasible; therefore all clients within the residential level of care at BriteLife's Hilton Head location were included in the evaluation. Upon admission to the facility, clients completed a biopsychosocial assessment which established the substance use disorder diagnosis confirming eligibility to receive residential treatment services and participate in the intervention.

Logic Model

Per the logic model (see Appendix A), inputs for this program included funding to train clinicians as Certified Nature Informed Therapists prior to offering the intervention. The nature informed philosophy and curriculum was then integrated into the treatment center. The mindfulness-based intervention is delivered to clients in a 4-week, rotating format. Some of the group therapy sessions are offered off-site in nature settings which require transportation for clients while others are offered indoors with nature elements integrated into the session. The immediate, short-term outcomes are an increase in knowledge of coping skills, benefits of mindfulness, benefits of engaging in nature, and attitudes surrounding sense of self. This leads to medium outcomes of improved mood, increase in connection to self, others, and nature, improved attention and mental clarity, and improvements in prosocial behavior as well as the ability to self-regulate which reduces impulsivity and improves problem solving skills. Therefore, the long-term impact is hypothesized to be improved treatment engagement and

retention as well as improved outcomes such as lower relapse rates and improved sense of overall well-being.

Methods

The following section describes the research methods including evaluation design, sampling, measurement, and data collection.

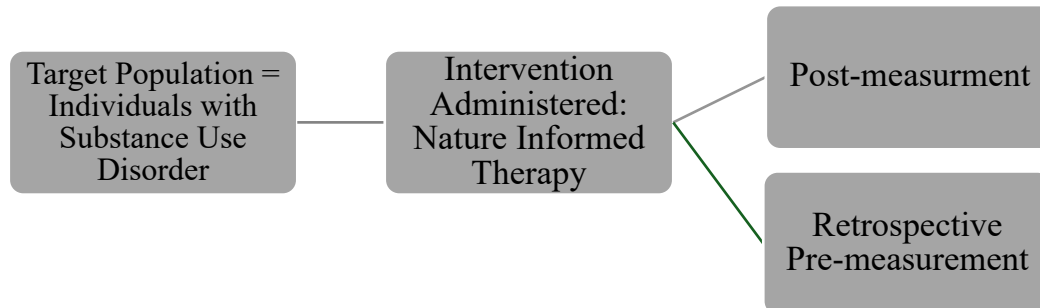
Evaluation Design & Sampling

For this project, a retrospective post-then-pre questionnaire was developed to evaluate the appropriateness and effectiveness of integrating NIT within treatment settings for substance use disorder. The retrospective post-then-pre questionnaire was administered to any participant that successfully completed at least 75% of the 4-week, nature informed curriculum within the residential level of care. The data was collected using a printed survey and administered by the evaluator to the client prior to discharge from the facility. The retrospective post-then-pre approach assessed changes in knowledge, awareness, skills, confidence, attitudes or behaviors at the end of the intervention by asking participants to self-report changes from after and before participation (UW-Madison, 2021). This approach helped to control for response shift bias which occurs when a participant uses a different frame of understanding about a question between the pre and post periods (UW-Madison, 2021). Additionally, the retrospective method may be particularly beneficial for individuals in early recovery from substance use disorders as clients tend to gain a more accurate perspective of their areas of deficiencies as the treatment process progresses. One limitation of the retrospective design may be difficulty in recalling requested information from the pre-intervention period. However, given the target population, cognitive deficits and memory function should actually improve as acute and post-acute withdrawal symptoms begin to subside (Goldman, 1995). The retrospective design was also selected in order

to simplify the collection process due to staffing and time constraints of the initial evaluation period.

Figure 1

One Group Retrospective Post then Pre Design



Measurement & Data Collection

As a new standardized measure was developed, it is important to properly evaluate the consistency and accuracy of the data collected. In an effort to support dependable results, several questions were included for each of the six key outcomes being measured which include increased attention, decreased stress and anxiety, increased sense of self-efficacy, improved mood, increased prosocial behavior, and connection to nature. For instance, when determining the intervention's impact on increased attention, questions include ability to pay attention and feeling mentally alert. When assessing decreased stress and anxiety, there are questions related to ability to manage stress, regulate emotions, and navigate unexpected situations. For self-efficacy, multiple questions are incorporated related to this component including ability to learn from previous experiences and use coping skills as well as belief in ability to accomplish goals. Questions related to the desired outcome to increase mood include ability to experience gratitude, connect with self, and have a positive self-image. When measuring prosocial behavior,

there are several items that correlate to this concept such as the ability to express feelings and thoughts clearly, have positive relationships, communicate boundaries, and experience empathy. And, finally, for nature connectedness, questions include having positive experiences in nature as well as ability to connect and feelings of awe in nature. Each of these areas are rated using the following response format 1) rarely or not at all, 2) small portion of the time, 3) some of the time, 4) considerable amount of the time, and 5) most or all of the time.

Originally, there was discussion regarding the evaluation questionnaire being input into the organization's existing medical records system so the client's primary therapist could administer the NIT survey as part of the assessment process prior to discharge. However, this process was unable to be completed within the time constraints of the evaluation project. Therefore, data was collected using a printed survey with the sum of the scores used for data analysis to compare the post and pre intervention periods. The measurement survey is included in Appendix B for reference.

Measure Reliability & Validity

With any self-reported measure, there will likely be inconsistencies in measuring outcomes especially within substance use disorder treatment settings. This may in part be due to lack of overall functioning with participants that are in acute and post-acute withdrawal as well as participants that exhibit low motivation to change which may be in treatment due to court mandate or insistence of family members that may be reluctant to provide data. As such, there is potential to compare assessment data from the client's Brief Addiction Monitor (BAM) scores which could offer better reliability and validity of the information gathered in the Nature Informed Therapy questionnaire. If outcome information from the NIT questionnaire is similar, this will increase confidence that the data is reliable (Bean, 2023).

Results

This section describes the methods used to analyze outcome data as well as a presentation of the results.

Data Analysis

A one-group retrospective post-then-pre evaluation design was utilized for the evaluation. Per Appendix C, the data from the questionnaire was compiled and analyzed in Excel. First, the data was visually analyzed by creating a column graph using the sum of the scores from the post and pre periods. The visual analysis provided insight into whether there were changes from the pre-test to post-test periods after participation in the program. This allowed dynamic decisions to be made whether to modify or change the intervention as well as allowed the evaluator to share insights in supervision about treatment strategies (Bean, 2023). Then, effect size was determined by using the Paired Sample t-Test and standardized mean difference reported as Cohen's *d* to determine the practical and statistical significance in the pre-post differences for participants. This method was selected to determine effect size due to measuring the same client at two points in time; therefore, there was paired pre-post data for each individual in the program (Bean, 2023). Trends in data were brought to the clinical supervisor to review program activities and identify any modifications to program implementation that were necessary.

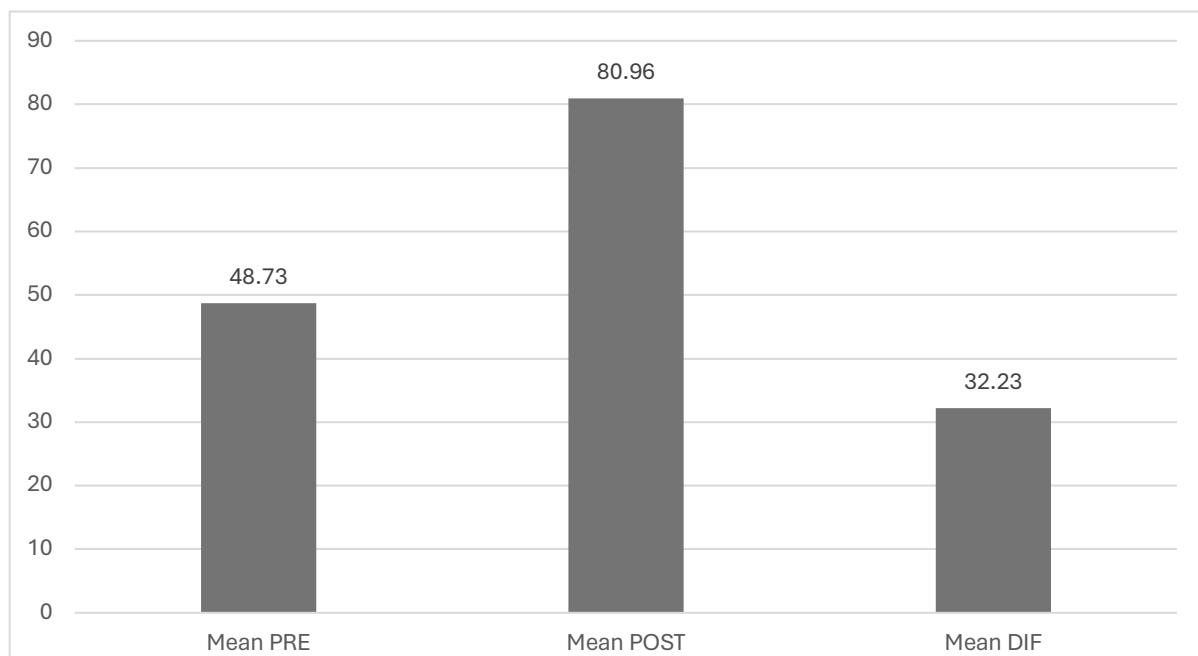
Visual Analysis

The mean difference was calculated using the difference between the mean post and pre scores identified in the data collected (see Appendix C). For the visual analysis, a column chart was used to compare the post and pre intervention periods with a mean pre-intervention score of 48.73, mean post-intervention score of 80.96, and mean difference of 32.23. After at least three weeks in the program, retrospective pretest-posttest comparisons (see Figure 2) indicated

improvements in the participant's beliefs, attitudes, and knowledge. Participants reported increase in knowledge of coping skills, understanding the benefits of mindfulness and engaging in nature, and improved attitudes surrounding sense of self. Additionally, participants indicated improved mood and self-regulation skills, increase in connection to self and others, improved attention and mental clarity, and improvements in prosocial behavior.

Figure 2

Column Graph Depicting Mean Difference for Integrating NIT for SUD Treatment



A visual analysis was then conducted based on separating out the mean difference for the six key outcomes being measured (see Table 1). This data was used to visually determine where the greatest amount of improvement was as these indicators have a direct correlation to risk and protective factors for SUDs as well as supporting successful treatment outcomes. Per Figure 3 below, you can see increase in each of the six outcomes measured with greater improvement in improved mood, prosocial behavior, self-efficacy, and decreased stress/anxiety.

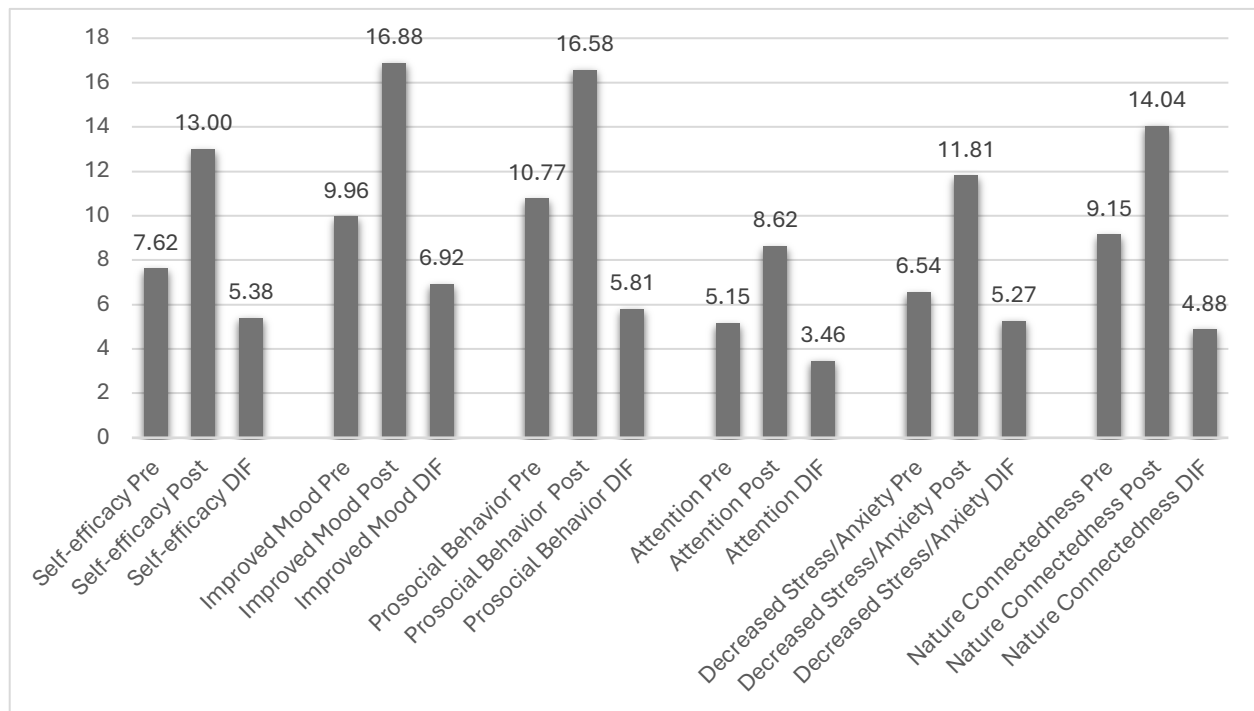
Table 1

Nature Informed Therapy Mean Difference for Key Outcomes

<i>Item</i>	<i>MEAN PRE</i>	<i>MEAN POST</i>	<i>MEAN DIF</i>
Self-efficacy	7.62	13.00	5.38
Improved Mood	9.96	16.88	6.92
Prosocial Behavior	10.77	16.58	5.81
Attention	5.15	8.62	3.46
Decreased Stress/Anxiety	6.54	11.81	5.27
Nature Connectedness	9.15	14.04	4.88

Figure 3

Column Graph Depicting Mean Difference for Key Outcomes Being Measured



Statistical Analysis

A Paired Sample t-Test was then used to compare mean scores on pre-test items assessed retrospectively to the corresponding posttest items for each program participant that completed at least three weeks of the NIT curriculum. Per Table 2 below, the two tailed p-value was calculated at < 0.01 indicating there is a statistically large difference between the pre-test and posttest data. Additionally, the standardized mean difference reported as Cohen's d was calculated at 1.88 indicating the practical significance of integrating NIT into substance use disorder treatment settings. Based on these calculations, the intervention produced both statistically and practically significant results in the pre-post differences for participants with the Cohen's d score indicating a very large effect size (see Table 2 & 3).

Table 2

t-Test: Paired Two Sample for Means

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	80.96	48.73
Variance	115.08	159.72
Observations	26.00	26.00
Pearson Correlation	-0.07	
Hypothesized Mean Difference	0.00	
df	25.00	
t Stat	9.57	
P(T<=t) one-tail	0.00000000039	
t Critical one-tail	1.71	
P(T<=t) two-tail	0.00000000077	
t Critical two-tail	2.06	

Table 3

Summary of Post-Pre Changes using a paired sample t-Test and standardized mean difference

P Value	0.00000000077
Effect Size (Cohen's d)	1.88

Discussion

The research provided valuable insight into understanding the effectiveness of integrating Nature Informed Therapy into substance use disorder treatment. The results of the evaluation are consistent with existing research which supports the physical and psychological benefits of incorporating a relational model with nature in conjunction with other therapy approaches. Based on the visual and statistical analysis, there were measurable increases in each of the six outcomes identified including improved mood and self-regulation skills, decreased stress and anxiety, increase in connection to self, others, and nature, improved attention and mental clarity, and improvements in prosocial behavior. Beyond the statistical and practical significance, the results were also clinically significant with the greatest observed improvements demonstrated in clients that actively engaged in group sessions as well as those that exhibited higher motivation for change.

The study adhered to ethical guidelines ensuring informed consent, confidentiality, and participant well-being. Despite the improvements in outcomes identified, it is important to acknowledge the study's limitations. The study does lack rigor as there were several threats to validity present including utilizing self-reported measures as well as lack of a control group and random assignment of participants. Due to the lack of control group and randomized assignment, it is difficult to eliminate alternative explanations for the observed differences (Bean, 2023). While the approach has reduced validity that is susceptible to bias, given the organization randomization is not feasible (Bean, 2023).

Another limitation as well as ethical consideration of the evaluation included the type of insurance the facility accepts which may also pose a threat to external validity as the facility is primarily self-pay and private insurance. This excludes economically disadvantaged as well as a

disproportionate rate of minority populations from the sampling. For instance, within Beaufort County, South Carolina where the facility is located, one of the top health problems was identified as lack of ability to afford quality care (BMH, 2022). Of the non-Hispanic residents surveyed, 45.21% reported no health insurance and 3.39% indicated that they are unable to pay for health care costs (BMH, 2022). In contrast, the Hispanic and Latino respondents disclosed that 66.67% lacked health insurance and 20.51% were unable to afford health care costs (BMH, 2022). This contributes to increased health disparities as Beaufort County where the agency is located has the third highest percentage (11.1%) of the population identifying as Hispanic or Latino within South Carolina (BMH, 2022).

Another limitation and threat to validity is the lack of measurement prior to the intervention which may reduce reliability of results as clients may have difficulty in retrospectively recalling information regarding their functioning from the pre-intervention period. Therefore, the study design does lack rigor in that there is room for potential bias and difficulty in inferring causal connections (Bean, 2023). And, finally, as NIT is provided as part of residential treatment programming, it's important to consider potential inconsistencies in measuring outcomes due in part to lack of overall functioning of participants that are in acute and post-acute withdrawal. Additionally, there may be participants that are in treatment due to court mandate or insistence of family members which may be reluctant to provide accurate data or have lower motivation for change. In light of these limitations, it necessary to consider overestimation of the program effects when determining if modifications are needed to support positive outcomes.

Results have already been shared with the clinical director in supervision. Based on outcomes, the curriculum will be modified into a two-hour, twice-weekly format at the facility

with plans to train additional clinicians to deliver the intervention. The final evaluation report will be shared with the founder of the Center of Nature Informed Therapy, Dr. Heidi Schreiber-Pan, and BriteLife's Chief Clinical Officer, Dr. Jennifer Richards, informing further research and guiding implementation best practices. The long-term contribution is anticipated to be improvements in treatment engagement and retention as well as improving relapse rates and overall health outcomes.

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Appendix A - Logic Model

Inputs	Outputs		Outcomes -- Impact		
	Activities	Outputs	Short	Medium	Long
Funding to train clinicians Clinicians trained as Certified Nature Informed Therapists Clients diagnosed with substance use disorder in residential level of care Access to nature supplies and settings to hold sessions Transport to outdoor locations Safety supplies	Integrate nature informed philosophy into facility Conduct nature-informed group therapy sessions Provide transportation to clients for outdoor sessions	Provide 60 minute, NIT sessions in a 4 week format Deliver nature-informed, mindfulness based curriculum to all clients in residential level of care	Increase knowledge of coping skills Increase knowledge about benefits of mindfulness Change attitudes and knowledge about substance use disorder Increase positive attitude about engaging in nature Improve attitude surrounding self and belief in ability to navigate situations	Improve mood Increase self-efficacy Increase connection to self, others, and nature Improve ability to regulate emotions Increase problem-solving skills Reduce stress and anxiety Improve ability to express thoughts and feelings clearly Increase attention and mental clarity Increase prosocial behavior	Improve treatment engagement and retention Reduce relapse rates Improve treatment outcomes Improve overall sense of well-being

Appendix B

Nature Informed Therapy Retrospective Post-then-Pre Assessment

The following survey is seeking to determine what positive effects participants feel they received by engaging in Nature Informed Therapy (NIT) services. You will do two ratings – 1. Rate how you feel each item relates to you after starting NIT services and then 2. Rate how you feel each item relates to you before participating in NIT services.

Participant: _____

- 1 = Rarely or Not at All**
- 2 = Small portion of the time**
- 3 = Some of the time**
- 4 = Considerable amount of the time**
- 5 = Most or all of the time**

	Items as they relate to <u>AFTER</u> completing the program					Items as they relate to <u>BEFORE</u> starting the program				
	1	2	3	4	5	1	2	3	4	5
Experiences positive moods										
Has confidence to navigate difficult situations										
Has positive relationships										
Has had positive experiences in nature										
Is able to regulate emotions										
Feels empathy or concern for others										
Has a positive self-image										
Has felt awe or wonder in nature										
Is able to use coping skills										
Expresses thoughts & feelings appropriately										

Appendix C

Nature Informed Therapy Retrospective Post-then-Pre Assessment Data

ID	GENDER	PRE	POST	DIF
<i>Cameron</i>	M	29	78	49
<i>Matthew</i>	M	49	75	26
<i>John C</i>	M	73	87	14
<i>Thomas</i>	M	59	69	10
<i>Michael</i>	M	32	69	37
<i>Chris</i>	M	27	81	54
<i>Justin</i>	M	34	95	61
<i>Dorian</i>	M	58	61	3
<i>Richard</i>	M	56	85	29
<i>Paul</i>	M	48	84	36
<i>Jefferson</i>	M	55	70	15
<i>Taylor</i>	M	37	95	58
<i>John A</i>	M	46	68	22
<i>Connor</i>	M	57	89	32
<i>James</i>	M	54	75	21
<i>Benjamin</i>	M	48	88	40
<i>Graham</i>	M	54	82	28
<i>Mark</i>	M	46	60	14

<i>Tammy</i>	F	26	95	69
<i>Lauren</i>	F	44	95	51
<i>Summer</i>	F	77	85	8
<i>Kathryn</i>	F	46	71	25
<i>Vicki</i>	F	48	85	37
<i>Sara</i>	F	57	90	33
<i>Caryn</i>	F	57	95	38
<i>Andrea</i>	F	50	78	28
MEAN		48.73	80.96	32.23

Note. This table demonstrates the sum of the scores from the post and pre periods collected using the Nature Informed Retrospective Post-then-Pre Assessment (appendix a). The self-reported questionnaire was administered as a printed survey to any client in the residential level of care that completed at least 75% of the 4-week NIT curriculum throughout February and March 2024.